# ANNUAL REPORT

## 2015-16

भारतीय प्रौद्योगिकी संस्थान खड़गपुर

INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

# Annual Report

## 2015 - 2016


Indian Institute of Technology
Kharagpur

*August, 2016*

# Contents

**PART– III**

***Statistical Information***



**PART– IV**

# Members of the Council of Indian Institutes of Technology

| S.No. | Name and Designation |
|---|---|
| 1. | Shri Prakash Javadekar,<br>Hon'ble Minister of Human Resource Development |
| 2. | Shri Mahindra Nath Pandey, Minister of State, H.R.D. |
| 3. | Shri Ninong Ering, Member of Parliament (Lok Sabha) |
| 4. | Dr. Pawan Goenka, Chairperson, BOG, IIT Madras |
| 5. | Shri Kumar Mangalam Birla, Chairperson, Board of Governors, IIT Delhi |
| 6. | Dr. Srikumar Banerjee, Chairperson, BOG IIT Kharagpur |
| 7. | Prof. Ashok Misra, Chairperson, Board of Governors, IIT Roorkee |
| 8. | Dr.Rajiv I.Modi, Chairperson, BOG, IIT Guwahati |
| 9. | Shri R.C. Bhargava, Chairperson, BOG, IIT Kanpur |
| 10. | Shri V.S. Oberoi, Secretary (HE), MHRD |
| 11. | Dr. B.V.R. Mohan Reddy, Chairperson, BOG, IIT Hyderabad |
| 12. | Mrs. Lila Poonawalla, Chairperson, Board of Governors, IIT Ropar |
| 13. | Prof. Girish Chandra Tripathi, Chairperson, BOG IIT (BHU),Varanasi |
| 14. | Prof. Devang V. Khakhar, Director, IIT Bombay |
| 15. | Prof. V. Ramgopal Rao, Director, IIT Delhi |
| 16. | Prof. Indranil Manna, Director, IIT Kanpur |
| 17. | Prof. Partha P.Chakrabarti, Director, IIT Kharagpur |
| 18. | Prof. Bhaskar Ramamurthi, Director, IIT Madras |
| 19. | Prof. Gautam Biswas, Director, IIT, Guwahati |
| 20. | Prof. Pradipta Banerji, Director, IIT Roorkee |
| 21. | Prof. Rajeev Sangal, Director IIT(BHU) Varanasi |
| 22. | Prof. C.V.R. Murty, Director, IIT, Jodhpur |
| 23. | Prof. Sudhir K. Jain, Director, IIT Gandhinagar |
| 24. | Prof. Pushpak Bhattyacharya, Director IIT Patna |
| 25. | Prof. U.B. Desai, Director, IIT Hyderabad |
| 26. | Prof. Sarit Kumar Das, Director, IIT Ropar |
| 27. | Prof. R.V. Rajakumar, Director, IIT Bhubaneswar |
| 28. | Prof. Timothy A. Gonsalves, Director, IIT Mandi |
| 29. | Prof. Pradeep Mathur, Director, IIT Indore |
| 30. | Prof. Anil D. Shahsrabudhe, Chairperson, AICTE |
| 31. | Prof. Ashok Jhunjhunwala, Deptt. Of Elect. Engg., IIT Madras |
| 32. | Dr. (Mrs.) Tessy Thomas, Outstanding Scientist' & Director, Advanced Systems Laboratory (ASL), Hyderabad |
| 33. | Prof. Vijay Lakshmi Ravindranath, Centre for Neuro science, IISc, Bangalore |
| 34. | Dr. S.K. Joshi, Former D.G. CSIR, NewDelhi |

| | |
|---|---|
| 35. | Prof. R.C. Bhudhani, IIT Kanpur |
| 36. | Prof. D.C. Panigrahi, Director, IIT(ISM) Dhanbad |
| 37. | Shri R. Subrahmanyam, AS(TE), MHRD |
| 38. | Shri Sanjeev Mittal, Joint Secretary, Ministry of Information Technology |
| 39. | Ms. Darshana M. Dabral, JS&FA, MHRD |
| 40. | Mrs.Tripti Gurha, Director(IITs), MHRD, NewDelhi |
| 41. | Ms. Prisca Mathew, Under Secretary(IITs), MHRD |
| 42. | Shri V.K.Wadhwa, Project Officer, Secretariat of Council of IITs |
| 43. | Shri Arun Kumar Karan, ASO, MHRD |
| 44. | Shri Mohit Gupta, ASO, MHRD |
| 45. | Ms. Heena, ASO, MHRD |

| | **Outgoing Members of the Council** |
|---|---|
| 1. | Smt. Smriti Zubin Irani, Hon'ble HRM |
| 2. | Prof. M. Ananda krishnan, Chairperson, BOG IITKanpur |
| 3. | Dr. Anil Kakodkar, Chairperson, BOG IIT Bombay |
| 4. | Dr. Vijay P.Bhatkar, Chairperson, BOG, IIT Delhi |
| 5. | Dr. R.P. Singh Chairperson, BOG, IIT Guwahati |
| 6. | Shri S.K. Roongta, Chairperson, BOG, IIT Bhubaneswar |
| 7. | Prof. K. Gupta/Prof K.Thyagarajan,Oficiating Director, IIT Delhi |

| | **New Members of the Council** |
|---|---|
| 1. | Shri Prakash Javadekar, Hon'ble HRM |
| 2. | Shri Mahindra Nath Pandey, Minister of State, H.R.D |
| 3. | Shri R.C. Bhargava, Chairperson, BOG, IIT Kanpur |
| 4. | Shri Dilip Shanghvi, Chairperson, BOG, IIT Bombay |
| 5. | Shri Kumar Mangalam Birla, Chairperson, BOG IIT Delhi |
| 6. | Dr. Rajiv I. Modi, Chairperson, BOG, IIT Guwahati |
| 7. | Shri Pankaj Rambhai Patel, Chairperson, BOG, IIT Bhubaneswar |
| 8. | Prof. V. Ramagopal Rao, Director, IIT Delhi |

# Board of Governors, IIT Kharagpur
# From 1st April, 2015 to 31st March, 2016

| Sl. No | Name & Address | Position |
|---|---|---|
| 1. | Dr. Srikumar Banerjee<br>DAE Homi Bhabha Chair Professor<br>Room No. A 419, 4th Floor, Central Complex<br>Bhabha Atomic Research Centre, Trombay<br>Mumbai-400085 | Chairman |
| 2. | Smt. Arundhati Bhattacharya<br>Chairperson, State Bank of India<br>Corporate Centre, 18th Floor<br>State Bank Bhavan, Madame Came Road<br>Mumbai-400021 | Member |
| 3. | Smt. Sudha N. Murty<br>Chairperson, Infosys Foundation<br>III Floor, Infosys Tower<br>27, Bannerghatta Road<br>Bangalore-560076 | Member |
| 4. | Dr. Jai Pal Mittal<br>M.N. Saha Distinguished Professor (NASI)<br>11-B, Rohini Coop. Housing Society<br>Vashi, Navi Mumbai<br>Maharashtra-400703 | Member |
| 5. | Prof. N. Balakrishnan<br>Supercomputer Education and Research Centre<br>Indian Institute of Science<br>Bangalore-560012 | Member |
| 6. | Shri Sanjiv Goenka<br>Chairman, RP-Sanjiv Goenka Group<br>CESC House<br>1, Chowringhee Square<br>Kolkata-700001 | Member |
| 7. | Prof. Partha P. Chakrabarti<br>Director<br>IIT Kharagpur | Member |
| 8. | Prof. Rajendra Singh (Up to 31.12.2015)<br>Dept. of Agricultural & Food Engineering<br>IIT Kharagpur | Member |
| 9. | Prof. Dipanwita Roychowdhury (From 1.1.2016)<br>Dept. of Computer Science & Engineering<br>IIT Kharagpur | Member |

| | | |
|---|---|---|
| 10. | Prof. Swagata Dasgupta (Upto 31.12.2015)<br>Dept. of Chemistry<br>IIT Kharagpur | Member |
| 11. | Prof. Manoj Kumar Tiwari (From 1.1.2016)<br>Dept. of Industrial & Systems Engineering<br>IIT Kharagpur. | Member |
| 12. | Prof. Pallab Banerji (Upto 19.04.2015)<br>Registrar<br>IIT Kharagpur | Secretary |
| 13. | Shri Pradip Pyne (From 20.04.2016)<br>Registrar<br>IIT Kharagpur | Secretary |

# Finance Committee, IIT Kharagpur
# From 1st April, 2015 to 31st March, 2016

| Sl. No | Name & Address | Position |
|---|---|---|
| 1. | Dr. Srikumar Banerjee<br>DAE Homi Bhabha Chair Professor<br>Room No. A 419, 4th Floor, Central Complex<br>Bhabha Atomic Research Centre, Trombay<br>Mumbai-400085 | Chairman |
| 2. | Joint Secretary & Financial Adviser<br>Government of India<br>Ministry of Human Resource Development<br>Department of Higher Education,<br>Shastri Bhawan, New Delhi-110115 | Member |
| 3. | Director (IITs)<br>Government of India<br>Ministry of Human Resource Development<br>Department of Higher Education<br>Shastri Bhawan, New Delhi-110115 | Member |
| 4. | Prof. N. Balakrishnan<br>Supercomputer Education and Research Centre<br>Indian Institute of Science<br>Bangalore-560012 | Member |
| 5. | Prof. Partha P. Chakrabarti<br>Director<br>IIT Kharagpur | Member |
| 6. | Prof. Rajendra Singh (Upto 31.12.2015)<br>Dept. of Agricultural & Food Engineering<br>IIT Kharagpur | Member |
| 7. | Prof. Dipanwita Roychowdhury (From 1.1.2016)<br>Dept. of Computer Science & Engineering<br>IIT Kharagpur | Member |
| 8. | Prof. Pallab Banerji (Upto 19.04.2015)<br>Registrar<br>IIT Kharagpur | Secretary |
| 9. | Shri Pradip Pyne (From 20.04.2016)<br>Registrar<br>IIT Kharagpur | Secretary |

# Building and Works Committee
# From 1st April, 2015 to 31st March, 2016

| | | |
|---|---|---|
| 1. | Prof. Partha P. Chakrabarti<br>Director<br>IIT Kharagpur | Chairman |
| 2. | Superintending Engineer & Circle Manager<br>Midnapore Distribution Circle<br>West Bengal State Electricity<br>Distribution Co. Ltd. (WBSEDCL)<br>190, S. K. Bose Road<br>Paschim Medinipur, PIN-721101 | Member |
| 3. | Superintending Engineer<br>South Western Circle<br>Public Works Department (PWD)<br>Saheed Mangal Pandey Sarani<br>Paschim Medinipur, PIN-721101 | Member |
| 4. | Head<br>Department of Civil Engineering<br>IIT Kharagpur | Member |
| 5. | Head<br>Department of Electrical Engineering<br>IIT Kharagpur | Member |
| 6. | Head<br>Dept. of Architecture & Regional Planning<br>IIT Kharagpur | Member |
| 7. | Registrar<br>IIT Kharagpur | Secretary |

# Administrative Heads

**Updated on 01.07.2016**

| Sl. No. | Position | Name of the Faculty | *Tenure* From | To |
|---|---|---|---|---|
| 1. | Director | Prof. Partha P. Chakrabarti, Dept. of Computer Science & Engg. | 27.7.2013 (AN) | 26.07.2018 5 years |
| 2. | Deputy Director | Prof. Souvik Bhattacharyya, Dept. of Mechanical Engineering | 04.11.2013 | 10.06.2015 (3 years) |
| 3. | Deputy Director | Prof. Sriman Kumar Bhattacharyya Dept. of Civil Engineering | 19.08.2016 | 16.08.2019 |

| Sl. No. | Position | Name of the Faculty | *Tenure* From | To |
|---|---|---|---|---|
| 1. | Dean (Faculty) | Prof. Pratim Kumar Chattaraj, Chemistry | 01.10.2013 | 30.09.2016 |
| 2. | Dean (UGS) | Prof. Rajendra Singh (89010), AgFE | 16.08.2013 | 15.08.2016 |
| 3. | Dean (PGS&R) | Prof. Samit Kumar Ray, Physics | 01.10.2015 | 30.09.2018 |
| 4. | Dean (SA) | Prof. Manish Bhattacharjee, Chemistry | 01-04-2015 | 31.03.2018 |
| 5. | Dean (SRIC) | Prof. Sunando Dasgupta (94038), Chem | 01.08.2013 | 31.07.2016 |
| 6. | Dean (CE) | Prof. Om Prakash Sha, O.E.& N.A | 01.10.2013 | 30.09.2016 |
| 7. | Dean (AA&IR) | Prof. Siddhartha Mukhopadhyay, E.E | 01.10.2013 | 30.09.2016 |
| 8. | Dean (Planning & Coordination) | Prof. Biswajit Mahanty, I &SE | 01.10.2013 | 30.09.2016 |
| 9. | Acting Dean, VGSOM | Prof. K.K. Guin, VGSOM | 05.06.2012 | U.F.O |
| 10. | Dean, RGSOIPL | Prof. Khushal Vibhute, RGSOIPL | 04.03.2013 | 30.06.2016 |
| 11. | Associate Dean, SRIC | Prof. Pallab Dasgupta, CSE | 07.10.2013 | 06.10.2016 |
| 12. | Associate Dean, VGSOM | Prof. Kalyan Kumar Guin, VGSOM | 11.01.2005 | U.F.O |

| Sl. No. | Heads of the Dept. / Centre/School/Unit | Name of the Faculty | *Tenure* From | To |
|---|---|---|---|---|
| 1. | Aerospace Engineering | Prof. B. N. Singh | 11.09.2013 | 10.09.2016 |
| 2. | Agricultural & Food Engineering | Prof. V. K. Tewari | 01.09.2014 | 31.08.2017 |
| 3. | Architecture & Regional Planning | Prof. Subrata Chattopadhyay | 01.08.2014 | 31.07.2017 |
| 4. | Chemical Engineering | Prof. Sirshendu De, Chem. Engg | 01.01.2015 | 31.12.2017 |
| 5. | Chemistry | Prof. Tanmaya Pathak | 01.06.2014 | 31.05.2017 |
| 6. | Civil Engineering | Prof. Kusam Sudhakar Reddy | 01.01.2016 | 31-12-2018 |

| | | | | |
|---|---|---|---|---|
| 7. | Computer Science & Engineering | Prof. Sudeshna Sarkar | 01.04.2016 | 31.03.2019 |
| 8. | Cryogenic Engineering | Prof. Parthasarathi Ghosh | 01.01.2016 | 31-12-2018 |
| 9. | Electrical Engineering | Prof. Siddhartha Sen, Elec.Eng | 01.05.2013 | 30.04.2017 |
| 10. | Electronics & Electrical Communication Engineering | Prof. Prabir Kumar Biswas, E&ECE | 01.01.2015 | 31.12.2017 |
| 11. | Geology & Geophysics | Prof. Anindya Sarkar | 01.01.2016 | 31.12.2018 |
| 12. | Humanities & Social Sciences | Prof. Vijai Nath Giri | 01.10.2013 | 30.09.2016 |
| 13. | Industrial & Systems Engineering | Prof. Jhareswar Maiti | 01.01.2016 | 31.12.2018 |
| 14. | Mathematics | Prof. Umesh Chandra Gupta | 01.10.2013 | 30.09.2016 |
| 15. | Material Science Centre | Prof. Susanta Banerjee | 08.05.2014 | 07.05.2017 |
| 16. | Mechanical Engineering | Prasanta Kumar Das | 01.10.2013 | 30.09.2016 |
| 17. | Metallurgical & Materials Engineering | Prof. Gour Gopal Roy | 01.04.2014 | 31.03.2017 |
| 18. | Mining Engineering | Prof. Khanindra Pathak | 01.11.2014 | 31.10.2017 |
| 19. | Ocean Engineering & Naval Architecture | Prof. Trilochan Sahoo | 01.10.2013 | 30.09.2016 |
| 20. | Physics | Prof. Arghya Taraphder | 01.02.2014 | 31.01.2017 |
| 21. | Rubber Technology Centre | Prof. Dipak Khastgir | 01.10.2013 | 30.09.2016 |
| 22. | Biotechnology | Prof. Sudip Kumar Ghosh | 01.01.2016 | 31.12.2018 |
| 24. | School of Medical Science & Technology | Prof. Suman Chakraborty, ME | 01.04.2015 | 31.03.2018 |
| 25. | Reliability Engineering Centre | Prof. V.N. Achutha Naikan | 01.12.2013 | 30.11.2016 |
| 26. | Centre for Oceans, Rivers, Atmosphere & Land Sciences (CORAL) | Prof. Arun Chakraborty, CORAL | 29.06.2013 | 28.06.2017 |
| 27. | G. S. Sanyal School of Telecommunication | Prof. Saswat Chakrabarti | 01.04.2012 | 31.03.2017 |
| 28. | Rural Development Centre | Prof. V.K. Tewari | 01.09.2014 | 31.08.2017 |
| 29. | Ranbir & Chitra Gupta School of Infrastructure Design & Management | Prof. Joy Sen, A&RP | 01.09.2014 | 31.08.2017 |
| 30. | School of Water Resources | Prof. A.K. Gupta, Civil Engg | 01.04.2016 | 31.03.2019 |
| 31 | Computer & Informatics Centre | Prof. Arobinda Gupta | 01.01.2015 | 31.12.2017 |
| 32. | Centre for Educational Technology | Prof. Anupam Basu, CSE<br>*(Chairman & Head)* | 01.01.2015 | 31.12.2017 |
| 33. | Head,<br>Institute Information Cell<br>Associate Head,<br>Institute Information Cell | Prof. Soumya Kanti Ghosh<br><br>Dr. Pralay Mitra | 21.04.2015<br><br>21.04.2015 | 20.04.2018<br><br>20.04.2018 |
| 34. | Admin Computer Service Support Centre (ACSSC) | Prof. Debasis Bhattacharya, Materials Science Centre | 01.12.2013 | 30.11.2016 |

| | | | | |
|---|---|---|---|---|
| 35. | Advanced Technology Development Centre | Prof. Sunando Dasgupta, 94038 | 02.08.2013 | 01.08.2016 For 3 years |
| 36. | Rajendra Mishra School of Engg Entrepreneurship | Prof. Partha Pratim Das, CSE | 01.10.2013 | 30.09.2016 |
| 37. | School of Bioscience | Prof. Amit Basak | 18.02.2014 | 17.02.2017 |
| 38. | School of Nano-Science and Technology | Prof. Samit Kumar Ray | 18.02.2014 | 17.02.2017 |
| 39. | School of Energy Science & Engineering | Prof. A.K. Sinha | 19.02.2014 | 18.02.2017 |
| 40. | School of Environment Science and Engineering | Prof. Jayanta Bhattacharya | 03.03.2014 | 02.03.2017 |

**Chairman of the Various Centres / Committees**

| **Sl. No.** | **Committee/Centre** | **Name of the Faculty** | ***Tenure*** **From** | **To** |
|---|---|---|---|---|
| 1. | Chairman (Civil Construction & Maintenance) | Prof. Baidurya Bhattacharya | 01.10.2013 | 30.09.2016 |
| 2. | Hall Management Centre (HMC) | Prof. Surya Kanta Pal | 14.09.2015 | 13.09.2017 |
| 3. | Chairman, Career Development Centre (Previously - T&PSection) | Prof. Debasis Deb | 01.01.2016 | 31.12.2017 |
| 4. | Central Library | Prof. Subrata Chattopadhyay | 26.06.2012 | 31.07.2016 |
| 5. | GATE | Prof. K.S. Sreenivasa Rao | 28.05.2016 | 27.05.2017 |
| 6. | JEE | Prof. Adrijit Goswami | 02.09.2015 | JEE-2016 |
| 7. | JAM | Prof. K.S. Sreenivasa Rao, | 28.05.2016 | 27.05.2017 |
| 8. | Enterprise Resource Planning (ERP) | Prof. Debasis Bhattacharya | 01.12.2013 | 30.11.2016 |
| 9. | Central Research Facility<br>Chairman, Materials Div<br>Chairman, Life Science Div | Prof. Rahul Mitra<br><br>Prof. Amit Kumar Das | 01.12.2013<br><br>01.12.2013 | 30.11.2016<br><br>30.11.2016 |
| 10. | Central Workshop & Instruments Service | Prof. Asimava Roy Choudhury, | 10.08.2015 | UFO |
| 11. | Rajbhasha Vibhag | Prof. D.K. Gupta | 01.10.2013 | 30.09.2016 |
| 12. | Nehru Museum of Science & Technology | Prof. Dhrubajyoti Sen | 01.10.2015 (Extension) | 30.09.2016 |
| 13. | Kalpana Chawla Space Technology Cell (KCSTC) | Prof. Dipanwita Roy Chowdhury | 01.01.2013 | 31.12.2017 |
| 14. | Staff Benefit Fund | Registrar | 01.07.2002 | U. F. O. |
| 15. | Students' Brotherhood Fund(SBF) Committee | Dean, Students' Affair | 01.01.2016 | - |
| 16. | House Allotment Committee (HAC) | Prof. A.K. Gupta | 24.06.2015 | 23.06.2018 |
| 17. | Commercial Establishments & Licencing Committee (CELC) | Prof. Susanta Banerjee | 01.01.2015 | 31.12.2017 |

| | | | | |
|---|---|---|---|---|
| 18. | Standing Consultative Committee on Community Issues (SCCCI) | Director (Ex-officio) | | |
| 19. | Security and Transport Advisory Committee (STAC) | Deputy Director (Ex-officio) | | |
| 20. | Space Allocation Committee (SAC) | Director (Ex-officio) | | |
| 21. | Campus Schools Advisory (CSA) Committee | Prof. Biswajit Mahanty | 20-02-2013 | 30.09.2016 |
| 22. | Industrial Training Centre, Hijli | Dean, Continuing Education | Ex-officio | |
| 23. | Campus Green Cover (CGC) | Prof. Adinpunya Mitra | 01.10.2013 | 30.09.2016 |
| 24. | Canteen Management Committee | Prof. Somnath Sen | 01.02.2015 | 31.01.2017 |
| 25. | Technology Film Society | Dean, Students' Affairs | *Ex-officio* | |
| 26. | House Building Advance | Registrar | 01.08.1996 | U. F. O. |
| 27. | Scooter & Cycle Allowance | Registrar | 26.07.1993 | U. F. O. |
| 28. | Computer Purchase, Maintenance & Networking Committee | Prof. Arobinda Gupta, | 01.01.2015 | 31.12.2017 |
| 29. | Furniture* | Deputy Director | *Ex-officio* | |
| 30. | Budget & Allotment of Fund | Deputy Director | *Ex-officio* | |

| **Sl. No.** | **Vice-chairman/Others** | **Name of the Faculty** | ***Tenure*** | |
|---|---|---|---|---|
| | | | **From** | **To** |
| 1. | Vice-Chairman, GATE | 1. Prof. Ramkrishna Sen<br>2. Prof.Manjunatha Madadevappa | 28.05.2016<br>28.05.2016 | 27.05.2017<br>27.05.2017 |
| 2. | Vice-Chairman, JEE | Prof. Pallab Banerji | - | JEE-2016 |
| 3. | Vice-Chairman, JAM | 1. Prof. Ramkrishna Sen<br>2. Prof.Manjunatha Madadevappa | 28.05.2016 | 27.05.2017 |
| 4. | Vice-Chairmen, Career Development Centre | 1. Prof. A Rajakumar<br>2. Prof. Sujoy Kumar Kar<br>3. Prof. G.P. Rajasekhar | Extended upto<br>01.01.2016 | 31.12.2016<br>31.12.2017 |
| 5. | Vice-Chairman, Technology Aquatic Society (TAS) | Prof. Santanu Chattopadhyay | 15.10.2014 | 14.10.2016 |
| 6. | Vice-chairman,Technology Film Society (TFS) | Prof. Arnab Roy | 01.10.2013 | 30.09.2016 |
| 7. | Treasurer, TFS | Prof. Saikat Kumar Paul | 01.10.2013 | 30.09.2016 |
| 8. | President, Technology Students' Gymkhana (TSG) | Prof. Somesh Kumar | 01.09.2014 | 31.08.2017 |

| | | | | |
|---|---|---|---|---|
| 9. | Treasurer. TSG | Prof. Kingshook Bhattacharyya | 01.09.2014 | 31.08.2016 |
| 10. | Head, NSS | Dr. P.K. Bhowmick | 01.07.2002 | U.F.O |
| 11. | Coordinator, EAA | Dr. S.C. Mahapatra | 01.07.2002 | U.F.O |
| 12. | Convener, Centre for Theoretical Studies (CTS) | Prof. Sayan Kar | 07.10.2013 | 06.10.2016 |
| 13. | Convener, Inst. Lecture Series Comm. | Dean, Continuing Education | Ex – Officio | |
| 14. | Coordinator SC/ST | Prof. Partha Saha | 2013-2014 and 2014-2015 | |
| 15. | Coordinator, PGDST | Prof. P.K. Sen | 01.10.2015 | 30.09.2016 |
| 16. | Principal Medical Officer (Acting) | Dr. Seema Roy | 01.07.2014 | U.F.O |
| 17. | Chief Vigilance Officer (Part time) | Prof. Sujoy Ghose | 24.06.2015 | 23.06.2018 |
| | i) Managing Director, STEP | Prof. Satyahari Dey | 04.02.2015 | 23.06.2018 |
| 18. | ii) Executive Advisors to STEP | Prof. Satyahari Dey<br>Prof. Siddhartha Das | 04.02.2015 | 03.02.2018 |
| 19. | Vice-Chairman (Civil Construction & Maintenance) | Prof. Sushanta Chakraborty | 01.10.2013 | 30.09.2016 |
| 20. | Vice-Chairman (Civil Construction & Maintenance, Architecture & Planning) | Prof. Shankha Pratim Bhattacharya | 01.10.2013 | 30.09.2016 |
| 21. | Faculty Coordinator, Counseling Services | Dr. S.D. Bhattacharya | 19.08.2013 | 18.08.2016 |
| 22. | Coordinator, Vodafone Essar-IIT Centre of Excellence in Telecommunications (VEICET) | Prof. Saswat Chakrabarti | 19.04.2011 | U.F.O. |
| 23. | Coordinator, National Knowledge Network (NKN) | Prof. P.K. Biswas | 09.03.2010 | U.F.O. |
| 24. | Vice Chairman, ERP & Co-PI, IER Project | Dr. Shyamal Kumar Das Mandal | 28.05.2014 | 27.05.2017 |
| 25. | Programme Cordinator, International Summer Winter Term (ISWT) | Prof. A. Goswami | 25.03.2014 | 24.03.2017 |

| Sl. No. | Professors-in-Charge | Name of the Faculty | *Tenure* | |
|---|---|---|---|---|
| | | | **From** | **To** |
| 1. | Electrical Works<br>Associate Professor-in-Charge (Electrical Works) | Prof. A.K. Pradhan,<br>Dr. Prabodh Bajpai | 01.10.2013<br>01.01.2014 | 30.09.2016<br>31.12.2017 |
| 2. | Refrigeration & AC Unit | Prof. M. Ramgopal | 01.08-2014 | 31-07-2017 |
| 3. | Co-Professor-in-Charge, Refrigeration & AC Unit | Dr. Parthasarathi Ghosh | 01.08.2014 | 31.07.2017 |
| 4. | Horticulture | Prof. Adinpunya Mirtra | 01.10.2013 | 30.09.2016 |
| 5. | Water Works | Prof. M.M. Ghangrekar | 01.10.2013 | 30.09.2016 |
| 6. | Institute Guest Houses | Prof. B.C. Meikap | 05.02.2016 (AN) | 04.02.2018 |
| 7. | Technology Telecom Centre | Prof. Raja Datta | 04.02.2011 | 03.02.2018 |
| 8. | Time Table | Prof. Dilip Kumar Baidya | 01.10.2013 | 30.09.2016 |
| 9. | Audio Visual Cell | Chairman, CWISS | Ex-officio | |
| 10. | Examinations | Prof. Madan Kumar Jha | 01.10.2013 | 30.09.2016 |
| 11. | Convocation | Prof. Rajendra Singh, Dean(UGS) | 62nd Annual Convocation – 2016 | |
| 12. | Advanced VLSI Laboratory | Prof. T.K. Bhattacharyya | 01.10.2015 | 30.09.2016 |
| 13. | IPR & IR | Prof. Goutam Saha | 07.10.2013 | 06.10.2016 |
| 14. | IIT Kharagpur Kolkata Campus | Prof. A.P. Gupta | 01.08.2015 | 31.07.2017 |
| 15. | IIT Kharagpur Bhubaneswar Campus | Dean (CE) | 01.10.2015 | UFO |
| 16. | Advanced Laboratory for Plant Genetic Engineering | Prof. Sudip Kumar Ghosh | 01.10.2013 | 30.09.2016 |
| 17. | Incubation & Entrepreneurship Activities of SRIC along with TIETS | Prof. Satyahari Dey | 24.06.2015 | 23.06.2018 |
| 19. | B.C. Roy Technology Hospital | Prof. Chhanda Chakraborti<br>Prof. Rajib Mall | 26.06.2012<br>26.06.2016 | 25.06.2016<br>25.06.2019 |
| 20. | Centre for Railway Research (CRR) | Prof. Suvranshu Roy | 10.02.2014 | 09.02.2017 |
| 21. | Radiological Safety Officer | Prof. Ananta Kumar Ghosh | 24.06.2010 | U.F.O. |
| 22. | P.K. Sinha Centre for Bio Energy | Prof. Debabrata Das | 01.02.2014 | 31.01.2017 |

| | | | | |
|---|---|---|---|---|
| 23. | Co-Professor in-Charge, Centre for Railway Research (CRR) | Prof. Arghya Deb | 04.04.2014 | 03.04.2017 |
| 24. | Professor-in-Charge of Outsourced Manpower | Prof. Sabyasachi Sengupta | 08.09.2014 | 07.09.2017 |
| 25. | Professor-in-Charge, Counselling Centre, IIT Kharagpur | Prof. Manish Bhattacharjee<br><br>Prof. Sangeeta Das Bhattacharya | 04.02.2015<br><br>12.08.2015 | 11.08.2015<br><br>11.08.2018 |
| 26. | Professor-in-Charge, Transport & Automobile Section | Prof. Arun Kumar Majumder | 26.05.2015 | 25.05.2018 |

**Miscellaneous Assignment**

| **Sl. No.** | **Name of Assignment** | **Name of the Faculty** | ***Tenure*** | |
|---|---|---|---|---|
| | | | **From** | **To** |
| 1. | Faculty Coordinator, International Relations | Dr. Sanjay Gupta | 22.10.2014 | UFO |
| 2. | NSS Programme Coordinator /Head, NSS | Prof. Debasis Roy | 01.07.2013 | UFO |
| 3. | Programme Coordinator, NSO (Health & Fitness) | Prof. Sudipta Mukhopadhyay | 25.07.2014 | 24.07.2017 |
| 4. | Programme Coordinator, NCC | Dr. K.D. Raju | 05.09.2013 | 04.09.2016 |
| 5. | Institute's Representative at the Indian Member Council | Prof. Om Prakash Sha, | 26.05.2014 | UFO |
| 6. | Coordinator for Rural Technology Action Group (RuTAG) Cell, IIT Kharagpur | Prof. P.B.S. Bhadoria, | 13.11.2014 | 12.11.2017 |

# List of Senate Members

**THE 316th MEETING OF THE SENATE HELD ON 13.04.2016 AT 3.30 P.M. IN THE GARGI SEMINAR HALL**

**Section 14(A) - DIRECTOR**

Prof. Partha P. Chakrabarti

**Section 14(B) - DEPUTY DIRECTOR**

Prof. Sriman Kumar Bhattacharyya

**Section 14 (C) - PROFESSOR OF THE INSTITUTE**

**AEROSPACE ENGINEERING**

Prof. N. Singh
Prof. K.P. Sinhamahapatra
Prof. B.N. Singh
Prof. Dipak Kumar Maiti

**AGRICULTURAL & FOOD ENGINEERING**

Prof. R. Singh
Prof. V.K. Tewari
Prof. K.N. Tiwari
Prof. R.K. Panda (Lien upto 27.08.2016)
Prof. R. Banerjee
Prof. S.K. Das
Prof. P.B.S. Bhadoria
Prof. B.C. Ghosh (Visiting Professor up to 30.06.2016)
Prof. A.K. Datta
Prof. H.N. Mishra
Prof. N.S. Raghuwanshi
Prof. S.N. Panda
Prof. T.K. Goswami
Prof. Nirupama Mallick
Prof. Madan Kumar Jha
Prof. Hifjur Raheman
Prof. S. Dutta Gupta
Prof. Adinpunya Mitra
Prof. Chandranath Chatterjee
Prof. Bhabani Sankar Das
Prof. E.V. Thomas

**ARCHITECTURE & REGIONAL PLANNING**

Prof. U.K. Banerjee
Prof. Jaydip Barman
Prof. S. Chattopadhyay
Prof. Joy Sen

**BIOTECHNOLOGY**

Prof. D. Das
Prof. S. Dey
Prof. A.K. Ghosh
Prof. A.K. Das
Prof. T.K. Maiti
Prof. Sudip Kumar Ghosh
Prof. Ramkrishna Sen

**CENTRE FOR OCEAN, RIVERS, ATMOSPHERE AND LAND SCIENCES**

Prof. Arun Chakraborty (Head, CORAL)

**CHEMICAL ENGINEERING**

Prof. A.N. Samanta
Prof. S. Dasgupta
Prof. N. C. Pradhan
Prof. S. De
Prof. Gargi Das
Prof. Sudarsan Neogi
Prof. Jayanta Kumar Basu
Prof. Goutam Kundu
Prof. B.C. Meikap
Prof. Swati Neogi
Prof. Sudipto Chakraborty

**CHEMISTRY**

Prof. D. Mal
Prof. J.K. Roy (Visiting Professor up to 30.06.2017)
Prof. P.K. Chattaraj
Prof. T. Pathak
Prof. T.S. Pal
Prof. A. Basak
Prof. D. Ray
Prof. M. Bhattacharjee
Prof. S.K. Srivastava
Prof. Nilmoni Sarkar
Prof. Swagata Dasgupta
Prof. Srabani Taraphder
Prof. Sanjoy Bandyopadhyay
Prof. Joykrishna Dey

Prof. Kumar Biradha
Prof. C.R. Raj

**CIVIL ENGINEERING**

Prof. Dhrubajyoti Sen
Prof. S.K. Bhattacharyya
Prof. K.S. Reddy
Prof. L.S. Ramachandra
Prof. S. Dey
Prof. D.K. Baidya
Prof. N. Dhang
Prof. S. K. V. Barai
Prof. V. R. Desai
Prof. Ashok Kumar Gupta
Prof. M.M. Ghangrekar
Prof. Baidurya Bhattacharya
Prof. Damodar Maity
Prof. Debasis Roy
Prof. Bhargab Maitra
Prof. Aniruddha Sengupta

**COMPUTER SCIENCE & ENGINEERING**

Prof. A. Pal (Visiting Professor upto 31.12.2016
Prof. A.K. Majumdar (Re-employment upto 30.06.2016)
Prof. S. Ghose
Prof. P.P. Chakrabarti (Director)
Prof. Anupam Basu
Prof. I. Sengupta
Prof. J. Mukhopadhyay
Prof. S.P. Pal
Prof. R. Mall
Prof. D. Sarkar
Prof. D. Roy Chowdhury
Prof. Pallab Dasgupta
Prof. Rajeev Kumar (Lien from 12.6.2015 to 11.6.2017)
Prof. Sudeshna Sarkar
Prof. Chittaranjan Mandal
Prof. Arobinda Gupta
Prof. Partha Pratim Das
Prof. Niloy Ganguly
Prof. Shamik Sural
Prof. Soumya Kanti Ghosh

**CRYOGENIC ENGINEERING**

Prof. Parthasarathi Ghosh (Head)
Prof. V. Rao Vutukuru
Prof. K. Chowdhury

**ELECTRICAL ENGINEERING**

Prof. S.K. Das
Prof. A.K. Sinha
Prof. A. Patra
Prof. N.K. Kishore
Prof. A. Barua
Prof. Goshaidas Ray
Prof. S. Mukhopadhyay
Prof. S. Sen
Prof. P.K. Dutta
Prof. B.M. Mohan
Prof. Debapriya Das
Prof. Sabyasachi Sengupta
Prof. T.K. Bhattacharya
Prof. Chandan Chakraborty
Prof. Ashok Kumar Pradhan
Prof. Debaprasad Kastha
Prof. Aurobinda Routray

**ELECTRONICS & ELECTRICAL COMM. ENGINEERING**

Prof. A. Chakraborty
Prof. D. Datta
Prof. Ajoy Kr. Roy (Lien upto 03.09.2017)
Prof. Swapna Banerjee (Visiting Professor upto 31.12.2016)
Prof. V.R.K. Ratnam (Lien upto 21.04.2020)
Prof. P.K. Biswas
Prof. M. Chakraborty
Prof. Sant Sharan Pathak
Prof. Subrata Sanyal
Prof. D. Biswas
Prof. K. K. Bandyapadhyay (On Contract as Visiting Professor upto 28.12.2017
Prof. Santanu Chattopadhyay
Prof. Tarun Kanti Bhattacharyya
Prof. Goutam Saha
Prof. Anindya Sundar Dhar
Prof. Raja Datta
Prof. Indrajit Chakrabarti
Prof. Debatosh Guha (Visiting Professor and HAL Chair Professor upto 09.08.2018)

**GEOLOGY & GEOPHYSICS**

Prof. S.K. Nath
Prof. B. Mishra
Prof. A.K. Gupta (Lien up to 31.08.2016)
Prof. D. Sengupta
Prof. A. Bhattacharya

Prof. S. Tripathy (Lien up to 14.02.2021)
Prof. Anindya Sarkar
Prof. Subhasish Das
Prof. M.K. Panigrahi
Prof. S.K. Bhowmik
Prof. Saibal Gupta
Prof. S.P. Sharma
Prof. Manish A Mamtani
Prof. William K. Mohanty

**G S SANYAL SCHOOL OF TELECOMMONUCATIONS**

Prof. S. Chakraborti

**HUMANITIES & SOCIAL SCIENCES**

Prof.(Ms.) B. Chatterjee (Visiting Professor upto 30.06.2016)
Prof. D. Suar
Prof. A. Gera Roy
Prof. K.B.L. Srivastava
Prof. S. Chopra Chatterjee
Prof. V.N. Giri
Prof. Chhanda Chakraborti
Prof. Priyadarshi Patnaik
Prof. N.C. Nayak

**INDUSTRIAL & SYSTEMS ENGINEERING**

Prof. B. Mahanty
Prof. P.K. Ray
Prof. M.K. Tiwari
Prof. P. L. Narasimhan (Chair Professor (TVS) up to 14.06.2016)
Prof. Jhareswar Maiti
Prof. Sarada Prasad Sarmah

**MATERIALS SCIENCE**

Prof. D. Bhattacharya
Prof. S. Ram (under suspension)
Prof. Susanta Banerjee
Prof. Pallab Banerjee
Prof. Chako Jacob
Prof. Subhasish Basu Majumder

**MATHEMATICS**

Prof. P.D. Srivastava
Prof. U.C. Gupta
Prof. M.P. Biswal
Prof. D.K. Gupta
Prof. S. Bhattacharyya
Prof. A. Goswami
Prof. Somesh Kumar
Prof. Rajni Kant Pandey
Prof. G. P. Raja Sekhar
Prof. P.V.S.N. Murthy

**MECHANICAL ENGINEERING**

Prof. B. Maiti
Prof. S.K. Som (re-employment up to 30.06.2017)
Prof. A.K. Chattopadhyay
Prof. S. Bhattacharya
Prof. R. Bhattacharyya
Prof. S.K. Dash
Prof. P.K. Das
Prof. A.R. Mohanty
Prof. S.N. Bhattacharyya
Prof. R. N. Maiti
Prof. S. Paul
Prof. M.C. Ray
Prof. A.K. Nath
Prof. S. Roy
Prof. D. K. Pratihar
Prof. S. Chakraborty
Prof. A. Dasgupta
Prof. A. Guha
Prof. M. Ramgopal
Prof. Ashimava Roy Choudhury
Prof. Manab Kumar Das
Prof. Surjya Kanta Pal
Prof. Arun Kumar Samantaray
Prof. Kumar Siva Cheruvu
Prof. Sanjay Gupta
Prof. Sandipan Ghosh Moulic
Prof. Partha Pratim Bandyopadhyay
Prof. Partha Saha

**METALLURGICAL & MATERIALS ENGINEERING**

Prof. N. Chakraborti
Prof. I. Manna (Lien upto 06.11.2017)
Prof. Siddhartha Das
Prof. K. Das
Prof. Gour Gopal Roy
Prof. Rahul Mitra
Prof. P.K. Sen (Chair Professor in STC up to 08.12.2016)

Prof. Jyotsna Dutta Majumdar
Prof. Shiv Brat Singh
Prof. Sudipto Ghosh

**MINING ENGINEERING**

Prof. S.S. Bhamidipati
Prof. A. Bhattacharya
Prof. K. U. M. Rao
Prof. S. K. Das
Prof. K. Pathak
Prof. J. Bhattacharyya
Prof. Samir Kumar Pal
Prof. Debasis Deb

**OCEAN ENGINEERING & NAVAL ARCHITECTURE**

Prof. N.R. Mandal (Under suspension)
Prof. D. Sen
Prof. O. P. Sha
Prof. Trilochan Sahoo
Prof. Prasad Kumar Bhaskaran

**PHYSICS**

Prof. S.L. Sharma
Prof. S.K. Ray
Prof. A. Taraphder
Prof. K. Kumar
Prof. Somnath Bharadwaj
Prof. Sayan Kar
Prof. Anushree Roy
Prof. Prasanta Kumar Datta
Prof. Tapan Kumar Nath
Prof. Achintya Dhar
Prof. Pragya Shukla
Prof. Sudhansu Sekhar Mandal

**RAJENDRA MISHRA SCHOOL OF ENGG. ENTREPRENEURSHIP**
**RAJIV GANDHI SCHOOL OF INTELLECTUAL PROPERTY LAW**

Prof. Khushal Vibhute (Dean)
**RELIABILITY ENGINEERING**
Prof. V.N.A. Naikan

**RUBBER TECHNOLOGY**

Prof. A.K. Bhowmick
Prof. D. Khastgir
Prof. Nikhil Kumar Singha

**SCHOOL OF MEDICAL SCIENCE & TECHNOLOGY**

Prof. S. K. Guha (Re-employment up to 30.06.2016)

**STEEL TECHNOLOGY CENTRE**

Prof. R. N. Ghosh (Chair Professor up to 30.06.2016)

**VINOD GUPTA SCHOOL OF MANAGEMENT**

Prof. K. K. Guin
Prof. G. Sinha (EOL up to 05.11.2017)
Prof. Prabina Rajib

**Under Section 14 (1)(a) Heads of the Deptts./Centres/Schools other than Professor. Already included under ''C'' above**

**Under Section 14 (1)(b) The Librarian of the Institute**

Dr. B. Sutradhar

**Under Section 14 (1)(c) :**

**Under Section 14 (1)(d) :**

**Under Section 14 (1)(e) :**
**Under Section 14 Clause (d) of Act :**

**Under Section 19 (2) The Registrar (Secretary)**

Sri Pradip Pyne

**Students' Representatives :**
Mr. Atal Ashutosh Agarwal (Vice President, TSG)
Mr. Rahul Arya (UG Representative)
Mr. Pankaj Tyagi (PG Representative)
Mr. Sawant Amol Dayanand (RS Representative)

# DIRECTOR'S REPORT

Professor Lord SushanthaKumar Bhattacharyya (CBE), *Commander of the Most Excellent Order of the British Empire*, Chief Guest of this program, Dr. Srikumar Banerjee, Chairman of the Board of Governors, IIT Kharagpur, Members of the Board of Governors, Members of the Senate, Distinguished Guests, Faculty Colleagues, Degree and Award Recipients, Parents, Guardians, Media Persons, Ladies and Gentlemen.

I welcome you all on the occasion of the 61st Convocation of our prestigious Institute.

On this auspicious day, as I stand here in the august presence of honorable men and women of our great Nation, I am reminded of the words of Ralph Waldo Emerson *"Beauty is the form under which the intellect prefers to study the world"*. It is this beauty, I wished to explore as I imagined myselfwatching the foundation stone of this Institute being laid. As if a whisper entered my ears; "*from now on, Indian students would get the best quality engineering education within the sanctified soil of this great Nation*". Henceforth the great Gurus of this Institute engaged in the pursuit of instilling *'longing for knowledge and understanding and an appreciation for intellectual values, whether they are artistic, scientific, or moral, not knowledge or understanding per se'*. The visionaries of the Institute trained the students who are to hold the flag of the Nation high in future, through their enduring efforts. Of course they have accomplished a great part and some are still left, and IIT Kharagpur is always proud of these gentle souls, who had contributed to Institute's greatness and for them, who shall forward our greater future. This Convocation perhaps stands at the junction of the two; past and future. Here under the portals of an ancient mansion, a citadel of learning, the oldest IIT of all makes the greatest of efforts to be the liveliest, the most innovative and the most all-embracing!

Almost six and half decades, since its inception, this Institute, *the torch bearer of the IIT system*, continues to represent *"India's urges and its future in the making"*. The spirit of this vision is echoed in the motto of our Honorable Prime Minister Sri Narendra Modi - *"Make in India"*. Over these years not only has IIT Kharagpur spearheaded setting up new standards in engineering education but also has put its best limbs forward in all spheres of national development from the strategic sectors of Defense, Space and Atomic energy to the Economic, Public and Development sectors that directly or indirectly touch the lives of all the citizens of India and eventually those of the world. Today, we are second to none, although we strive to achieve the greater goals, not in the luxury or surplus but, many a time through difficulties won over! Our 'International Summer Winter Program' successfully concluded this year too positioning the Institute at higher levels in the global academic scenario.

IIT Kharagpur has been producing students who are nation builders, achievers and global citizens over these years; *men and women of value*. Today, in addition to its continued academic excellence, the nation looks up to the IITs to address some of its major problems and to lead to a better and promising future. These include concerns about all round sustainability including *'bridging science and heritage', 'providing basic safety and security', 'assuring food and nutrition' and 'shelter for all and livable habitat', garnering renewable 'energy and environment', building a collective 'economy and employment', grounded on 'health and well-being', and 'empowering the elderly'*. Moreover, the IITs are now mandated to be able to spread their educational excellence beyond the boundaries of the Institutions and reach out to a much larger number of people requiring quality education assuring good quality of life and living. During the last year, we at IIT Kharagpur have responded to this challenge by taking up major projects related to Future of Cities, Food and Nutritional Sustainability, Signals and Systems in Life Science, Science and Heritage Initiative and other major research projects related to Clean Water, Bio-energy, Environment and the like. In parallel, we continue to pursue some cutting edge technology development in the areas of Nano-Science, Bio-MEMS, Materials, Circuit Design and, Mathematical Methods, which produce research publications in top quality journals keeping us at par with global standards. We have embarked upon giving shape to a key national goal 'The National Digital Library', potentially India's biggest game changer in education and research.

IIT Kharagpur's major strength lies in its ability to recognize the continued need for achieving greater heights. In order to increase the scope for our international exposure, the Institute has set up successfully *International Summer Winter Program* which has brought several international faculty members to this Institute enabling not only exchange of ideas in teaching and research but also fostering collaborations with Institutes of the highest repute. We have also embarked on an outreach program through which we are able to communicate with ten thousand teachers of college level institutions and help them in the pedagogy of imparting quality education. We have tried to instill competitive and

collaborative excellence through promotion of *Research Challenge Grants* which have excited both our young and senior faculty members of the Institute. Attracting sufficient high quality faculty members remains the biggest challenge of the IIT System and IIT Kharagpur is not an exception either. We have, therefore, embarked on an aggressive recruitment process through which we screen out quality applications and provide appointments as soon as possible. Special efforts are made to identify and induct brilliant faculty from industry and academia within the country and from abroad.

IIT Kharagpur maintains steadfast strides towards emerging directions to meet the increasing demands of future sustained growth, dissemination of scientific and technological knowledge during this year too as in bygone years. We at the Institute have been very sensitive to the human resource development needs of the Country and have initiated new academic programs and research ventures. In recent years we have introduced several new academic programs both at PG and UG levels as detailed in this report. I am glad that the companies and institutes continue to absorb our graduates for their purposes in the endeavor of research and development in all walks of life. We are proud of our brilliant alumni who make important decisions that are pivotal to the world outside and within the Nation. They are our ambassadors whom we count on and I am glad to place on record their wholehearted cooperation and boundless support; both financially and technologically, in making the spectrum of endeavors of this Institute bright and brilliant. Let me take this opportunity to appreciate the wonderful and selfless dedication that our professors and staff whohave graciously contributed. Recollecting and echoing the ancient mantra of our motherland, I do call upon each and every degree recipient to *arise, awake, and stop not* until the dream India is actualized.

Let me now introduce our Chief Guest, Professor Lord Sushantha Kumar Bhattacharyya before moving on to the various achievements and contributions of this Institute in the last year.

Professor Lord Sushantha Kumar Bhattacharyya, CBE FR-Eng, FRS,born on 6$^{th}$ June 1940, obtained his B. Tech (Honors) in Mechanical Engineering from IIT Kharagpur in 1960 and did his M.Sc and Ph.D from Birmingham, United Kingdom. He has received Honorary Doctorates from several universities. Lord Bhattacharyya was appointed CBE in 1997 and knighted in 2003. In 2004, he was made a life peer as Baron Bhattacharyya, of Moseley in the County of West Midlands. He joined the Parliamentary House of Lords, London on 3$^{rd}$ June 2004 and sits on the Labour benches in the House of Lords.

Professor Lord Sushantha Kumar Bhattacharyyaserved as Engineer and Industrial Manager, Lucas Industries Ltd. during 1961-67, Researcher Dept. of Engineering, Birmingham University during 1967-80, Professor of Manufacturing, Founding Director and Chairman, Warwick Manufacturing Group, Warwick University, United Kingdom from 1980. He served on Science and Technology: Sub-Committee I, House of Lords during 2007-08. He is Trustee, Coventry 2020, from 2011, Co-chair, SERC A-Star review, Singapore (2008-12), Companion, Chartered Management Institute (2003-03), Member of Board, Advantage West Midlands (1999-04), Trustee, Member of Advisory Council Institute for Public Policy Research from 1997, Fellow, Chartered Institute of Logistics and Transport (1996-96), Member, UK Council for Science and Technology (1993-03), Fellow, Royal Academy of Engineering (1991-91), Member, National Consumer Council(1990-93), Fellow Institute of Electrical Engineers (1975-75), and Fellow, Royal Society of Arts, Manufactures and Commerce, UK. His focus is on Business, Industry and Consumers, Economy and Finance, Education, International Affairs, Science and Technology in UK, China, India, South East Asia, Turkey, South Africa and USA.

Professor Lord Sushantha Kumar Bhattacharyyahas extensively worked and published in the field of manufacturing. A distinguished academic and innovator, Professor Bhattacharyya was appointed as the UK's first Professor in Manufacturing in 1980 when he became founder and the Director of the new internationally renowned Warwick Manufacturing Group (WMG), at the University of Warwick. He is the advisor to many companies and organizations around the world. He is the past member of the UK Council for Science and Technology, the premier advisory body on major science and technology issues of strategic importance to the UK. He advises Government of South Africa on Science and Technology Policy and is a member of the Board of Transnet, the holding company for the state owned transport businesses from airlines to railways.

He has received many international and national honors and awards for his distinguished contributions in the field of Science and Technology. In 1988, he was the recipient of Mensforth International Gold Medal by the Institute of Electrical Engineers. In 2002 the President of India accorded him with the prestigious award Padma Bhusan for services to Science, Technology and Industry. I would be glad to continue on the contributions of Lord Bhattacharyya,

but for the lack of time, let me greet him and welcome to the 61st Convocation. Your presence here today will inspire our brilliant, young students to follow the path of discovery, development and self reliance through their enduring contributions in Science and Technology in service of the Nation and the world at large.

It is my great privilege and pleasure to welcome our Chairman of the Board of Governors Dr. Srikumar Banerjee, who is the former Chairman of the Atomic Energy Commission, a distinguished alumnus of IIT Kharagpur and a very eminent scientist. His wisdom, insights and learning will surely inspire all of us. We await your illuminated words of wisdom and encouragement.

**DISTINGUISHED ALUMNI AWARDS**

I am proud to announce that in this convocation the Senate and the Board of Governors of the Institute will confer the Distinguished Alumnus Award on

- **Shri Bedabrata Pain**, noted scientist turned film maker.
- **Shri Chetan V Vaidya**, Director and Chairman of Academic Council at the School of Planning and Architecture, New Delhi and Chairman of Planning Education Board by All India Council of Technical Education.
- **Shri Manoj Gandhi**, Executive Vice President and General Manager of the Verification group at Synopsys responsible for Verification Compiler and the Verification Continuum Platform.
- **Shri MK Badhwar**, Retired Rear Admiral, Indian Navy, pioneer of 'Warship Building Procedure'
- **Shri Peter Chan**, renowned Bonsai artist and Founder and CEO, Herons Bonsai Limited.
- **Shri Pradip Dutta**, Distinguished Professor, Dept. of Mechanical Engineering, Indian Institute of Science, Bangalore.
- **Shri Rakesh Bahadur Verma**, Retired Commodore, Indian Navy, Former Head of Submarine Design including Nuclear Powered Submarines.
- **Shri S. Christopher**, Director General of the Defense Research and Development Organization (DRDO), key scientist behind India's first indigenous Airborne Early Warning & Control System (AEW&C) system.
- **Shri Sharat Chandra Bhargava**, Senior Vice President, Electrical & Automation, Larsen & Toubro Limited.
- **Shri Sundararajan Pichai** (aka. Sundar Pichai), Senior Vice President and Product Chief at Google.
- **Shri Venkatesh Shankar**, Professor of Marketing and Coleman Chair in Marketing and Director of Research, Center for Retailing Studies, Mays Business School, Texas A&M University.

**HIGHLIGHTS OF ACHIEVEMENTS DURING THE PAST YEAR**

Let me take this opportunity to present before you what the Institute has achieved during the last one year. Some of the outstanding achievements are as follow:

**INSTITUTE'S LEADING NATIONAL INITIATIVES**

In order to enhance our international exposure, we continued to invite several international faculty members to IIT Kharagpur for exchange of ideas in teaching and research, under our International Summer Winter Term (ISWT) Program. This initiative of ours graduated to the national level under the Global Initiative of Academic Networks (GIAN) program of the Ministry of Human Resources and Development, where IIT Kharagpur has the privilege of coordinating the program nationwide. In the last year, IIT Kharagpur offered ten courses under the ISWT program and twelve courses under the GIAN program.

IIT Kharagpur has also played a leading role in several other educational initiatives at the national level, such as, the National Digital Library (NDL) initiative and the National Initiative for Design and Innovation. The National Digital Library, hosted at IIT Kharagpur, provides a digital platform that serves as a single-window search portal. By incorporating video lectures and by embedding interactive learning software in addition to online books and journals, we are trying to prepare the National Digital Library as an interactive forum for knowledge dissemination.

IIT Kharagpur is setting up a Design and Innovation Centre having special focus on Rural Technologies with an outlay of INR 10 Crore in 3 years from MHRD. For this unique venture, IIT Kharagpur will be the Hub with four Spokes, namely IIEST Shibpur, NIT Rourkela, NIT Jamshedpur, and NIT Patna.

To carry out impactful research and innovation that will address the societal needs and achieve national prosperity, we at IIT Kharagpur are coordinating the Healthcare and Information and Communication Technology areas under the recently launched IMPRINT program. Similarly, we are going to host 13 new projects under the *Uchchatar Avishkar Yojana* of the Government of India. In the last year, we have taken several other collaborative initiatives with a wide range of agencies, such as, ONGC, Indian Railways, and Hindustan Aeronautics Limited.

Over the years, IIT Kharagpur has played its role in nation building by imparting quality education not only to its own students within its physical boundary, but also going beyond the boundary by leading initiatives like the Knowledge Dissemination Programme (KDP), wherein a total of 10 courses were offered in 2015-16 that were attended by several hundred students and faculty members of TEQIP-II institutions and industry professionals.

**RECOGNITIONS**

Our commitment to research and innovation was recognized by the Indian Patent Office and the Confederation of Indian Industries, on the last World Intellectual Property Day when IIT Kharagpur received the National Intellectual Property award under the category of 'Top Academic Institute for Patents 2016'. In the recent report by the Department of Science and Technology, IIT Kharagpur is ranked among the top three Science & Technology Research Institutions in India and several IIT Kharagpur faculty members are cited as top researchers in various fields of research. Our efforts to instill free thinking and leadership skills in our students have made IIT Kharagpur the most employable institution in the country as rated by an international survey for higher educational institutions by QS global employability rankings. With high quality research at IIT Kharagpur, we have rewritten history, literally! A team led by a faculty member of IIT Kharagpur, has established that the Indus valley civilization is 2500 years older than previously thought, thus predating the Egypt and Mesopotamia civilizations.

**INITIATIONS OF SCHOOLS AND CENTRES**

With the support of our alumni, we have launched the MN Faruqui Design and Innovation Centre that encourages and facilitates the spirit of innovation in our students from an early stage. DeySarkar Centre of Excellence in Petroleum Engineering has been launched to produce future game changers and leaders in the energy sector. An electronic design facility under the Centre is ready and several new acquisitions under equipment head are expected soon. For expansion of the scope of this Centre, a general 'Endowment for Innovation' has been created in the Institute. Many new Centres are in the pipeline such as the SandHI Centre, the Rekhi Centre of Excellence for the Science of Happiness, the Centre for Cognitive Sciences, and the Centre on Leadership.

**GREEN CAMPUS**

By using renewable energy source like solar power, we aim to reduce the Institute's electricity expenses by 10-15%. We are in the process of setting up a one Mega Watt solar plant in the campus with solar panels installed on the roof tops across nine prominent buildings. The already installed 100 kilo Watt solar power plant has generated 80,000 units of energy in 6 months which is being fed to the Grid.

**NEW ACQUISITIONS AT CENTRAL RESEARCH FACILITY**

In the past year, several state-of-the-art equipments such as Vibrating Sample Magnetometer, Small molecule Single Crystal X-Ray Diffractometer, X-ray Micro CT Tomography, Pulsed Electron Paramagnetic Resonance, etc., have been acquired at the Central Research Facility of IIT Kharagpur.

**LEARN-EARN-RETURN SCHEME**

The institute has initiated a novel scheme that aims to create a financial support system for students and foster a culture of giving back among them. Students availing benefits under this scheme will be required to take an Honor Pledge to give back to the Institute after establishing their career. Through this scheme, 'Learn-Earn-Return Fund' will help students to learn without a burden, shape their career to earn and give back to their Alma Mater. The fund raised for this campaign will be partially channelized to support students and partially to build corpus to ensure self-sustainability of the scheme.

## ALUMNI GRANT

Under the Institutional Development Program, IIT Kharagpur establishes endowments to generate sustainable sources of alternative funding every year. The Institute usually invests these endowment funds in term deposits with Banks and utilizes certain portions of interests generated from those deposits for some designated projects as decided in conformity with the desires of the donors. In FY 2015-16, apart from raising donations through fundraising campaigns, two Alumni have made significant contributions. Shri Asoke Dey Sarkar contributed about INR 5 Crore for setting up of a Trans-disciplinary Program in Petroleum Engineering and Shri Gopal Rajgarhia contributed INR 1.75 Crore as the completion funding of INR 10 Crore for SGR International Program.

Fostering Incubation and Entrepreneurship has been a long standing tradition of IIT Kharagpur. I am happy to report that Capillary Technologies, an early incubatee of IIT Kharagpur, has set up an endowment of INR 5.6 Crore for fostering student incubation and entrepreneurship. This continues in the great tradition of IIT Kharagpur's alumni's approach to give back to the Institute and help charter new vistas.

## STUDENT INNOVATION AND ENTREPRENEURSHIP

Student Groups of IIT Kharagpur are actively engaged in innovation and entrepreneurship ventures. Students have bagged top prizes in DST-Lockheed Martin India Innovation Growth Programs, BIRAC-SRISTI awards in Gandhian Young Technology Innovation, and in various design competitions. Successful student entrepreneurial ventures include companies such as M/s Capillary Technologies Pvt. Ltd with more than INR 95 Crore turnover, and M/s Suncraft Energy Pvt Ltd who are producing inverters and smart management devices. Our current and graduated incubates employ nearly 3000 S&T graduates with a total business of around INR 350 Crore.

## ACADEMIC PROGRAMS

The Institute offers B. Tech (Honors) program in fifteen different branches of Engineering, B. Arch (Honors) program in Architecture, sixteen Dual Degree programs, six Integrated M. Sc programs, four two-year Joint M.Sc-Ph.D programs, and fifty four Postgraduate degree programs leading to Joint M. Tech. / MCP-Ph.D, MBA, MHRM, EMBA, PGDBA, LLB, LLM and MMST degrees. The Curricula and Syllabi of these programs are periodically updated with focus on quality and excellence to meet the demands of the changing world.

To improve employability and research capability of students, the Institute has introduced Micro-Specializations for UG students from this year. Each Micro-Specialization has a defined structure in terms of three sequential components: a) Component-I – One Foundation Course (2-4 credits) that constitutes a mandatory requirement and also a pre-requisite for subsequent components; b) Component-II – One/two subjects (3-4 credits each) from a specified list of subjects; c) Component-III – Project/Design/Term Paper (4 credits) OR one subject (4 credits) from a specified list. A student would be required to complete 3-4 subjects (10-14 credits) from the specified list in order to earn a Micro-Specialization. The subjects can be taken through the Breadth/Open Elective component of the curriculum or as additional subjects. A student has to register for a Micro-Specialization which can be done in the beginning of any Semester beyond the first year. In order to register for a Micro-Specialization the student should have completed all curricular requirements up to the previous semester and have a CGPA $\geq$ 7.0. Thereafter the student must maintain a CGPA or SGPA $\geq$ 7.5 without any Backlog in the subsequent semesters to keep the Micro-Specialization registration active. GPA for the subjects contributing to the Micro-Specialization will be separately calculated. A minimum GPA of 6.00 is essential to earn the Micro-Specialization.

Some new courses have been approved by the Senate during April 2014 – March 2015. A 2-year 'Postgraduate Diploma in Business Analytics' is to be offered jointly by IIM Calcutta, IIT Kharagpur and ISI Calcutta. A new M.Tech program in 'Energy Science & Engineering' has been introduced under the School of Energy Science & Engineering. The Department of Civil Engineering has launched a new M.Tech program in 'Railway Engineering'. The Rajiv Gandhi School of Intellectual Property Law will be imparting a 2 year-Master of Laws (LLM) program.

The existing ERP System has also been strengthened. All academic issues including faculty recruitment, students' registration, enrollment, course allocation, examination results, students' feedback and sponsored project details are now available on-line through this system.

In this convocation, we will be conferring 242 Ph.D., 5 Joint M.Tech./MCP-PhD, 52 MS, 611 M.Tech., 29 MCP, 83 MBA, 9 MMST, 19 MHRM, 46 LLB, 469 Dual Degree, 497 B.Tech. (Hons), 40 B.Arch. (Hons.) and 263 M.Sc. degrees.

## RESEARCH AND DEVELOPMENT ACTIVITIES

I shall now outline some of the research and development activities various Departments, Schools and Centres are carrying out.

## AEROSPACE ENGINEERING

The Department of Aerospace Engineering has pioneered research in composite & smart structures, structural dynamics, Aeroelasticity design, Development of MR-fluid damper, Analysis of aerospace structures using DQM, DTFM, FEM, Nanomaterials and nanomechanics, Development of reconfigurable autonomous air vehicle, Lunar gravity modeling, topography modeling and orbit determination for the Chandrayaan-I, Fault tolerant and reconfigurable architecture development for the automotive, Real time system identification, system identification using neural sensitivity analysis, Fault detection and identification for aircraft, Low Reynolds number airfoils for micro air vehicles, Analysis of high Reynolds number three dimensional flows, Supersonic and hypersonic flows for various configurations, Large eddy simulation of turbulent flow, Flow-induced vibration and fluid-structure interaction, Development of micro-aerial vehicles, Global navigation satellite systems (GNSS), Estimation theory, Combustion of solid fuels and energetic particles, Droplet and spray combustion, Numerical simulation of compressible and chemically reacting flows, Combustion driven shock tunnel, Two-phase flow computations, Design guidance and control of rockets parafoil UAV MAV WIG-Craft etc., and Turbulence-radiation interaction and turbulent reacting flows.

## AGRICULTURE AND FOOD ENGINEERING

As one of the leading Departments of the country in agricultural research, the Department of Agriculture and Food Engineering has treaded new heights in the realm of Sensor-based technology interventions for precision farming, Remote sensing and GIS application in watershed management, Simulation/optimization and climate modeling for holistic water management, High pressure processing of high-value perishables and nutraceuticals, Targeted metabolomics of floral scents for value-added products, Microalgal biofuel production, Digital soil mapping and hyperspectral remote sensing, and Waste utilization in aqua-culture.

## ARCHITECTURE AND REGIONAL PLANNING

In its pursuit to uphold the values of sustainability, science and technology in built environment, the Department of Architecture and Regional Planning has spearheaded its research and development activities in Architectural design, Building science and environmental planning: (Performance studies, Design simulation and Intelligent architecture, Building automation and management systems, Sustainable development, Energy efficient design, Appropriate technologies, Spatial environmental planning, Eco-sensitive and green architecture), Art and architecture: (Indian traditional architecture and heritage studies, Vernacular architecture, design, Visual communication, Visual simulation, Product design and Industrial design), Infrastructure and spatial planning: (Transportation planning, Traffic engineering and management, Hazards and disaster mitigation and management, Urban design, Eco-tourism, Recreation and landscape planning, Conservation and preservation studies, Housing and shelter, Social infrastructure), Urban information system and planning: (Urban development management and finance, Advanced planning informatics, Geographical information systems, Decision support systems and expert systems, Urban settlement and systems dynamics), and Architecture, media and communication: (Cultural studies, Media and architectural journalism, Symbolism and cultural sustainability).

## BIOTECHNOLOGY

The Department focuses on research areas, such as, Process development and optimization for the production of an anti-tumor biosurfactant and production of biodiesel and its evaluation, Bioremediation of heavy metals, radionuclides and organic pollutants, Molecular analysis of microbial community structure and function at contaminated sites, Development of methods of o-antigens and its relation with pathogenecity in Gram negative bacteria, Bioreactor strategies for the enhanced production of probiotic endospores for nutraceutical formulations and their clinical evaluation, Characterization of E. histolytica surface proteins and characterization of E. invadens encystation specific

proteins, Recombinant protein (therapeutic & diagnostic) expression in plant, animal and microbial systems, Structural and functional studies of protein from M. tuberculosis and S. aureus aiming at drug and inhibitor design, Improvement of hydrogen production from industrial waste using hybrid bioreactor, Continuous hydrogen production by immobilized recombinant E. coli BL-21, Molecular analysis of cypovirus infecting tasar silkworm, Phytomedicine and molecular farming, Development of low fat content transgenic oilseed plant, Biomicrofluidics and Biochip development, Identification and characterization of immunomodulator from natural sources, Characterization of Antarctic microbiota, Probiotic nutraceutical development, and Bioinformatics and computational biology of RNA protein interaction.

**CHEMICAL ENGINEERING**

The Department focuses on research areas, such as, Environmental pollution control, Polymer processing and composites, Plasma engineering and surface science, Computational materials science, Colloid and interface engineering, Molecular simulation, Computational fluid dynamics and thermal engineering, Catalysis and reaction engineering, Bioenergy, Coal science and engineering, Petroleum production engineering, Carbon capture and storage, Fine particle engineering, Crystallisation engineering, Process optimization, Dynamics and control, Membrane separation, Bio- and energy materials, Soft nanotechnology, Complex fluids, Microfluidics and microscale transport engineering, Porous media, and Structured fluids and multiphase flow.

**CHEMISTRY**

The Department focuses on areas of Biomimics, Transition metal cluster complexes, Structural coordination chemistry, Ferromagnetic metal complexes, Drug design and delivery, Chemical and electrochemical sensors, Molecular modeling, Protein folding and enzymatic catalysis, Spectroscopy of assemblies, Green chemistry, Nanochemistry, and Catalysis.

**CIVIL ENGINEERING**

The core areas of research in the Department include Shock and projectile loading on structures, Meso- and nano- scale constitutive modeling of structural materials, Safety and reliability of structural and geotechnical systems, Landslide and earthquake hazards and their mitigation and management, Pavement engineering, transportation planning and road safety research through projects funded by various government agencies, e.g., state PWDs and National Highways Authority of India, Fluvial hydraulics, sediment transport and scour, impacts of climate change on surface water and ground water hydrology, Bioengineering solutions for ground improvement, slope stabilization and erosion control, Use of recycled materials and renewable resources, e.g., bamboo in construction, Low cost and sustainable technologies for water treatment, and Specifications and guidelines development for Bureau of Indian Standards (BIS) and Indian roads Congress (IRC).

**CRYOGENIC ENGINEERING CENTRE**

The thrust areas of research of this Department are Cryogenic engineering, Advanced materials, and Nonconventional energy.

**COMPUTER SCIENCE AND ENGINEERING**

The core research areas of the Department include, Spatial informatics and spatio-temporal data, Internet of things, Wireless sensor networks, A variant of maximum weighted independent set problem, and a question in external combinatorics, Approximation algorithms for vertex guarding of simple polygons, Bisecting and separating families for sets systems: Bounds and Algorithms, Development of (1) An integrated digital repainting technique for restoration of heritage murals, (2) EPuralekhak - a reader for stone inscription from its digital epigraphy, (3) A new technique for automated classification of land cover in landstat images and (4) An application software for scene change detection from Landsat and SAR images with GP/GPU computation, Initiated the SEAL Lab (Secured Embedded Architecture Lab), IoT Lab, SCA Lab in IIT Kharagpur. Founded the state-up embedded security and privacy Ltd. (ESP), www.esp-research.com (STEP, IIT Kharagpur). Founded the International conference SPACE (Security Privacy and Applied Cryptography Engineering) now run for 6 times in India, Translation validation of sequential and parallel programs, Distributed system protocol verification using first-order modal logic with arithmetic predicates, formal analysis of heterogeneous embedded systems using tagged signal models, Worked on high speed wireless access networks, Initiated the bioinformatics laboratory (high performance computing and experimental laboratory facility),

Development of mobile research lab, Information diffusion and cascades in online social network, event based social networks and location based social network, Group activity recognition from smartphone and wearable devices and Mobile affective computing. Developed Tapsense, an emotion detection app from smartphone activities, Optimization of real-time encryption performance for high volume storage data traffic (in collaboration with IBM), and Verification challenges in compression & cryptographic stacks in QuickAssist Technology (in collaboration with Intel Corporation).

**ELECTRICAL ENGINEERING**

The Department is actively engaged in research areas, such as, Flexible AC transmission systems (FACTS) devices, Voltage regulator modules, DC power management circuits & IC design, Renewable energy, Microgrid/Smartgrid applications, High performance industrial drives, Electric vehicles, Guidance, control and tracking of aerospace vehicles, Control allocation of over-actuated systems, Estimation for maneuvering target tracking, Vehicle health monitoring, Modelling & analysis of biomedical systems, Synergism and saturation system (S-system), Model order reduction (MOR), Orthogonal functions and Fuzzy logic, Advanced control theory: Periodic controller, robust, nonlinear, multivariate control, Fractional order (FO) and time-delay (TD) systems, Embedded control of power converters, High performance energy-efficient control, Power system security, Power system simulator, High voltage engineering, Wind energy, FACTS and power system stability, Hybrid power flow controller (HPFC), Thyristor controlled series capacitor (TCSC) control, Trajectory sensitivity analysis, Wide area measurement systems (WAMS) and protection, Adaptive relaying, Distributed system planning and automation, Smart home energy management system, Reconfigurable distribution network, MEMS and embedded sensing, Detection of adulterated milk, Laser-based instrumentation systems, Signal/Image processing, Online monitoring system for overhead electric (OHE) traction parameters, Human emotion recognition, Machine learning, Computational bioinformatics, and Medical image analysis and visualization.

**ELECTRONICS AND ELECTRICAL COMMUNICATION ENGINEERING**

The research areas of the Department include Analog/mixed signal and RF design, CNT and graphine based sensors for environmental monitoring, Fault tolerant design of network on chip, Development of bridge health monitoring for Indian Railways with wireless sensor networks, Protocol development for interplanetary network for deep space communication, Computational electromagnetics and modelling of antennas above multilayered ground plane and microwave circuits and study of EMI/EMC effects, Radar signal processing and advanced array processing for subsurface target detection, 3D imaging, VLSI architecture for low bit rate video coding, Medical image processing, Gesture recognition from video sequences, Face recognition, Image and video coding, Fuzzy neural network, Development of block floating point based schemes for implementing adaptive filters in digital hardware, Functional imaging of neural activity, and Systems biology: Bacterial motion analysis, Biofilm dynamics, Control in Boolean network, Inference of parameters in biological networks.

**GEOLOGY AND GEOPHYSICS**

This Department continues its research in Tectonic evolution of craton – mobile belt ensembles in parts of the Indian shield, Gold mineralization in greenstone belts of Dharwar Craton, Metamorphic remobilization of massive sulphide deposits, Studies on Indian microvertebrates, Lithospheric structure across Himalaya, Deformation at collisional boundaries, Stable isotopes in Himalayan foreland sediments, Paleogene climate of Kutch, Rajasthan, Environment in ancient sedimentary basins in India, Seismic hazard assessment and microzonation in the NE India and metropolitan cities, Improvement of rock index test methods and mechanical characterization of rock materials, Groundwater potential assessment and pollution by natural and anthropogenic causes, Waste utilizations, wasteland development and acid marine drainage, Natural radiation hazard estimation, Studies on Indian monsoon (both modern and ancient), and Paleoclimate studies of the Indian subcontinent and paleoceanography of the Indian Ocean.

**HUMANITIES & SOCIAL SCIENCES**

The Department focuses on Quantitative economics, Financial economics, Economics of growth, Industrial economics, Development economics, Environmental and resource economics, Financial institutions and markets, Economics of biofuels, Gender and trade, Developing world bioethics, Bioethics and Public Health Ethics, Business ethics, corporate social responsibility, Sociology of health and medicine, Human resource development, Brain and behavior,

Interpersonal, intercultural and organizational communication, End-of-life care and Indic perspective, Generosity behavior, Creative economy, Food security, and Music and audience response.

**INDUSTRIAL & SYSTEMS ENGINEERING**

The thrust research areas of the Department of Industrial and Systems Engineering (ISE) include Logistics and supply chain management, Optimization and simulation of work systems, Decision support systems, Analytics and data sciences, Ergonomics, human factors and safety engineering, Quality engineering, System dynamics, E-business, Product development, Process transformations, and Healthcare systems.

**MATHEMATICS**

Besides extensive research in the thrust areas viz. Functional analysis and Fluid mechanics, significant contribution has also been made by the members of the faculty in the area of Computational fluid dynamics, Micro-nanofluidics modeling, Sediment transport in open channel, Commutative algebra, Applied linear algebra, Numerical linear algebra, Fuzzy mathematics, Bio-Mechanics, Dynamics of nonlinear systems, Inventory management, Graph theory, Integral equations, Queuing theory, Statistical decision theory, Statistical data analysis, Compiler design, Combinatorics, Fractional calculus, Optimization, Theoretical computer science, Information and coding theory and cryptography, Complex networks, Quantum entanglement, Strategic network formation, Data mining, Functional data analysis, and Image processing.

**MECHANICAL ENGINEERING**

The research areas of this Department include Friction stir welding, High speed machining, grinding and development of cutting tools/grinding wheel, Micro manufacturing and micro-scale transport processes, laser materials processing, Bio-mechanics and bio-micro-fluidics, Microfluidics, lab-on-a-chip, Smart materials and composites, and Railway vehicle dynamics, aerodynamics, wheel shelling and high-speed rail transport.

**METALLURGICAL AND MATERIALS ENGINEERING**

The R&D Program of the Department encompasses various areas like Corrosion science and technology, Extractive metallurgy Mechanical metallurgy, Melting, Casting and solidification processing, Modeling, Simulation, Physical metallurgy, Powder metallurgy, Surface engineering etc., Direct reduction of iron ore using mine generated ore and coal fines using rotary Hearth furnace, understanding CO2 mitigation in steel industry using process models are two major areas of research in the area of extractive metallurgy, Investigations related to novel fatigue testing, structure-property relationship of various ceramic and metal-matrix composites, high temperature materials and advanced alloys, development of newer grades of dual phase and micro alloyed steels, superalloys, high strength-lightweight alloys and composites, development of thin sheet steel components remained the thrust areas of activity. In addition, development of bulk nanocrystalline materials based on low stacking fault energy materials, severe plastic deformation processing, and correlation between structural defects on the macroscopic functional properties have been investigated. In addition, in the area of modeling and simulation, significant development has been observed. Application of Computational Fluid dynamics, heat and mass transfer, thermodynamic modeling, atomistic simulation, molecular dynamic simulation, genetic algorithm in several areas of metallurgy has received significant attention and publications.

**MINING ENGINEERING**

The Department focuses on Environment and safety: Application of LCA, GIS and remote sensing for soil and water analysis, Experimental and computational fluid dynamics studies for shock loss determination in mine air flow, Biological and passive treatment of mine waste water, Study of human behavior related accidents in mines, Epidemiological investigations to identify risk factors of occupational injuries in mines, Behavior of pore structure of Indian gas-shales on the methane and CO2 adsorption, Rock mechanics and ground control: Longwall strata control problems, design of shield supports; influence of rock joints on the stability of underground openings, fly ash composites as a substitute for underground mine fill, paste backfill investigations, and Mine planning and geoinformatics: Grade control of mines using multivariate control charts, stochastic simulation and neural networks, integration of GPS & I.SAR ground deformation data over mining areas, and vision based semi-automatic mine navigation system.

**OCEAN ENGINEERING & NAVAL ARCHITECTURE**

Some of the current research and development activities of the Department involve Energy efficient hull forms design for shipbuilding industry, Measurement of flow characteristics around ships to improve propulsion efficiency, Studies on climate change and ocean wave modeling, Under water robotics, Hydrodynamic studies on ships and offshore structures, Hydroelastic analysis of ship and marine structures, Coastal hydrodynamics, Wave energy, Subsea engineering and marine vibration The Department runs a National Program in Marine Hydrodynamics sponsored by Naval Research Board (DRDO) which aims to bridge the knowledge gap in Marine Hydrodynamics and develop indigenous R&D capabilities on Naval Systems. Department has organized various outreach programs like short-term courses and workshops for interacting with industry experts and researchers of sister Institutions in the broad area of Ocean Engineering and Naval Architecture, In collaboration with Royal Institutions of Naval Architects, the Department organized the biennial conference ICSOT-INDIA, 2015, and the Department is in the process of upgrading the infrastructure and augmenting the existing laboratory.

**PHYSICS**

The areas of research in the Department include Astrophysics and cosmology, Atomic and molecular physics, Biophysics, Condensed matter physics, Non-linear dynamics and hydrodynamics, Nuclear and high energy physics and Optics and photonics covering both experimental and theoretical aspects.

**CENTRE FOR EDUCATIONAL TECHNOLOGY**

The thrust areas of this Centre are Instructional design, Technology enhanced learning, Teaching-learning process, Distance education, Speech and image processing, Speech technology development for Indian language and ICT application, Cognitive psychology and human resource development, E-learning, Natural language processing for e-learning, and Artificial intelligence in education.

**CENTRE FOR OCEANS, RIVERS, ATMOSPHERE AND LAND SCIENCES**

The Centre leads the Digital earth initiative of the Institute and is gearing up for the development of a mesoscale land-ocean-atmosphere coupled model, especially suitable for Indian sub-continent. The thrust areas of research and development of this centre include Ocean modeling for Bay of Bengal, Indian ocean and north Indian ocean, Observation and modeling of thunderstorm, Modeling and prediction of tropical cyclone, Study of forest biomass and carbon sequestration, Monsoon meteorology, Air pollution study, Observations and modeling of land surface processes, Mesoscale and land surface data assimilation, Cloud microphysics, Cryospheric studies, Satellite oceanography, and Regional coupled modeling for extreme weather events study.

**RELIABILITY ENGINEERING CENTRE**

The faculty members and students are actively involved in the following research activities: Network reliability, Software reliability, Fault diagnosis and condition monitoring, Accelerated life testing, Probabilistic risk assessment, and Development of virtual lab on "Rotating Machinery Fault Simulation".

**RUBBER TECHNOLOGY CENTRE**

The Centre focuses on Rubber technology, Rubber product design and development, High performance TPEs and TPVs for automotive applications, Rheology and processability of rubber compounds and polymer blends, Conductive rubber nanocomposites for EMI shielding, electrical and electronics applications, Waste rubber recycling, Failure and degradation of rubbers, Shape memory polymer blends and self-healing, Green tire technology, Block, graft, self-healing and super-hydrophobic polymer by controlled/living radical polymerization and 'click' reaction, Smart and stimuli responsive flexible materials, Block copolymers in drug delivery, High performance brake block and insulator for high voltage in outdoor applications, Radiation processing and cross-linking of elastomers, Polymer synthesis in a ionic liquid, a 'Green process of polymerizations', Polymer nanocomposites for biomedical and food packing applications, and Smart textile materials for military and space applications.

**G. S. SANYAL SCHOOL OF TELECOMMUNICATIONS**

The research areas undertaken by the School include Wireless communication and networking, Statistical signal processing and statistical modeling of high dimensional data, Broadband mobile communications, Millimeter wave

communications, 5G and beyond, Cognitive radio, Optical communication and networking, Hybrid optical wireless access networks, Green communications, and Biomedical signal processing.

**RAJIV GANDHI SCHOOL OF INTELLECTUAL PROPERTY LAW**

The research and development activities of the School include Plant metabolic pathway laboratory, Intellectual property education, Research and public outreach program, Governing framework of future cities, Ministry of Human Resource Development, Govt. of India, Designing the 'continuing legal education for advocates in India', Ministry of Law and Justice, Govt. of India, and Policy planning, legal Assessment and governance of smart cities, Ministry of Human Resource Development, Govt. of India.

**RANBIR AND CHITRA GUPTA SCHOOL OF INFRASTRUCTURE DESIGN AND MANAGEMENT**

The School pursues active research in Transportation engineering (Planning, design, operation and management of highways, airport and seaport infrastructure), Environmental engineering (Planning, design, operation and management of water supply and waste management systems, environmental impact Assessment), Facilities infrastructure (Urban infrastructure planning and design, facility programming and specialized building design, building automation systems design, building management systems, regional infrastructure planning and construction), Power systems (Planning, design, operation and management of thermal, hydel and nuclear power plants, renewable power plants, power generation, transmission and distribution, power system planning and reliability), Infrastructure project management, Infrastructure financing and Infrastructure regulatory issues. The School is focusing on six principal thrust areas namely, a) Smart urban Health, education and economy-generating Social infrastructure; b) Transport-oriented-development (TOD) based infrastructure; c) Water resources based economic zone based logistics infrastructure; d) Climate-based and disaster responsive mitigation infrastructure; e) IT-enabled and ICT driven regulatory and governance infrastructure and f) Smart micro-electro-mechanical-systems driven intelligent infrastructure.

**RURAL DEVELOPMENT CENTRE**

This Centre is committed to research and development activities related to the Development and transfer of technology, Resource planning and marketing, and Tribal development.

**SCHOOL OF BIOSCIENCE**

Currently, the School is actively engaged with following areas of research: Molecular and structural biology, and Structure-function relationships of eukaryotic membrane proteins. Particularly, membrane receptors that are associated with the development and progression of cancers, Structure-guided protein engineering for the development of therapeutic reagents, Macromolecular interactions: protein-protein and protein-DNA, Regulation of eukaryotic transcription, Solution NMR spectroscopy for biological macromolecules, and Synthetic and biological investigation of the enediyne moiety and its ability to act as photo-activated affinity probes for selective protein capture.

**KALPANA CHAWLA SPACE TECHNOLOGY CELL**

The major thrust areas of research of this Cell are Liquid combustion, Propulsion and cryogenics, Space communications and EMI/EMC, Micro-machine sensors, Control, Navigation and Guidance, Embedded systems and IP-cores, Cryptography and security, Remote sensing, Life support engineering, Smart materials & exotic materials, Power electronics, Space education, Electronics devices, and Cryogenics.

**SCHOOL OF MEDICAL SCIENCE AND TECHNOLOGY**

Significant numbers of scholars are pursuing fundamental and translational research in the areas of Cancer biology and early diagnostics, Wound healing biology, Regenerative medicine, Biomaterials, Soft & hard tissue engineering, Neuro-rehabilitation prostheses, Pediatric HIV, Proteomic/ Metabolomic dimensions of health and disease, Reproductive Health, Herbal medicine, Medical informatics and CAD, MEMS and microfluidics-based biosensors. Over the past year, SMST has specifically focused on Appropriate medical technology development endorsing theranostics, Epigenomics in regenerative medicine and tissue engineering, Integrated biomarker discovery, Tissue engineered 3D constructs, Low cost paper based biosensors, Diagnostic automation, Vaccination in immune-compromised population, Retinal prosthesis, and Neutraceuticals.

**SCHOOL OF NANOSCIENCE AND TECHNOLOGY**

The Department focuses on the Nanofabrication/nanoelectronic & photonic devices, NEMS, Nanosensors, Bulk nanostructured materials for structural applications, Novel nanomaterials: Synthesis, self-assembly and applications, Nanostructured coatings for energy conversion/storage and surface engineering, Nanobiotechnology, Computational nanostructures, and Soft nanotechnology.

**SCHOOL OF WATER RESOURCES**

The research areas of the School include, Leak detection & urban water supply network management, Eco-friendly treatment systems for reuse of greywater, Pathway identification & toxicity analysis of electrochemical oxidation of methyl orange, Transient conservative pollutant transport model for river-scale application, Artificial intelligence-based storm & inundation prediction from Doppler weather radar, WNARX real-time flood forecasting model using satellite rainfalls, VPMM flow transport model for distributed non-uniform lateral flow in rivers, and Environmental flow assessment under climate change.

**VINOD GUPTA SCHOOL OF MANAGEMENT**

The research areas of the School include, Business data analytics, Globalization and competition, SMEs in India, Societal culture, Leadership and organizational effectiveness, and Positive psychology.

**CENTRE FOR THEORETICAL STUDIES**

Research areas of this centre include theoretical/computational aspects of science and engineering in areas of Astrophysics and Gravitation, Chemistry, condensed matter science, Mathematics and mathematical physics, Nonlinear science, and High energy physics.

**INFRASTUCTURE DEVELOPMENT**

As a modern technological institution, we constantly upgrade our existing infrastructure to accommodate growing number of campus residents and to facilitate state-of-the art methods of teaching and research. Listed below are some recent additions.

**AEROSPACE ENGINEERING**

New facilities created in the Department include, Oxygen Bomb Calorimeter, Model: C200, Make: IKA, Digital Delay Generator, 250 fS, 4 Channels with Gate Input, Time base Stability, Clock Out, model 745-4C-GOC, Berkeley Nucleonics Corporation, Optical Table, 6′long x 3′ wide x 21″ thick, TMC, Laser, Diode-pumped, solid-state, 532 nm, Repetition Rate: 400 Hz, Pulse Width: less than or equal to 800 ps, Spark-S500-SHG, IB Photonics Ltd., Liquid Mass Flow Controller, M13-AGD-22-0-S mini Cori-Flow, BRONKHORST CORI-TECH, 32 port ZOC pressure scanner unit for 15 psid and 10 inch water column, Make: Scanivalve, 6 component load cell unit. Make: Chunk, 6 component strain gage based sting balance for Low Speed Wind Tunnel. Make: Aerobalance Associates, Drag balance for Supersonic Wind Tunnel. Make: Aerobalance Associates.

**AGRICULTURAL AND FOOD ENGINEERING**

The Department created the following facilities: Hyperspectral Imaging System, Twin-Screw Rice Extruder, and Diffractometer Using Laser Diffraction.

**ARCHITECTURE AND REGIONAL PLANNING**

The Department acquired the following new facilities: Sketch-up Pro and V-Ray Software, DSLR Camera with extra zoom lens for 3D Media Lab, 3D Printer, PTV-Visum and PTV-Visim Software, Rolta Geometica Software, Global Navigation Satellite System, Total Station for Geo Informatics Lab, Design Built Software, Hammer and Ultrasonic Pulse Velocity Meter, Multimedia Projector, and Plotters and A3 Printers.

**BIOTECHNOLOGY**

New facilities created in the Department include, Stereo zoom Microscope, Projector, IVC case/rack, Temperature controlled Heat Plate, Live Cell Imaging Microscope, and Preparative HPLC.

**CHEMICAL ENGINEERING**

The Department acquired FESEM and XRD machines in the last year.

**CHEMISTRY**

In the past year, the Department created the following new facilities: BET Surface Area Analyzer, Liquid chromatography–mass spectrometer (LC-MS), Fluorimeter (solid state mode), Gas Analyzer, Advanced Gel Permeation Chromatograph, Differential Scanning CalorimeterRheometer, and Atomic Force Microscope.

**CIVIL ENGINEERING**

A new 3000 kN servo hydraulic UTM and full activation of 6 degrees-of-freedom shake table were created in the last year.

**COMPUTER SCIENCE AND ENGINEERING**

A Side Channel Laboratory and an IoT Laboratory were set-up. High speed wireless access testbed - IEEE 802.11 ac supported routers, and USRP were procured and set up.

**ELECTRICAL ENGINEERING**

The Department procured a thermal camera (8-12 micron) of 640x480 resolution from Infratec GmbH, Germany (Centre for Railway Research), an Electronic Tongue instrument (Bioprocess Instrumentation Lab), and an Electronic Nose instrument (Bioprocess Instrumentation Lab). The OP4500 simulator was installed in the Drives laboratory.

**ELECTRONICS AND ELECTRICAL COMMUNICATION ENGINEERING**

The new facilities created in the Department include, Deep Reactive Ion-Etching System with Cryo-cooling System installed at Micro Electronics Laboratory of E & ECE Department, State of the art VLSI test laboratory in collaboration with Keysight Technology, formerly Agilent Technology (this is a comprehensive VLSI Test laboratory first time in India), Two Photon Microscope for functional imaging of neural activity, and capable of simultaneous imaging and photostimulation.

**GEOLOGY AND GEOPHYSICS**

The Department acquired two Stable Isotope Ratio Mass Spectrometers (IRMS) from the Institute Diamond Jubilee Fund. The Thermo-Finnigan MAT-253 equipped with dual inlet port and eight collectors are capable of measuring carbon isotopes. In addition, the Laser Fluorination system would enhance the capability of the instrument for measuring oxygen isotopic composition in silicates. The newly supplied conFlo IV attached with the Delta V can be used for measuring C, H, N, O, S isotopic composition in solid and liquid samples, State-of-the-art MC-ICPMS Laboratory, Ground Penetration Radar System (GSSI SIR-3000) with multi-low frequency (16-80 MHz) and 2000 MHz Bistatic antennas for geo-exploration, and Low level Portable Gamma NaI(Tl) based gamma ray scintillation equipment.

**HUMANITIES AND SOCIAL SCIENCES**

The Department is equipped with state-of-the-art language lab, an econometrics lab and a psychology lab. In the last year, the Department went for renovation of its Psychology lab and its econometrics lab is under renovation. The econometrics lab and computer lab are equipped with data analytics software like STATA and SPSS and database like NSS unit level data and Indiastat.com.

**INDUSTRIAL AND SYSTEMS ENGINEERING**

The Department has developed “Safety Analytics and Virtual Reality Laboratory” for advanced research and teaching in safety engineering and management. The laboratory is equipped with sophisticated data analytics software like SAS, CPLEX, CATIA, and QUEST and Virtual Reality (VR) system encompassing stereo-desktop, projection and immersive facilities, head mounted display (HMD), associated software, and tracking and interactive devices that facilitate research and training on safety including operations in Hazardous Environments. The e-business Centre of excellence under ISE is fully operationalized. The department has taken active participation in the operation and development of Design Innovation Centre of the institute.

**MATHEMATICS**

One Window AC purchased for innovation lab, Two multimedia projectors were purchased for two computer labs, MHRD Lab has been renovated, Department has created an Innovation Lab for UG/PG students with 8 PCs and it is equipped with Multimedia Projector which will operate on 24x7 basis.

**MECHANICAL ENGINEERING**

ANSYS Academic Research (Mechanical and CFD) was procured by the Department in the last year.

**METALLURGICAL AND MATERIALS ENGINEERING**

Planetary Ball Mill PM 400 MA, HMT High Speed Precision Lathe NH 22/1000 with Standard accessories, Chamber size Controlled Atmosphere muffle Furnace mounted on trolley maximum Temperature $1000^0$C etc. and High Temperature Contact Angle Measurement facilities were created in the Department.

**MINING ENGINEERING**

The Department acquired a Servo-controlled Direct Shear-cum-Triaxial Testing Machine of capacity 2000 kN normal load and 1000 kN shear load, under the one time seed grant for research infrastructure. This is a unique test facility in the country and a National resource. ONGC granted additional support to incorporate hydro-fracture test feature into this machine.

**OCEAN ENGINEERING AND NAVAL ARCHITECTURE**

The Department acquired Workstation HP-1, HM 150.06 stability of floating bodies, Slip ring for mounting on shaft – 2, Pulsed Sygernic MIG/MAG welding machine, Digital protector series 950 - pro 3600, Encoder incremental, PC Desktop-9, Underwater accelerometer, Spares for 200 A DC Drive panel, and HP 1005 laserjet-01.

**PHYSICS**

The Department created new facilities for the studies on Ultrafast Processes for Electronic, Spintronic, Magnonic, and Photonic Applications.

**CENTRE FOR EDUCATIONAL TECHNOLOGY**

The video studios are being updated to high definition (HD) system and as a result new set of instruments viz. camera, switcher, etc. have been installed.

**CENTRE FOR OCEANS, RIVERS, ATMOSPHERE AND LAND SCIENCE**

The Centre created the following new facilities: New Space for CORAL at the New J. C. Ghosh and P. C. Ray Science Block, Portable Automatic Weather Station (AWS) has been acquired for CORAL, Video conferencing Facility is being installed, and Well-equipped Seminar Room has been built.

**MATERIALS SCIENCE CENTRE**

The Centre acquired Seebeck coefficient measurement system and Universal Testing Machine.

**RELIABILITY ENGINEERING CENTRE**

The Centre acquired Electrical Fault Simulator System with facilities for broken rotor bar and inter-tern fault.

**RUBBER TECHNOLOGY CENTRE**

Differential Scanning Calorimetry (DSC), Thermogravimetric Analysis (TGA), and Network Analyzer (NA) facilities were created in the Centre.

**G.S. SANYAL SCHOOL OF TELECOMMUNICATIONS**

The new facilities created in the School include, Graphical System Design Tool, MIMO Channel Builder, LTE A Baseband Verification Library, Host PC Based RF Transceiver (NI- USRP) (Frequency range 1.2 GHz to 6 GHz, RF Signal bandwidth 40 MHz), Vector Signal Transceiver with IQ Interface (NI - VST) (Frequency range 1.2 GHz to 6 GHz, RF Signal Bandwidth 60 MHz), Baseband Tx-Rx Development module with IF input & output stages (Frequency range DC to 300 MHz, Bandwidth 100 MHz), PXI Express compliant controller platform (Backplane – Hybrid

compatible PXI Express, Cumulative System Bandwidth 12 GB/s), and In-house development of visible light communication test bed.

**RAJENDRA MISHRA SCHOOL OF ENGINEERING ENTREPRENEURSHIP**

The new facilities created in this School are Product Analytic and Modeling Lab, Energy Lab Instruments, and ISIRD Lab Instruments.

**RAJIV GANDHI SCHOOL OF INTELLECTUAL PROPERTY LAW**

The School built a 220 seat state-of-the-art Auditorium.

**RANBIR & CHITRA GUPTA SCHOOL OF INFRASTRUCTURE DESIGN AND MANAGEMENT**

The School acquired 10 desktop computers, PRIMAVERA and MX Roads software. The School has taken new strides to initiate the new premises in the New Science Block with 6 state-of-the-art infrastructure Labs on 6 different areas of Infrastructure. The school has also acquired 30 desktop computers with state-of-the art software in Visual and Design Simulation.

**SCHOOL OF ENERGY SCIENCE AND ENGINEERING**

The School acquired Fridge (Temp: -40°C), Centrifuge, Ultrasonic Bath, Hot Air Oven, Fridge (Temp: - 200°C), Shaker Biospectrometer, Polymer Chain Reaction (PCR), Magnetic Stirrer, Gas Chromatograph, and Spectral response efficiency measurement system EQ.

**SCHOOL OF ENVIRONMENTAL SCIENCE AND ENGINEERING**

The new acquisitions of this School are Atomic Absorption Spectroscopy (AAS), Gas chromatography (GC) and Gas Chromatography Mass Spectrometry (GC-MS), Ion Chromatography (IC), Inductively Coupled Plasma Mass Spectrometry (ICP-MS), Liquid Chromatography-Mass Spectrometry (LCMS), Total Organic Carbon (TOC), X-Ray Diffraction (XRD), X-Ray Fluorescence (XRF), and Zeta-sizer Nano Z.

**SCHOOL OF MEDICAL SCIENCE AND TECHNOLOGY**

The new facilities created by the School include, 3D printer, 8 channel current stimulator from Multi Channel Systems and 128 channel Grapevine Scout data acquisition system, Optical Microscope, Computational Workstation, Up-gradation of SS-OCT to PS-OCT, Multiscan GO, Biorad Western Blot, -20°C Freezer, GE NanoVeu Plus, Dynamic light scattering system for particle size measurement and zeta potential of nanoparticles, and Development of new premises for SMST.

**SCHOOL OF WATER RESOURCES**

In the last year, the school acquired Water Flow meter, Bench Top Conductivity/TDS Meter, Manual Soil Auger, Submersible Liquid Level Transmitter, Professional Plus Handheld Multiparameter, Turbidity meter, GPRS based automatic weather station, Wi-Fi enable data acquisition filed node for remote ground water level sensor, and Wi-Fi enable data acquisition filed node with integrated water flow sensors.

**VINOD GUPTA SCHOOL OF MANAGEMENT**

The new facilities created in the school include Bloomberg Real-time Database, AceEquity Financial Database, Prowess IQ, and CRISIL Research.

**ADVANCED TECHNOLOGY DEVELOPMENT CENTRE**

Pulsed-Laser-Deposition (PLD) System has been procured and successfully installed. This system will be used to deposit different thin films on silicon substrate for possible applications in lithium ion battery. Deep-Reactive-Ion-Etching (DRIE) system has been procured and installed primarily for etching silicon (Si) substrate. It will be used for fabricating different MEMS and Si-Photonic devices.

**KALPANA CHAWLA SPACE TECHNOLOGY CELL**

A number of software and hardware have been procured under KCSTC projects to enhance the research platform of KCSTC as well as different department laboratories. A few of these are, CST Software-Microwave studio, version-5,

IE3D version 9, MATLAB, WIPL-D, HFSS, VCO Model ZOS-1025, LNA, Filters, Mixers & TCAD software for VLSI design.

**INFRASTRUCTURE DEVELOPMENT IN THE INSTITUTE**

The Civil Construction and Maintenance section has taken up several construction projects to cater to the infrastructural requirements of the Institute. The construction of new faculty transit apartments, married scholar accommodation, 100 units of post-doctoral accommodation, foreign visitor's accommodation, and faculty apartments are at various stages of progress. The construction of Nivedita hall of residence and extension of Vikram Sarabhai residential accommodation are under progress.

The foundation work for construction of the Main Hospital Building for the Dr. B.C. Roy Institute of Medical Science & Research has been completed and work is in progress at the second floor level. 66 New Faculty Accommodation units in 11 (G+2) buildings are being constructed by CPWD in place of several dilapidated/demolished quarters. In Nalanda Complex, the remodeling and finishing of 30 class rooms (RCR-1 & CCR-1) are completed while work in STB-1, STB-2, Administrative Block are in progress. In the J. C. Ghosh Science Block and P. C Ray Laboratory Block, 6 Floors have been handed over and the HVAC work in the remaining floors is in progress. Excavation work for the Life Science Building of Diamond Jubilee Complex is almost completed. The work order for the (B+G+9) Main Building along with Auditorium, Sub Station building and services for the construction of research park at Rajarhat, Kolkata, has been issued by CPWD. The super structure of the Auditorium has been completed and work for the roof dome is under progress. The super structure of the Main Building has been completed up to the sixth floor level. Under the new water supply project of the institute, total pipe laying has been done for 11.04 km out of 12.60 km. The work is in progress in the SE Rly Goods yard Area where total of 4.29 km has been laid out of 5.50 km. Pier casting and Collector well casting work is in progress.

The Institute has taken up an initiative of conversion of conventional sodium vapor and mercury vapor street lights into LED street lights in phases. The job is in its last phase. 100 kWp solar power plant in the roof top of the Mathematics Department of the Institute is installed. The power generated is being fed to the Grid. Total energy generated is 80,000 units in 6 months. A proposal for 1000 kWp distributed roof top power solar plant has been approved and tendered. The institute has installed the occupancy sensor for automatic switching operation of light and fan in several classrooms and auditoriums. New generation ESE Type lighting arresters have been installed in the Institute Main Building, Old Building and in five Halls which will protect the large area of the Institute from lightning.

Technology Telecom Centre (TTC) provides voice communication services to subscribers in the academic as well as in the residential campuses. During the financial year (2015-16), TTC laid underground telephone cables for the newly constructed building of Centre for Railway Research and transferred telephone lines from the old SMST Department to its relocated place at old NCC building. TTC also laid necessary cables to the Central Research Facility (CRF) building in an exercise to restructure the existing telephone cables. Laying of underground telephone cables from the telephone exchange to J.C. Ghosh and P.C. Ray science block is under process.

IIT Kharagpur is going to launch its new website very soon. The integration with ERP data is already complete. Presently, the website is under testing.

**CENTRAL RESEARCH FACILITY**

The central research facility of the Institute in the last year has acquired several state-of-the-art equipments, such as, (a) Vibrating Sample Magetometer (VSM) for High Precision Measurements of Magnetic Properties, (b) Small molecule Single Crystal X-Ray Diffractometer System, (c) Cryo-Analytical High Resolution Transmission Electron Microscope make 200KV Field Emission Transmission Electron Microscope, (d) Table Top and Portable X-Ray Diffractrometer, (e) LTD Model 800 Series Nitrogen Gas Cryostream Cooler standard 1500mm x 905mm 50/60Hz, M/S. Oxford Cryo-systems, United Kingdom, (f) X-ray Micro CT Tomography, and (g) Pulsed Electron Paramagnetic Resonance (P-EPR).

**ALUMNI AFFAIRS AND INSTITUTIONAL DEVELOPMENT (ID) PROGRAM**

The alumni of IIT Kharagpur have been the global champions and brand ambassadors of the Institute. On one hand, their accomplishments across various domains have enhanced our global image and brought us recognition, while on the other, their spontaneous contributions and support have constantly encouraged us to move forward. Maintaining

close relations and being in constant touch with our alumni constitute one of the cornerstones of regular activities of the Institute. The Office of the Dean, Alumni Affairs & International Relations (AA&IR), the Institutional Development (ID) Program Team and the Students Alumni Cell work together to achieve this by organizing alumni events, maintaining connections through our numerous and regular communications and conduct branding and fundraising activities.

The major activities undertaken during 2015-16 are given below.

**ALUMNI CONNECTIVITY**

Close and sustained connections with our alumni have been top priority for us and the alumni website iitkgp.org has been a key facilitator. Registrations on this portal have crossed the 20000 mark. We also regularly connect with the larger stakeholder groups - alumni, students, faculty members, retired faculty members and parents – through our mass mailing system and keep them informed about the latest developments at or related to the Institute. Seasonal Greetings and various fund-raising campaign updates are also sent via mass mails. Mass mailers go out to more than 49000 people, up from 42000 last year. Besides, we are also connected to about 42000 alumni through the University Page on LinkedIn.

**BRANDING**

In keeping with our continuous efforts to improve our global brand image, we have reached out to media regularly with news and information on research, academics, student achievements and other developments at the Institute. This systematic focus on visibility enhancement has resulted into 260 insertions on 74 unique stories (up from 128 insertions on 27 unique stories last year) in a wide variety of media publications. Our branding activities and initiatives have received a further fillip from the establishment of the Students' Branding and Relations Cell. Among other things, this Cell has prepared videos that highlight and communicate the work in individual Departments. The website why.iitkgp.ac.in for IIT aspirants and JEE qualifiers is also publicized to help them know more about Institute academics, student life and facilities.

**PUBLICATIONS**

Our internal publications provide another key tool for us to share Institutional and student-related news as well as encourage participation of alumni in institutional activities. To that end, we have launched a new electronic newsletter 'Clap for KGP' which sends out positive news and achievements of the Institute and all its stakeholders. A new magazine 'IIT KGP Researcher' has also been launched and has received wide appreciation from the academic community. Other regular publications such as the Alumni Annual Report and the annual souvenir "Yearnings of Yore" were published during the Annual Alumni Meet. In addition, we published a steady stream of communication and other material such as brochures for different campaigns, Foundation Day Celebrations, Alumni ID Cards as well as separate Yearbooks for UG, PG and Ph.D. students.

**AWARDS**

The Distinguished Alumnus Award was conferred by the Institute to the alumni during the Annual Convocation 2015. The distinguished alumni who were presented with the Award were Bedabrata Pain (1986/EC/PH): CEO Edict Inc., Chetan Vaidya (77/AR/VS): Director, School of Planning and Architecture, Delhi, Peter Chan (62/EERK): Founder and CEO, Herons Bonsai Ltd., Manoj Gandhi (82/CS/AZ): Executive VP, Verification Group, Synopsys, Rakesh Verma (69/NA/NH): Executive VP, TAFE, Pradip Dutta (83/ME/AZ): Professor and Chairman, Department of Mechanical Engineering, IISc Bangalore, Venkatesh Shankar (84/NA/NH): Professor and Coleman Chair in Marketing Texas A&M University.

**FUNDRAISING CAMPAIGN**

Under the Institutional Development (ID) Program several fundraising campaigns are being carried out to build corpus through endowment mode to ensure self-sustainability in the long run. The campaigns such as Batch Endowment encourages alumni to contribute in the name of their batch. When the collection from a batch reaches the milestone of INR 50 Lakh, the batch is commemorated with a classroom named after it in the Nalanda Academic Complex. In 2015-16, the batch of 1966 achieved this target. Hall Endowment is another campaign where alumni are appealed to donate for the development of their Halls. Two more campaigns were launched in 2015-16 – Students

Innovation Endowment and International Endowment. A campaign was also launched to support the M N Faruqui Innovation Centre. An Annual Donation Program is also being run for those alumni who prefer to donate a fixed amount every year.

**MY IMPRINT PROGRAM**

The 'My Imprint Class Gift' program has been consistently promoted among the graduating students to inculcate the culture of giving back while they are still at the Institute. In 2015-16 the donating students have opted for "Installation of Campus Benches" as "Class Gift from Class of 2015".

**INSTITUTE WEBSITE**

The Institute website has been taken under the aegis of Institutional Development Program. The team created and edited content for various sections of the website.

**ANNUAL ALUMNI MEET AT IIT KHARAGPUR**

This is the flagship event of the Office of Alumni Affairs & International Relations. The office along with Students Alumni Cell and Technology Alumni Association Kharagpur hosted the 13th annual alumni meet from 15th-17th January, 2016. The special guests of honor were the graduating batches of 1966, 1976 and 1991. The meet was attended by more than 250 alumni along with their families.

**FOUNDATION DAY**

The 65th Foundation Day of IIT Kharagpur was celebrated on August 18, 2015. The Chief Guest was Dr. S Christopher, Director General of the Defense Research and Development Organization, India. In an open house, Dr. Christopher shed light on his journey after graduating from the Institute. Like every year on the occasion of Institute Foundation Day, faculty and staff members who completed 25 years of service were felicitated by the Director. Ms Sujata Roy, the Vice President of IIT Foundation India also graced the ceremony with the announcement of Alumni Sponsored Awards. In the evening, a debate was conducted among the student and faculty members of the Institute. This year's Foundation Day Debate topic was "For the IITs, Leading in the World is more important than Making in India".

**GUEST LECTURES**

The Students' Alumni Cell, IIT Kharagpur conducts Guest Lectures throughout the year. The year started with the Students' Alumni Cell hosting the awardee of the Distinguished Alumnus Award as its speaker for the first guest lecture. The Cell hosted Mr. Ranbir Sinha who conducted a workshop on Design Innovation in the month of October. In March, two recently graduated alumni of the Institute, Mr. Amritanshu Anand and Mr. Gaurav Dahake were invited to deliver a guest lecture on the theme 'How to Startup'. Both the alumni established successful business ventures as soon as they graduated from the institute. The event was enthusiastically received by the student community, especially the ones hoping to start up on their own in the near future.

**LEADERSHIP SUMMIT 2**

On the occasion of the 61st Convocation, a panel discussion titled "KGP AND BEYOND..." was organized. Hundreds of eager students filled the auditorium to draw inspiration from the alumni who have made it large in their professional lives. Seven alumni who have excelled in different fields shared the stage to discuss life, journey and challenges beyond the campus. The following were the guests of honor for the program: Mr. Bedabarata Pain, Chief Executive Officer of Edict Inc; Chetan Vaidya, Director, School of Planning and Architecture, New Delhi; Peter Chan, Founder and CEO, Herons Bonsai Ltd; Manoj Gandhi, Executive Vice-President and General Manager, Verification Group, Synopsys; Rakesh Verma, Executive Vice-President (Research and Development), Tractors and Farm Equipment Ltd (TAFE); Pradip Dutta, Professor and Chairman, Department of Mechanical Engineering, IISC Bangalore; Venkatesh Shankar, Professor and Coleman Chair in Marketing and Director of Research, Centre for Retailing Studies, Texas A&M University, USA.

**ALVIDA**

The annual farewell dinner, called "Alvida" was organized by the Technology Alumni Association, Kharagpur Chapter in association with the Office of AA&IR on 20th April, 2016. The event was graced by the Dean of Alumni Affairs &

International Relations, and the Director. The event was very well received by the student community and saw a turnout of more than 2000 students. The passing out students wrote enthusiastically on the graffiti wall installed at the arena. Students were also motivated to participate in the My Imprint Program and take their first step towards 'giving back' – contributing to the development of the institute by donating their caution money. Overall, the event was a grand success.

**REGIONAL STUDENTS' ALUMNI MEET**

Regional Students Alumni Meets were organized over the year in the cities of Hyderabad, Delhi and Bengaluru. The events were conducted in Hyderabad and Delhi in June and in Bengaluru in December. The Student Alumni Meet aims to connect the alumni of a particular region to the current batch of students from the institute and foster student-alumni relations. The event was very well received by the student and alumni community alike in all the cities. Student Alumni Meets would be conducted in other major cities of the country in the near future.

**MENTORSHIP PROGRAM**

The Student Alumni Mentorship Program is one of its flagship programs to foster student-alumni relations. The program helps connect students to alumni who are working in a field that they are interested in. This way, students get to learn from experiences rather than theoretical knowledge of the field alone. This was the second year when a dedicated portal was launched for the program. The portal was enthusiastically received by the students with registrations coming in large numbers after the launch of the portal. The Students' Alumni Cell hopes to serve as many students as possible through the program.

**INTERNATIONAL RELATIONS**

**Inbound Students' Visits**

The following students visited IIT Kharagpur during the period April 2015 – March 2016

| Name | From | Purpose |
|---|---|---|
| Ms. Bertille Edith Bella Nke | Laboratoire de Geologie de I'Environment (LGE) Departement des Sciences de la Terre, Universite de Dschange (Cameroon) | to pursue a part of her Ph.D. research |
| Mr. Andrew Keeton | University of California, Berkeley, USA | to undertake summer project under Cal Energy Corps Program of University of California Berkeley |
| Ms. Julia Sawaya | University of California, Berkeley, USA | to undertake summer project under Cal Energy Corps Program of University of California Berkeley |
| Mr. Charles Benjamin Strauber | Stanford University, California, USA | to complete United States-India Educational Foundation (USIEF) Program |
| Mr. Philipp Gribisch | Leibniz University, Hannover, Germany | to carry out one semester course work in the Dept. of Physics and concerned laboratory, IIT Kharagpur |
| Ms. Nik Zainab Nik Azizan | University of Sains Malaysia (USM) | to carry out her research work for three months |

| | | |
|---|---|---|
| Mr. Asmaysinh Gharia | University of California, Berkeley, USA | to undertake summer project under Cal Energy Corps Program of University of California Berkeley |
| Mr. Rohan Chakraborty | University of California, Berkeley, USA | to undertake summer project under Cal Energy Corps Program of University of California Berkeley |
| Mr. Izak House | University of Twente, Netherlands | to pursue internship to fulfil the requirement for Master's Program in Applied Physics, University of Twente |
| Mr. Gabriel Filipe Werner | Technical University Munich (TUM), Boltzmannstr, Germany, Department of Informatics | to pursue courses |

**SHRI GOPAL RAJGARHIA INTERNATIONAL PROGRAM (SGRIP) ENDOWMENT FUND**

International participation plays a significant role towards improving the world rank of a university. Alumnus Shri Gopal Rajgarhia (68/BTech/CH/NH) has been supporting the Institute in this regard. Shri Gopal Rajgarhia International Programme (SGRIP) endowment fund created from the donation made by him aims to support various schemes to enhance international participation. The Program funds four schemes for attracting international faculty and students to IIT Kharagpur. It also supports students, without additional sources of funding to participate in reputed international events. This year the committee has received 23 applications with contributions from various disciplines. The institutions with which IIT KGP has MoUs may play a key role in participating in such a scheme. Under the leadership of Director, a five member committee has been constituted under the chairmanship of Dean, AA&IR with the responsibility of taking the core decisions for the programs under SGRIP. Additionally, a faculty coordinator has been appointed to look after the activities. Five programs are proposed to be carried out under the scheme: SGR International faculty outreach program, SGR International research scholar support program, SGR International student scholarship program, SGR international Workshops/Meetings, and SGR student international travel support. The first SGRIP committee meeting was held on July 31, 2015. A total of 10 visits from the Autumn2015 cycle were successfully completed in this semester and reports have been submitted. In the second call for proposals for Spring 2016, total ten proposals were received out of which nine got approved.

**OUTBOUND STUDENTS' VISITS**

Undergraduate Students are mandated for at least one internship during their B.Tech. course. Many students also go for optional summer internships. The students of IIT KGP are spread across the world in top universities and institutions for global exposure in academics, research and industry orientation. In 2015-16, more than **185** students went for international internships.

More than **400** students and research scholars participated in international conferences for presentation of papers. The Institute funds the international travel of these scholars. Several students visited foreign universities under DAAD Scholarship and WMG programs.

**FACULTY VISITS**

21st international faculty members visited the Institute under the International Summer and Winter Term and Global Initiative of Academic Networks. The faculty came from reputed foreign universities such as University of Texas at Austin, USA, University of Minnesota, USA, Aalto University, Finland, Universityof the Negev, Beer-Sheva, Israel, Virginia Polytechnic Institute and State University, USA, University of London, UK, University of Newcastle, Australia, James Cook University, Australia, Technische Universit at Berlin, Germany, University of Leeds, UK, and many more.

**MOUS WITH INTERNATIONAL ORGANIZATIONS**

The Institute had the following International MoUs during the period April 2014 – March 2016

| | |
|---|---|
| Academic Exchange between IIT Kharagpur and The University of Tokyo, Japan (extended validity) (Agreement) | Signed on 22nd July 2013<br>Annexure signed on 17.08.2015<br>Validity : Upto 27th April 2018 |
| Curtin University, Australia (MoU) Agreement for the Establishment of a Dual Doctoral Degree Programme between Curtin University of Technology, Australia | Signed on 1st December 2011<br>Validity: 5 years<br>Signed on 15th May, 2015<br>Validity : 5 years |
| IIT Kharagpur and The University of Warwick, as represented by WMG, UK (MOU) | Signed on 18th April, 2008<br>Validity: 5 years<br>Renewed on 4th March, 2015<br>Validity: 5 years |
| Institute of Engineering, Tribhuvan University, Nepal and IIT Kharagpur (MoU) | Signed on 17.1.2006<br>Renewed on 11th June, 2015<br>Validity : 5 years |
| Technical Collaboration Agreement between the George Washington University (GWU), USA and IIT Kharagpur | Signed on 13th January, 2006<br>Validity: 5 years<br>Renewed on 20th July, 2015<br>Validity : 5 years |
| TOTAL France and IIT Kharagpur (MOU) | Signed on 18th February, 2009<br>Validity: 3 years initially<br>Renewed on 16th March, 2015<br>Validity : 3 years |
| University of Southampton, UK and IIT Kharagpur (MOU) | Signed on 17th April, 2008<br>Validity: 5 years<br>Signed on 5th March, 2015<br>Validity: 5 years |
| The University of Twente, Enschede, Netherlands and Indian Institute of Technology Kharagpur. (MoU) | Signed on 21st January, 2015<br>Validity: 5 years |
| The University of Alabama, USA and Indian Institute of Technology Kharagpur. (MoU) | Signed on 30th March, 2015<br>Validity: 5 years |
| National Tsing Hua University (NTHU), Taiwan and Indian Institute of Technology Kharagpur. (MoU) | Signed on 15th April, 2015<br>Validity: 5 years |
| Central Building Research Institute (CBRI), Roorkee and Indian Institute of Technology Kharagpur. (MoU) | Signed on 18th April, 2015<br>Validity: 5 years |
| Research and Development Centre of Nippon Koei Co. Ltd. (RDCNK), Tsukuba, Japan and Indian Institute of Technology Kharagpur (MoU) | Signed on April, 2015<br>Validity: 5 years |
| Universita Cattolica Del Sacro Cuore (Italy) and Indian Institute of Technology Kharagpur (MoU) | Signed on 29th May, 2015<br>Validity: 5 years |
| Taipei Medical University and Indian Institute of Technology Kharagpur (MoU) | Signed on 21st July, 2015<br>Validity: 5 years |

| | |
|---|---|
| Dwight Look College of Engineering, Texas A&M University (TAMU), USA and Indian Institute of Technology Kharagpur (MoU) | Signed on 17th July, 2015<br>Validity: 5 years |
| The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Telangana State and Indian Institute of Technology Kharagpur (MoU) | Signed on 26th August, 2015<br>Validity: 5 years |
| The University of Liverpool, UK and Indian Institute of Technology Kharagpur (MoU) | Signed on September, 2015<br>Validity: 5 years |
| The Graduate School of Management, Kyoto University and Indian Institute of Technology Kharagpur (MoU) | Signed on 30th September, 2015<br>Validity: 5 years |
| Ben-Gurion University of the Negev (BGU), Israel and Indian Institute of Technology Kharagpur (MoU) | Signed on 14th October, 2015<br>Validity: 5 years |
| The Hebrew University of Jerusalem, Israel and Indian Institute of Technology Kharagpur (MoU) | Signed on 14th October, 2015<br>Validity: 5 years |
| University of Haifa, Israel and Indian Institute of Technology Kharagpur (MoU) | Signed on 14th October, 2015<br>Validity: 5 years |
| Princess Sumaya University for Technology (PSUT), Jordan and Indian Institute of Technology Kharagpur (MoU) | Signed on 11th October, 2015<br>Validity: 5 years |
| The University of Jordan and Indian Institute of Technology Kharagpur (MoU) | Signed on 11 th October, 2015<br>Validity: 4 years |
| Ewha Womans University (EWU) and Indian Institute of Technology Kharagpur (MoU) | Signed on 11th November, 2015<br>Validity: 5 years |
| Rutgers, The State University of New Jersey, USA and Indian Institute of Technology Kharagpur (MoU) | Signed on 22nd January, 2016<br>Validity: 5 years |
| Colorado State University, USA and Indian Institute of Technology Kharagpur (MoU). | Signed on 4th January, 2016<br>Validity: 5 years |
| The Faculty and Graduate School of Agriculture, Kyoto University and Indian Institute of Technology Kharagpur (MoU). | Signed on 22nd February, 2016<br>Validity: 5 years |

**MoUs with National Organizations**

The Institute had the following National MoUs during the period April 2014 – March 2016

| | |
|---|---|
| MoU with Hindustan Aeronautics Limited (HAL), Bangalore. | Signed on 30th April, 2014<br>Validity: 3 years |
| Donation by Professor Tapan Prasad Bagchi to IIT Kharagpur (Agreement) | Signed on 25th June, 2014 |
| MoU with SAP Lab India Doctoral Fellowships at IIT Kharagpur | Signed on 3rd July, 2014<br>Validity: 2 years |

| | |
|---|---|
| MoU with Rajasthan University of Veterinary and Animal Science (RAJUVAS), Bikaner. | Signed on 5th August, 2014<br>Validity: 5 years |
| MoU with Delhi Mumbai Industrial Corridor Development Corporation (DMICDC). | Signed on 21st August, 2014<br>Validity: 5 years |
| MoU with Indian Institute of Engineering Science and Technology (IIEST). | Signed on 10th November, 2014<br>Validity: 5 years |
| MoU with Power System Operation Corporation Limited (POSOCO), New Delhi. | Signed on 14th November, 2014<br>Validity: 5 years |
| TVS Motors Chair Professor and IIT Kharagpur (MoU) | Signed on 6th August, 2010<br>Validity: 5 years<br>Extension on August 7, 2015<br>Validity: 5 years |
| Opal-RT Technologies India (P) Ltd. Bangalore and Indian Institute of Technology Kharagpur. (MoU) | Signed on May, 2015<br>Validity: 5 years |
| BEML Limited, Bangalore and Indian Institute of Technology Kharagpur (MoU) | Signed on June, 2015<br>Validity: 5 years |
| Defence Research & Development Organisation (DRDO), Ministry of Defence, Govt. of India and Indian Institute of Technology Kharagpur (MoC) | Signed on 18th August, 2015<br>Validity: 5 years |
| Indian Council of Medical Research (ICMR) and Indian Institute of Technology Kharagpur (MoU). | Signed on 21st January, 2016<br>Validity: 5 years |
| American Society for Quality India Pvt. Limited (ASQ India), New Delhi and Indian Institute of Technology Kharagpur (MoU). | Signed on 3rd March, 2016<br>Validity: 3 years |
| Tamil Nadu Fisheries University, Nagapattinam and Indian Institute of Technology Kharagpur (MoU) | Signed on 1st December, 2015<br>Validity: 5 years |

**SPONSORED RESEARCH & INDUSTRIAL CONSULTANCY (SRIC)**

The IITs are increasingly being regarded as the primary drivers for indigenous technology development targeting the needs of the nation. Research sponsored by Government as well as the industry is expected to grow in the years to come, spearheaded by the faculty members and research students of the premier academic institutes. At IIT Kharagpur, the Sponsored Research and Industrial Consultancy (SRIC) cell acts as the conduit for industrial interaction and faculty participation in sponsored research. The wide variety of engineering sciences at IIT Kharagpur provides a unique environment that fosters inter-disciplinary research in cutting edge technology areas, such as energy, nanotechnology, semiconductors, bioengineering, and computational sciences. The diversity of in-house expertise at IIT Kharagpur has also catalyzed the development of a healthy ecosystem for large scale industrial collaborations in multi-disciplinary areas, such as automotive control software, railways research, steel technology, petroleum and biofuels research, industrial robotics, and many more.

The year 2015-16 has witnessed a significant evolution in the models for research funding from the government. The Ministry of Human Resource Development has taken up a leadership role through the newly introduced schemes of **Uchchatar Avishkar Yojana** (UAY) and **Imprint**, by streamlining the partnership of various ministries and industry in areas of advanced high-end research at the academic institutions. SRIC IIT Kharagpur played a key role in

catalyzing the submission of a large number of proposals from IIT Kharagpur, and worked with the other IITs in carrying out the selection process. In UAY alone, the institute has received funding commitment to the tune of INR 66 Crore spread over 13 exciting new projects.

A very significant highlight of the year 2015-16 was the launch of the Global Initiative of Academic Networks (GIAN) program coordinated nation-wide by IIT Kharagpur. Aimed at tapping the talent pool of scientists and entrepreneurs worldwide and garnering the best international experience into our systems of education, the GIAN initiative has in one year attracted an astonishing 618 advanced courses involving international experts. These courses have been made available online for attendees all across the nation.

Additional educational initiatives under the leadership of IIT Kharagpur include the National Digital Library initiative, the National Initiative for Design Innovation, the Teaching Learning Centre for Pedagogy Design & Research, and the MOOC compliant e-content creation initiative. Major MHRD supported initiatives include the E-Business Centre of Excellence, Virtual Labs, and Real Time Virtual Labs.

Another important leadership role for IIT Kharagpur has been the nationwide coordination of the PAN-IIT collaborations with ONGC. This institute alone has received funding to the tune of INR 9.50 Crore for 5 new projects. Important collaboration initiatives were also started with Hindustan Aeronautics Limited and Indian Railways.

In the second round of Institute Challenge Grants, 7 new projects have been approved. These will help the institute in developing infrastructure in key areas of Microbiology, Materials Testing, Healthcare, Spintronics, Geophysical studies, and Nano patterned solar cells.

During the year 2015-2016 the Institute received 203 research projects from the Government, private and international funding agencies/enterprises for a total value of INR 102.82 Crore and 153 consultancy projects worth INR 22.68 Crore.

The Intellectual Property Rights and Industrial Relations (IPR & IR) Cell under SRIC is responsible for the licensing and the transfer of technologies developed by researchers at IIT Kharagpur to the commercial sector.

The IPR & IR Cell of the institute has made the institute proud in the year in 2015-16 by winning the prestigious National Intellectual Property Award in the category of "Top Indian Academic Institution for Patents". The award, which is given by the Indian Patent Office & Confederation of Indian Industries, was formally handed over to the Director, IIT Kharagpur on 26 th April, 2016, World IP Day by the Hon'ble Minister of Commerce and Industry, Smt. Nirmala Sitharaman, at a function jointly organized by the Indian Intellectual Property Office and Confederation of Indian Chamber of Commerce & Industry (CII). This success may be largely attributed to the proactive role played by the IPR Cell of SRIC. In the year 2015-16, through its web enabled IP Portal the IPR cell has received and filed more than 40 applications of this institute in the Indian Patent office.

As in previous years, in partnership with the Technology Transfer Group driven by the students, the IPR Cell organized an IPR Workshop in March 2016. This program focused on the importance of Industrial design and its protection. In a new study initiative from the IPR Cell, an IPR Round Table was held in April 2016 at Kolkata. The feasibility of a new model of IP prosecution system that can fast-track enforcement of IP with reduction of time and steps was debated in this meeting in the presence of the Hon'ble Justice Prabha Sridevan, Former Judge Madras High court and many other renowned dignitaries in this field.

Various student activities are encouraged and supported through SRIC. Notable activities include the following:

- **Boeing University Relations program** under which students have designed, built and flight tested a fixed wing UAV with vertical takeoff and landing, and cruise capability with rigidly attached set of thrusters. During the period they have successfully completed the design and building process followed by flight tests to improve and fine tune the project outcome.

- **RoboSoccer** activity for design and implementation of a team of soccer playing robots: This activity is coordinated under a students' group named "Kharagpur Robosoccer Students' Group" (KRSSG). The Federation of International Robo-soccer Association (FIRA) arranges the FIRA cup. The team from IIT Kharagpur participated in this competition last year under the MiroSot category at Seoul, South Korea, where participants need to devise artificial intelligence strategies, and develop sharp sensing and precise real-time control for the physical soccer-

playing robots. The team has bagged **bronze** medal in the Mirosot League and performed very well in the SimuroSot league. KRSSG also organized a competition on robo-soccer ("Code-o-Soccer") during the techno-management fest "Kshitij", and about 20 teams from different parts of India participated in the event.

- **Aerial Robotics Kharagpur (ARK)** is a students' group working for building autonomous aerial vehicles. The group was formed in February 2015. They are developing a system for flight control of a drone for participating in International Aerial Robotics Competition (IARC).

- **Team AGV** activity for design and implementation of autonomous ground vehicles.The team has designed, fabricated and operated autonomous vehicle with multiple sensors data processing and fusion incorporating sophisticated control steps to participate in various competitions in India and abroad. The Association for unmanned vehicle system international (AUVSI) organized the 24th Annual Intelligent Ground Vehicle Competition (IVGC) at Oakland University in Rochester, Michigan from June 3 - June 6, 2016. The IIT Kharagpur team participated in this competition, where participants need to devise intelligent strategies for autonomous driving, and develop accurate sensing with error-free real-time control for the physical robots to cover a given arena with defined difficulty levels. Recently the team has received one e2o vehicle from Mahindra for completing the driver-less car challenge under Mahindra Rise Prize students' competition, nationwide. The team Auro, a spin off from this AGV research group also has been selected for the same.

The M N Faruqui Innovations Centre (MNFIC) was launched in 2014 with support from our alumni. The objective of this centre is to provide tinkering facilities to students to motivate them to innovate through experimentation. An electronic design facility under the centre is ready, and several heavy duty mechanical machines are expected soon. The summer project competition for the first year batch has been launched. The MNFIC will also be a nodal centre to facilitate some new activities both by the institute and also with involvement of other alumni, corporate etc. For this purpose a general "Endowment for Innovation" has been created in the institute.

In addition to the above, students participation is also taking place in several areas of innovation such as the green policy initiative that aims to reduce the carbon footprint of the campus through technology advances.

**COMPUTER AND INFORMATICS CENTRE**

This Centre has extended the Institute networking facility to the new buildings like the J.C. Ghosh and P.C. Roy Science block, two new blocks of Nivedita hall of residence and two blocks of new faculty accommodation. In addition to these, the networking has also been provided extensively to the various new laboratories and research facilities within the academic campus. The new building of Centre for Railway Research (CRR) has been networked as per their requirement.

The first floor of the newly constructed Integrated Information Services (ISS) building has been fully networked and the ground floor which will house ERP servers and all other facilities will be networked shortly. To improve the Internet response and to facilitate various Information and Communication Technologies (ICT) based services, the NKN connectivity to the Institute has been upgraded to 11 Gbps. To facilitate faster internet access, CIC has hosted three Google cash servers in coordination with NKN.

In addition to the above, CIC has revamped the internet gateway infrastructure by installing high power internet routers with integrated firewalls, Intrusion Detection System (IDS), Intrusion Protection System (IPS) and Proxy Server Load Balancer. CIC is also in continuous process of maintaining and upgrading its infrastructure to enhance the scalability & reliability of IT operations. CIC has upgraded the Institute mail messaging system and has taken adequate security measures to protect the Institute network from spyware, malware and has also initiated proactive steps to prevent the latest threat ransomware. The laboratories in CIC (5 Nos) have been utilized for the Institute academics purposes for conducting Institute laboratory classes along with organizing GATE 2016 online examinations as a test centre.

**SCIENCE TECHNOLOGY ENTREPRENEURSHIP PARK (STEP), IIT KHARAGPUR**

STEP, IIT Kharagpur is one the oldest (started in 1986) and most successful innovation and incubation centres in the country, having supported the entrepreneurship endeavor of our graduates and others in establishing the startups for nearly 3 decades. So far, 172 companies have been incubated, of which 104 are in current incubation (41 in-campus). Four new companies which have been inducted into STEP in the last year are M/s Embedding Security and Privacy

Pvt. Ltd. (Software security system), M/s Unlax Consumer Solutions Pvt. Ltd. (Smart Home Management using the Internet of Things (IoT) and data analytics), M/s Parthasarathi Mukhopadhyay (Advanced Manufacturing and Desigh Technology for Civil Aircraft), and M/s Vas Bros. Enterprises Pvt. Ltd. (Transfer of Laterite Based Arsenic Filtration Technology and Manufacturing of Laterite Based Arsenic Filter Media).

Among the notable performances of the Incubatees, M/s Auro Robotics Pvt. Ltd. has been selected in Y Combinator startup incubator-cum-accelerator program in California, US for their project titled: 'Development of autonomous driving system for ground vehicle' (successfully completed PRISM project), M/s SG Art Heart Pvt. Ltd. has been awarded as the best Innovator's Pitch in BIRAC Innovators Meet 2014 for their project titled: 'Keyhole Surgery Replaceable Artificial Heart' and M/s Amnivor Medicare Pvt. Ltd. and their R&D team in SMST has been awarded by BIRAC SRISTI (2015) and Gandhian Young Technologists Innovation Award (2016) for their project titled: 'X-ray visible polymers via in situ iodination - crosslinking for non-invasive real time imaging'. The innovator's R&D team also has bagged DST-Lockheed Martin India-Innovation Growth Programmes 2015 and 2016. In the past, M/s Capillary Technologies Pvt. Ltd. has been very successful and created Companies in Singapore, UK, and USA among other countries (total employment ~600 and turn over ~ INR 95 Crore). M/s Suncraft Energy Pvt Ltd is currently doing business in West Bengal, Assam, Jharkhand etc for their products inverter on-grid/off-grid, smart management devices (SEMO). Our current and graduated incubates with total business of around INR 350 Crore employs nearly 3000 S&T graduates.

An ambitious innovation and translation plan is in place to work in complete harmony with the forthcoming Rajarhat Research Park (RRP). STEP is in the process of developing a Master Plan for supporting 250 incubatees in 5 years in 3 core areas – ICT & big data analytics, biotech/healthcare products and advanced manufacturing. A special drive is initiated to excite more faculty and students, and application procedure as well as administrative support with seed fund/grant has been eased out with standing call for proposals round the year.

In the past one year, several other important initiatives have been undertaken by STEP. Notable among them are the following: STEP Gopali Campus has been partially renovated for water connection, electrification, improving security measures etc. Science graduates from peripheral villages of STEP Gopali campus have been given training on "Tissue culture programmer" at Department of Biotechnology during January-June, 2016. Tata Metaliks DI Pipes Ltd. visited the "Tissue Culture Banana Plantation" site at STEP Gopali campus and STEP officials visited Tata Metaliks DI Pipes Ltd. on 15th February, 2016 and now shown their interest on the possibility of CSR project. Procedure for entrepreneurship for UG/PG students and Research Scholars was also decided.

Under STEP, Innovation Ignition Committee (IIC) has been formed with 10 Faculty members of IIT Kharagpur to motivate UG/PG/RS students and Faculty members to take up entrepreneurship. Core Committee for Performance Evaluation (CCPE) has been formed to take action against defaulting incubatees, to review activities/performance of all the defaulting companies and others and to recommend punitive actions. The committee formed with 5 Faculty members of IIT Kharagpur will also recommend new Entrepreneurs/Incubatees based on the merit or their proposals. Technical cum Financial Review Committee (TRC) has been set up with 11 Faculty members and Registrar of IIT Kharagpur to review the technical and financial progress made by various companies incubated at STEP, IIT Kharagpur and support the CCPE. An Interactive session was organized on 9th August, 2015 among the entrepreneurs of STEP and the students of the Institute with Mr. Peter Chan, esteemed alumnus of Department of Electrical Engineering, IIT Kharagpur who is the best bonsai entrepreneur in the world. A workshop on Bio-innovation was held on 4th September, 2015 at the Conference Room at STEP, IIT Kharagpur Campus. The workshop was attended by the STEP entrepreneurs and the students of our Institute. Dr. Asit B. Mandal (Agri Biotech), Principal Scientist, Central Research Institute for Jute & Allied Fibers (ICAR), Barrackpore; Dr. Debprasad Chattopadhyay (Drug discovery), Deputy Director (Scientist 'E'), ICMR Virus Unit, I.D. & B.G. Hospital, Kolkata and Dr. Bhaskar Saha (immunodiagnostics), Scientist 'G', National Centre for Cell Science, Pune were invited to give talk on Bio-innovation.

**RAJBHASHA VIBHAG**

Rajbhasha Vibhag is an integral part of the IIT. It has undertaken several steps in the last year. All the documents, correspondence, Institute's Annual Report and Annual Accounts statement are translated by Rajbhasha Vibhag apart from the routine translation of various technical/non-technical documents, administrative orders and letters from English to Hindi and vice versa. In addition to the translation of documents, the Vibhag ensures the bilingual display of

different nameplates, notice boards, rubber stamps, and preparation of Degree/Diploma certificates awarded by the institute. Rajbhasha Vibhag has initiated Hindi Training for Institute employees for Praveen and Pragya course under Hindi Teaching Scheme. A total 204 employees have been trained up to Pragya level.

The Vibhag has started a new training program of PARANGAT and 21 employees have passed and are planning to open a Hindi Typing Program also. With a view to create awareness for use of Hindi as Official Language in official work as well as to accelerate the pace of its progressive use, Rajbhasha Vibhag organizes various training programs, workshops and seminars for the employees /officers of the Institute throughout the year.

During the month of September, Rajbhasha Vibhag has organized "Hindi Saptah" from 14th Sep 2015. Several programs and competitions in Hindi were organised for employees and students of the Institute as well as for the students of nearby schools. Winners were motivated with certificates and Hindi books as prizes. Sri Ashok Vajpai, a noted writer and poet, was the chief guest of the occasion. Rajbhasha Vibhag publishes a monthly News Magazine "Jharokha" in Hindi covering academic, cultural, and extra-curricular activities of the institute.

Rajbhasha Vibhag has several Hindi Software like i-leap, ISM Publisher, ISM Office, Leap Office etc. Vibhag also uses the tools, PARIVARTAK, MANTRA, TRANSLITERATION, etc. developed by Department of Official Language, MHA, Government of India, C-DAC and other agencies. Recently ISM V.6 was procured which is Unicode compatible. It has activated UNICODE in all the computers of departments and trained the employees to work in Hindi. Rajbhasha Vibhag has a fully-fledged Library with a collection of more than 1800 books of different writers on literature, fiction, poetry, prose, play and various subjects of translation and language. Rajbhasha Vibhag has made its website bilingual. Useful information links are available on Vibhag Website regarding training programs, incentives schemes, different tools etc. Rajbhasha Vibhag has also assisted in making the Institute's website bilingual and efforts are being made to make the contents of the website bilingual.

## CONFERENCES, SEMINARS, SYMPOSIA AND WORKSHOPS

### Aerospace Engineering

- ISWT course on Vibration and Flutter, June 8-17, 2015

### Agricultural & Food Engineering

- Meeting of International Departmental Advisory Group, December 12, 2015
- AGRIEXPO'16: Workshop on Technologies for Skill Development and Entrepreneurship, January 8-10, 2016
- Technology Demonstration Mela under *Unnat Bharat Abhiyan*, March 18, 2016

### Architecture & Regional Planning

- International Symposium on Livable Habitats and Sustainable Urban Agenda, Kolkata, January 27-28, 2016
- International Symposium on Infrastructure Design and Management II
- International Symposium on Livable habitat and Sustainable Urban Agenda
- Livable Habitat and Sustainable Urban Agenda in association with MoHUPA
- National Symposium on Sustainability and the Built Environment

### Chemical Engineering

- Seminar On Development Of Frp-Nano Composites For Marine Structural Applications

### Chemistry

- IshanVikas Program for the School Children, December 2015
- Sir J. C. Ghosh Memorial Lecture 2016, Feb 09, 2016
- 22nd Annual meeting of National Magnetic Resonance Society of India (NMRS-2016), Feb. 18-21, 2016.

### Civil Engineering

- Workshop on "Developments in Pavement Design, Evaluation and Material characterization (DePAVE), November 15-17, 2015
- Workshop on "Pavement Design, Evaluation and Material Characterization" (PAVE), Transportation Engineering Section, December 21-23, 2015

- Workshop on "Improving Road Safety and Accessibility in 3rd Conference of Transportation Research Group of India" at Kolkata, December 17, 2015

**Computer Science & Engineering**

- IIT Kharagpur - Ben Gurion University, Israel Joint Research Workshop, February 23-24, 2016
- DST Workshop on Geospatial Data Modeling, March 9-11, 2016
- DST Workshop on Geospatial Data Modeling and GeoSMS, June 23-25, 2015

**Electrical Engineering**

- ISWT/GIAN course on Smart Grid Operation with Renewables December7-18, 2015
- IEEE International Conference on Systems in Medicine and Biology (ICSMB), January 4-7, 2016

**Electronics & Electrical Communication Engineering**

- IEEE Advanced Networking and Telecommunication Systems (ANTS), December 15-19, 2015
- 4th Electromagnetic Environmental Effects Management workshop February 23-March3, 2016
- Workshop on Advanced DSP Design Techniques, July 6-10, 2015
- Workshop on Antennas and Microwave Passive Components - Design and Measurement, June 22-28, 2015
- Course on Video Based Scene Understanding, December 7 – 18, 2016
- Short-term Course on VLSI Signal Processing December 23-27, 2015

**Geology & Geophysics**

- National Conference on Recent Trends in the Tectonics of Peninsular India
- 20th International Conference on Deformation Mechanisms, Rheology and Tectonics

**Humanities & Social Sciences**

- Short term course on Effective Speaking and Making Presentations July 24-31, 2015
- Short-term Course on Emotional Intelligence for Organizational excellence, November 02-04, 2015
- Short-term Course on Industrial Relations and Make-in-India, July 11-17 2015
- Short-term Course on Mapping Creativity July 6-14, 2015
- MHRD GIAN Course on LOGIC & APPLICATIONS OF LOGIC, December 7-18, 2015
- Short-term Course on Research Methods and Data analysis for Social Sciences and Management Research, September 16-30, 2015

**Industrial & Systems Engineering**

- Short-term Course on Data Analytics with SAS, July 1-4, 2015
- Short-term Course on Musculoskeletal Disorder and Workplace Stress Management, July 10-11, 2015
- Knowledge Dissemination Program on Service Operations Management, September 4-6, 2015
- Annual Workshop of System Dynamics Society of India, October 23-24, 2015
- Workshop on Development of Environmental Performance Management Framework
- ISWT on Ergonomics and Human Factors Engineering, December 7-18, 2015
- Conference on E-business and Supply Chain Competitivenessby E-Business Centre of Excellence in association with POMS India Chapter, February 12-14 2016
- ISWT on Supply Chain Network - Modeling and Analysis, July 15-26, 2016

**Mechanical Engineering**

- Workshop on CAD-CAM application in CNC Machining with Solid & Surface Modeling, February 22-26, 2016
- GIAN course on Orthopedic Biomechanics: Implants and Biomaterials, November 30 to December 11, 2015
- Course on Power Plant Technology for CESC Engineers, November 24 – November 28, 2015
- STC on Solid CAD/CAM Modeling and Applications in CNC Machines, September 27-October 01, 2015)
- Course on Special Topics in Robotics, December 7-21, 2015

**Metallurgical & Materials Engineering**

- Congress of Metallurgical Professionals involving Students, Industry and Teachers (COMPOSIT), March 4-6, 2015

**Mining Engineering**

- STC on Basic Remote Sensing and Geo-Spatial Analysis, February 2015
- GIAN course In Blasting and Fragmentation, May 2015
- Course on Stability and Design of Slope and Dump in Opencast Mines, September 2015
- Course on Stability and Design of Underground Access and Mine Excavation, December 2015
- Course on Separation of Fine and Ultra-Fine Particulates in Fluid Medium: Fundamentals and Applications in Mining, December 2015

**Ocean Engineering & Naval Architecture**

- International Conference On Ship & Offshore Technology, ICSOT-INDIA 2015 December, 11-12, 2015

**Physics**

- National Workshop on Advances in Photonics - 2015
- Indo-German Max Planck Partner group Workshop - 2015
- Joint Indo German Workshop on Electrochemical Storage Systems: Synergy of Material Design and Modelling - 2016

**Centre for Educational Technology**

- International Symposium on Frontiers of Research on Speech and Music (FRSM- 2015)
- National Seminar on Educational leadership
- STC on Educational Research: Tools & Techniques June 16-30 2015

**Centre for Oceans, Rivers, Atmosphere and Land Sciences**

- International Conference On Recent Advances In Regional Ocean Modelling (RAROM), March 10-12, 2016

**Cryogenic Engineering Centre**

- A Two week course on Vacuum Technology and Process Applications May 4-23, 2015
- A Two week course on Vacuum Technology and Process Applications November 18-27, 2015

**Materials Science Centre**

- Course on Thin Film Technology for Waste Heat Recovery, December 5 -14, 2015

**Reliability Engineering Centre**

- One Day Workshop on Reliability Engineering, February 19, 2016
- Course on Probabilistic Safety Assessment, December 07-18, 2015
- RAMS for Railway Systems, July 27-31, 2015

**Rural Development Centre**

- Indigenous Knowledge System and Sustainable Development for Tribal

**G S Sanyal School of Telecommunication**

- IEEE ANTS 2015, December, 15-18, 2015
- National Conference on Communication, February 27 –March 01, 2015

**Rajendra Mishra School of Engineering Entrepreneurship**

- Global Entrepreneurship Summit, January 08-10, 2016

**Rajiv Gandhi School of Intellectual Property Law**

- 2nd IIT Law School National Moot Court Competition, November 06-08, 2015
- 2nd National Colloquium on Legal Research, November 28-29, 2015
- Interactive Session and Workshop on Continuing Legal Education for Legal Professionals in India, December 26 –January 2, 2015

**Ranbir and Chitra Gupta School of Infrastructure Design and Management**

- International Symposium on Livable Habitat & Sustainable Infrastructure: A Key to Smart Growth, Kolkata, January 1-2, 2016

**School of Medical Science & Technology**

- 37th Annual International Conference of the IEEE EMBC, 2015
- 38th Annual International Conference of the IEEE EMBC, 2016
- Brainstorming Workshop on 3D Bioprinting, 2016
- International Conference on Systems in Medicine and Biology, 2016
- The 2016 IEEE International Symposium on Biomedical Imaging, 2016

**School of Water Resources**

- Course on Advances in Numerical Simulation Techniques for Hydraulics, Hydrology & Water Resource Management II, June. 01-06, 2015

**Vinod Gupta School of Management**

- STC on Consumer Behavior: Role Of Market Research, May 4-8, 2015
- STC on HR Analytics: Hands-on-Training, May 11-15, 2015
- MDA 2016, June 2016
- MDP for RBI Middle Management Officers, April 2016

**CONTINUING EDUCATION PROGRAM**

The continuing Education Program is an integral part of the ongoing academic activities of the institute. Over time, it has expanded its ambit in terms of the coverage of disciplines, duration and level of the programs and industry outreach. The major activities of this program include continuing education and training to professionals and teachers from industries and academics, In addition, M.Tech and Ph.D. programme under QIP remains a major area of activities. CEP also helps provide teaching-learning resource materials.

During 2015-16, the continuing Education Centre of the institute organized nine QIP (AICTE) Short Term Courses with 265 participants and 77 Sponsored/Self-financed Short term courses covering about 2500 participants. During last year, the centre conducted 17 Workshops/ National & International Conferences where 515 participants attended. The centre coordinated 3-Year Executive MBA Programme at Kolkata and Bhubaneswar campus with 31 and 11 students, respectively. Besides, it also coordinated 3-year M.Tech Programs for AICTE approved college teachers and industry professionals in which during 2015-16 college teachers and professionals completed their post-graduate degree from the Department of Electronics, Information Technology. Under the scheme Empowerment of Students and Teachers through Synchronous & Asynchronous Instruction (EIT) under NMEICT, MHRD, more than 389 faculty coordinators and 11023 engineering college teachers were trained. During the last year, 10 teachers under QIP completed their Ph.D. degree and 06 QIP scholars completed their M.Tech.

Continuing Education Centre introduced On-Line video-enabled micro-credit courses of 10-12 hours duration under the Knowledge Dissemination Program (KDP). A total of 10 courses were offered in 2015-16. These modular courses were conducted from IIT Kharagpur and streamed live through video conferencing to our Kolkata and Bhubaneswar campuses using the NKN enabled classrooms during evening/weekends. A total of 354 participants which included students and faculty members from TEQIP-II institutions, IIT Kharagpur students and industry professionals attended the KDP.

Indian Institute of Technology Kharagpur conducted its second International Summer and Winter Term (ISWT) by offering nine courses in the summer of 2015 and one in winter of 2015. Additionally, twelve courses were offered

under the Government of India new program titled ***Global Initiative for Academic Networks (GIAN)*** in the winter of 2015. These courses of 2 weeks or 10 working days duration were designed around current and multidisciplinary themes of Science, Engineering, Management and Law with a judicious blend of lectures and tutorials per day. A total of 360 national and international participants from the academia and industry participated in the summer courses whereas a total of 520 participants attended the winter courses. GIAN/ISWT courses provided an excellent platform to our students, faculty and industry professionals to seek knowledge and experience from international faculty. It also provided them an opportunity to interact and learn subjects in niche areas through collaborative learning process. High quality course material, both through print and video, was developed under the GIAN/ISWT program so as to be used by a larger body of students and teachers.

**LAURELS AND DISTINCTIONS AWARDED TO FACULTY**

Last year, like every other year, faculty members and students of this institute received a number of awards and honors, laurels and distinctions in recognition to their excellence. Faculty members were honored with prestigious awards and elected as Fellows of the National Science and Engineering Academies. The students were rewarded with various scholarships and their excellent contributions were acknowledged in various conferences, symposia etc. I highlight those achievements below:

**FELLOWSHIPS**

| | |
|---|---|
| Dr. Mrityunjoy Chakraborty (E&ECE) | • Elected to the fellowship of the National Academy of Sciences, India in the year 2015. |
| Dr. Souvik Bhattacharyya (ME) | • Elected to the fellowship of the National Academy of Sciences, India in the year 2015. |
| Dr. Indranil Manna (M&ME) | • Elected to the fellowship of The World Academy of Sciences (TWAS) |
| Dr. Suman Chakraborty (ME) | • Elected to the fellowship of the Indian Academy of Sciences, Bangalore |
| Dr. Tarasankar Pal (CY) | • Elected to the fellowship of the West Bengal Academy of Science & Technology (WAST) for the year 2015. |
| Dr. Ananta Kumar Ghosh (BT) | • Elected to the fellowship of the West Bengal Academy of Science & Technology (WAST) for the year 2015. |
| Dr. Chandan Chakraborty (SMST) | • Selected for the ICMR International Fellowship for Young Bio-medical Scientists 2015-2016, by the Indian Council of Medical Research, New Delhi |
| Dr. Tridib Kumar Goswami (AG&FE) | • Elected to the fellowship of the Association for the Advancement of Biodiversity Science. |
| Dr. Rajib Maity (CE) | • Awarded a "Humboldt Research Fellowship for Experienced Researchers" by the Alexander von Humboldt Foundation, Germany |
| Dr. Tridib Kumar Goswami (AG&FE) | • Elected to the fellowship of the Indian Society of Agricultural Engineers (ISAE) 2015. |
| Dr. Debabrata Das, Professor (BT) | • Selected as an International Association for Hydrogen Energy (IAHE) Fellow for the year 2016 for the contribution to research and development in hydrogen energy. |
| Dr. Amiya Ranjan Mohanty (ME) | • Elected to the fellowship of the International Society of Engineering Asset Management. |

**AWARDS**

| | |
|---|---|
| Dr. Srikumar Banerjee (Chairman, BOG, IIT Kharagpur) | • The Robert Cahn Award 2016 |
| Dr. G.G. Roy (MME) | • Selected for the prestigious "2015 Metallurgist of the year Award" instituted by the Ministry of Steel, Govt. of India |
| Dr. Pallab Banerji, Professor (MS) | • Selected for the MRSI Medal for 2016 by Materials Research Society of India (MRSI) |
| Dr. Ajay Muljibhai Sidpara (ME) | • Selected for the "IEI Young Engineers Award 2015-2016" in Production Engineering discipline, to be awarded by the Institution of Engineers (India) |
| Dr. Kamlesh Narayan Tiwari (AG&FE) | • Awarded the Rafi Ahmed Kidwai Award for Outstanding Research in Agricultural Sciences 2014, by the Indian Council of Agricultural Research, New Delhi, for Natural Resource Management and Agricultural Engineering |
| Dr. Dewashish Upadhyay (G&G) | • Awarded the K. R. Gupta Award, by the Geological Society of India |
| Dr. Swagata Dasgupta (CY) | • Awarded the CRSI Bronze Medal, in recognition of her contributions to research in chemistry, awarded by the Chemical Research Society of India (CRSI) |
| Dr. Somesh Kumar (MA) | • Selected for delivering the Platinum Jubilee Lecture in the Section of Mathematical Sciences (including Statistics) at the 103rd Indian Science Congress, to be held at University of Mysore, Mysuru, during January 3-7, 2016. |
| Dr. Tarasankar Pal, Professor (CY) | • Accepted the nomination for Professor J.N. Mukherjee Memorial Award 2014, by The Council of the Indian Chemical Society |
| Dr. Subir Kumar Mukhopadhyay (MI) | • Awarded "Prof. S. K. Bose Memorial Award" for the year 2014–2015, for excellence in teaching in Mining Engineering, by the Mining, Geological and Metallurgical Institute of India |
| Dr. Animesh Mukherjee (CSE) | • Selected to receive a 2015 IBM Faculty Award. |
| Prof. Sankar Kumar Nath (G&G) | • Selected by IGU for the Decennial Award for 2015 in recognition of his outstanding contribution in Geosciences. |
| Dr. Venkat Padmanabhan (CH) | • Selected for the Amar Dye-Chem Award of IIChE for 2015. |
| Dr. B.C. Meikap (CH) | • Selected for the Herdillia Award of IIChE for 2015 "Excellence in Basic Research in Chemical Engineering". |
| Dr. A. R. Mohanty (ME) | • Received the MS Narayanan's Memorial Lecture Award for the year 2015 |
| Dr. Shankha Pratim Bhattacharya (A&RP) | • Selected as an "Eminent Architectural Engineer" by the Architectural Engineering Division of IE(I). |
| Dr. Rintu Banerjee, Professor (AG&FE) | • Selected for the coveted honor of the "Malaviya Memorial Award-Senior Faculty" of Biotech Research Society, India (BRSI). |
| Dr. Tridib Kumar Goswami (AG&FE) | • Awarded 3rd Technology Achievement Award-15 presented by Research & Branding Company. |

| | |
|---|---|
| Dr. Abhijit Mukherjee (G&G) | • Awarded the Savitri Chadha Memorial INC-IAH Award for Young Scientist in Groundwater Studies, 2015. |
| Dr. Tridib Kumar Goswami (AG&FE) | • Considered to be a Distinguished Scientist for the contribution and achievement in the field of Food Processing, by the Venus International Foundation. |
| Dr. B. C. Meikap (CH) | • Awarded the "National Design Award in Environmental Engineering -2015" for his outstanding contribution in the field of Engineering Design, by the Institution of Engineers (India). |
| Dr. Sirshendu De (CH) | • Awarded the "Chemcon Distinguished Speaker (CDS) award 2015", by the IIChE. |
| Dr. Amit Basak (CY) | • Invited to deliver the Pfizer Endowment Lecture 2016 in the Department of Organic Chemistry, IISc, Bangalore |
| Dr. Hifjur Raheman (AG&FE) | • Awarded the "Commendation Medal" by the Indian Society of Agricultural Engineers, New Delhi. |
| Dr. Indrajit Dube (RGSoIPL) | • Invited to present a Kirby Seminar at the School of Law, University of New England |
| Dr. Abhijit Mukherjee (G&G) | • Awarded the title, "Thermo Fisher Outstanding Scientist in Water Analytics 2016". |
| Dr. Nirupam Chakrabarti (M&ME) | • Cyber Dyne s.r.l, an Italian optimization software company has incorporated the BioGP (Bi-objective Genetic Programming) algorithm, developed by Dr. Nirupam Chakrabarti, in the latest version of their flagship software named Kimeme. |
| Dr. Sirshendu De (CH) | • Selected for the Innovation Award 2016 for Developing Low Cost Eco-friendly Laterite based Arsenic Filter for Providing Safe Drinking Water by Indian Desalination Association (South Zone). |
| Dr. Dewashish Upadhyay (G&G) | • Selected for the "National Geoscience Award - 2014" by the Ministry of Mines. |
| Dr. Abhijit Mukherjee (G&G) | • Selected for the "National Geoscience Award - 2014" by the Ministry of Mines |
| Dr. Khanindra Pathak (MI) | • Selected for the "National Geoscience Award - 2014" by the Ministry of Mines. |
| Dr. G.P. Karmakar (MI) | • Awarded the "Best Paper Award" under the theme of Human Resource Management in ICEIM-2016. |
| Dr. Sriman Kumar Bhattacharyya (CE) | • Awarded the "Distinguished Alumnus Award" by the Indian Institute of Engineering Science and Technology (IIEST), Shibpur. |
| Dr. Kinsuk Naskar (RTC) | • Awarded the "2016 Morand Lambla Award" during the 32nd International Conference of the Polymer Processing Society. |
| Dr. V.N.A Naikan (REC) | • His paper published in International Journal of Quality & Reliability Management has been selected as a Highly Commended Paper in the 2016 Emerald Literati Network Awards for Excellence. |
| Dr. Subhasish Dey (CE) | • Invited as a "Foreign Expert in China" to visit Tsinghua University and has also been offered a title "Distinguish Visiting Professor of Tsinghua University" |

| | |
|---|---|
| | during 2016-18. |
| Dr. Sunil Kumar Sarangi (CR) | • Conferred with the "Outstanding Teacher Award" by the Indian National Academy of Engineering (INAE). |

**MEMBERSHIP OF EDITORIAL BOARDS IN PROFESSIONAL BODIES**

| | |
|---|---|
| Dr. Subhas Chandra Kundu (BT) | • Invited to join the Editorial Board of Scientific Reports, published by the Nature Publishing Group |
| Dr. Manas Chandra Ray (ME) | • Appointed as the Associate Editor of the journal "Structural Durability & Health Monitoring", published by Tech Science Press, USA |
| Dr. Abhijit Mukherjee (G&G) | • Invited to be an Editorial Board Member for the journal "Groundwater for Sustainable Development", published by Elsevier |
| Prof. V.N.A. Naikan (REC) | • Joined as Editor-in-Chief of the International Journal of Performability Engineering. |
| Dr. Trilochan Sahoo (OE&NA) | • Invited to join the editorial board of Applied Ocean Research. |
| Dr. Sanat Kumar Roy (M&ME) | • Selected for "Honorary Membership of the Indian Institute of Metals." |
| Dr. Santanu Kapat (EE) | • Appointed as an Associate Editor of the IEEE Transactions on Power Electronics. |
| Dr. G.P.Raja Sekhar (MA) | • Nominated by INSA Council as a member of IUTAM (International Union of Theoretical and Applied Mechanics)National Committee |
| Dr. C.S. Kumar (ME) | • Re-nominated as a member of the Editorial Board of IEEE Access. |
| Dr. Damodar Suar (HSS) | • Selected as the Chief Editor of the journal "Psychological Studies", the journal of the National Academy of Psychology (NAOP) India, published by Springer. |
| Dr. Sudip Misra (CSE) | • Selected as the Associate Editor of the IEEE Transactions on Mobile Computing. |
| Dr. K.B.L. Srivastava (HSS) | • Elected as the president-elect of the National Academy of Psychology (NAOP). |
| Dr.Pinaki Sar (BT) | • Invited to be a part of the Frontiers Community as Review Editor in Process and Industrial Biotechnology, part of the journal(s) Frontiers in Bioengineering and Biotechnology. |
| Dr. Chandan Chakraborty (EE) | • Appointed as an Associate Editor of IEEE Journal of Emerging and selected topics in Power Electronics. |
| Dr. Mrityunjoy Chakraborty (E&ECE) | • Invited to serve as one of the Senior Editorial Board Members of the IEEE Journal on Emerging and Selected topics in Circuits and Systems. |
| Dr. Santanu Kapat (EE) | • Elevated to the grade of Senior Member of the IEEE in 2016 |
| Dr. Mrityunjoy Chakraborty (E&ECE) | • Invited to join as one of the Senior Editorial Board Members of the IEEE Signal Processing Magazine. |
| Dr. V.R. Desai, Professor (CE) | • Nominated as a member of the Executive Board of Indian School of Mines, Dhanbad. |

| | |
|---|---|
| Dr. Anil K. Gupta (G&G) | • Nominated as a member of the Executive Board of Indian School of Mines, Dhanbad. |
| Dr.Abraham George (A&RP) | • Appointed as an Editorial Committee member of the Proiectum International Building Review, Colombia. |
| Dr. Khanindra Pathak (MI) | • Selected as a member of the Advisory Committee on Coal Washing of Observer Research Foundation, New Delhi. |
| Dr. Anjali Pal (CE) | • Selected as an Editorial Advisory Board Member of the Journal "Recent Patents on Engineering". |
| Dr. Abraham George (A&RP) | • Selected as an Editor of the Journal of Advanced Research in Construction and Architectural Engineering. |
| Dr. N.K. Singha (RTC) | • Selected as a member of the Editorial Board of European Polymer Journal. |
| Dr. Sanjay Kumar Chaturvedi (REC) | • Elevated to the Senior Membership of IEEE |
| Dr. Venkappayya R. Desai (CE) | • Nominated as a member of the All India Board of Post Graduate Education and Research in Engineering and Technology by AICTE. |
| Dr. V. R. Desai (CE) | • Nominated as a member of the All India Board of Undergraduate Studies in Engineering and Technology by AICTE. |

**ACHIEVEMENTS BY THE STUDENTS**

**LAURELS**

| | |
|---|---|
| Dr. Ashish Kumar Srivastava, Ex-Research Scholar (Ag&FE) | • Awarded Jawaharlal Nehru Award for Outstanding Doctoral Thesis Research in Agricultural Engineering 2014 by Indian Council of Agricultural Research, Krishi Bhavan, New Delhi. |
| Ms. Chandani Sen 12AG92R04 Research Scholar | • Received the 2nd Best Poster award in the IFT 2015 held in Chicago USA during 11-14th July 2015. |
| Mr. K. Ashok Kumar 12AG92S01 Research Scholar | • Selected for the 2015 International Plant Nutrition Institute Scholar Award. |
| Mr. Anirban Roy 12CH92P02, Research Scholar | • Awarded winner certificate based on "Spinning low cost haemodialysis hollow fibres" at "Innovators' Competition" for DST-Lockheed Martin India Innovation Growth Programme 2015 held at Federation House, FICCI, New Delhi during May 11-12, 2015. |
| Mr. Mohamad Meraj Shaikh11AR10015(B.Arch.) & Ms. Spoorthy Kotla 11BT10012(B.Tech.) | • Won the prestigious Go Green in the City 2015 Grand Finale International Award in Paris. |
| Ms. Nandini Bhandaru 12CH91R04 Research Scholar | • Conferred "Best Oral Award" for her presentation on "Soft Lithographic Fabrication of Topographic Meso-scale Pattern with Tunable Feature Height" (1st Prize) in the Indian Innovations in Materials Research: New Materials and Processes (IIMR-15) at Kolkata during June 25-27, 2015. |

| | |
|---|---|
| Ms. Nandini Bhandaru<br>12CH91R04<br>Research Scholar | • Awarded the "Materials Research Society of India (MRSI) Young Scientist Award 2015" in the "Young Scientists' Colloquium 2015" organized by MRSI, Kolkata Chapter on Sept. 11, 2015 at CSIR-Central Glass and Ceramic Research Institute, Kolkata. |
| Ms. Anushree Basu<br>12EE72P02<br>MS Scholar | • Awarded the Best Paper under Student Category. The paper is entitled "Increased core body temperature is accompanied by altered metabolic state during brief session of guided Kriya Yoga meditation: a thermographic study" in the first QIRT Asia Conference 2015 on Quantitative Infrared Thermography held at Mahabalipuram during 7-10 July, 2015. |
| Mr. C. Dhana Shekar<br>12PH91R01<br>Research Scholar | • Conferred "Best Poster Award" for his presentation on "Switching of ground state from pyroelectric- ferrimagnetic to ferroelectric-antiferromagnetic state in Ni doped CaBaCo4O7" in the International conference on Frontiers in Advanced Materials (FAM-2015) at IISc, Bangalore during June 15-18, 2015. |
| Ms. Paramita Bera<br>11AG91F02<br>Research Scholar | • Received "Dr. Manjushree Pal Memorial Award" for Best Poster Presentation at 2nd National Convention, SEF-INDIA, 2015 on 'Integrated approaches for promotion and development of herbal medicine' held at Jadavpur University, Kolkata during 5-6 Dec. 2015. |
| Ms. Paramita Bera<br>11AG91F02<br>Research Scholar<br>and Food Engineering | • Received "Dr. Manjushree Pal Memorial Award" for Best Poster Presentation at 2nd National Convention, SEF-INDIA, 2015 on 'Integrated approaches for promotion and development of herbal medicine' held at Jadavpur University, Kolkata during 5-6 Dec. 2015. |
| Mr. Deepanjan Saha<br>14AR91R05<br>Research Scholar | • Awarded the "BEST STUDENT PAPER" award at Urban Planning and Property Development Conference (UPPD) 2015 held at Singapore for the paper entitled 'Understanding clustering in Creative-knowledge Cities: case of Kumartuli and Boipara, Kolkata. |
| Mr. Balaram Mohapatra<br>12BT92F02<br>Research Scholar,<br>Mr. Jugal Mohapatra,<br>Mr. Adarsh Mukesh,<br>Mr. Pruthvi Patel and<br>Mr. Rhushikesh A.<br>Phadke (B.Tech.) | • Won the second prize (INR 3 lakhs) in an entrepreneurship competition organized jointly by Department of Biotechnology, Ministry of Science of Technology, and Association of Biotechnology Led Enterprises (ABLE, India) at Bangalore. |
| Ms. Sreemoyee Ghosh Ray 12AT91P02<br>Research Scholar | • Won a research competition organized by EU-India STI cooperation network bagging a fully paid trip to a conference of her choice in Europe in 2016. The competition was an initiative of EU 7th Framework Programme for Research and Technological Development (FP 7) held during 15th and 16th of October 2015 in Rome, Italy. |
| Ms. Prateeksha Mahamallik,<br>13CE91R02<br>Research Scholar | • Awarded for a paper presented in the 17th National Conference on Surfactants, Emulsions & Biocolloids held at School of Studies in Chemistry, Pandit Ravishankar Shukla University, Raipur, Chhattisgarh during November 4 - 6, 2015, under the aegis of Indian Society of Surface Science and Technology, Kolkata. |
| Ms. Anuja Das<br>14CH91R15<br>&Ms. Nandini Bhandaru<br>12CH91R04<br>Research Scholars | • Won the Second Best Paper Award at Chemference 2015 held at IIT Hyderabad during December 5-6, 2015for their paper titled "Confinement Induced ordering in dewetting of a Thin Polymer Bilayer with topographically patterned interface". |

| | |
|---|---|
| Ms. Meneka Banik<br>13CH91R05<br>Research Scholar | • Won the Second Best Paper Award at Chemference 2015 held at IIT Hyderabad during December 5-6, 2015 for her paper titled "Formation of non-hexagonal colloidal array by transfer". |
| Ms. Sumana Bhar,<br>12CY91F05<br>Research Scholar | • Awarded "Certificate of Appreciation" for securing third position in Poster presentation on "Advanced Oxidation Processes, AOP-2015" during 2nd National Conference held on October 15-16, 2015 at Dr. S. S. Bhatnagar University Institute of Chemical Engineering & Technology and Energy Research Centre, Punjab University, Chandigarh. |
| Mr. Lalatendu Kesari Jena<br>13HS92F01<br>Research Scholar | • Awarded the "Best Paper Award" in the Organizational Behaviour – Track of the International Conference on Organization and Management (ICOM), 2015, organized by Abu Dhabi University (UAE) and Asia Academy of Management, Asia Chapter of Academy Management, USA during 22-23 November 2015. |
| Mr Mainak Sen<br>13MT91R02<br>Research Scholar | • Received First prize in Poster presentation in non-ferrous group in NMD ATM-2015, 14-16th November, 2015 organized by Indian Institute of Metals at Coimbatore, TN. |
| Ms Sudipta Roy<br>11MT72P01<br>Research Scholar | • Received Third prize in Poster presentation in non-ferrous group in NMD ATM-2015, 14-16th November, 2015 organized by Indian Institute of Metals at Coimbatore, TN. |
| Mr Ashutosh Sharma<br>Ex-Research Scholar<br>& Mr Sumit Bhattacharya<br>Ex-Dual degree Student (MME) | • Received 2015 Extraction & Processing Division Technology Award of The Minerals, Metals and Materials Society of the USA for their award winning paper "A study on the effect of pulse electrodeposition parameters on the morphology of pure tin coatings" published in Metall. Mater. Trans. A. |
| Mr Ameya N Kannamwar<br>Ex-Dual Degree Student (PH) | • Awarded the Elmer L. Hann Award for their paper titled "Free dry vibration of marine rudder: theoretical and numerical analysis with experimental verification" presented at SNAME Maritime Convention October 2014, Houston, Texas, USA. |
| Mr. Harinath Aireddy<br>11PH92R02<br>Research Scholar | • Awarded with BEST POSTER paper in the International Conference on Condensed Matter & Applied Physics held in Bikaner, Rajasthan during 30-31 October, 2015 for the paper "Electro-magnetic transport and rectifying property of FeMnO/P-Si heterojunction". |
| Ms. Ishita Paul<br>12AG92F01<br>Research Scholar | • Conferred a Certificate of Merit for Best Poster Award(First Prize) at National Conference on Biotechnology for Sustainable Development (BSD-2015) held at Birla Institute of Technology, Mesra during 17-19 December, 2015 |
| Ms. Smaranika Mahapatra<br>14AG62R07 M.Tech Student | • Awarded 1st Prize in oral presentation for her research work entitled "Hydraulic Characterization of Vadose Zone: Case Study" during 50th Annual Convention of ISAE held from 19th to 21st January, 2016 at CAET, OUAT, Bhubaneswar. |
| Ms. Ishita Biswas<br>12AT72P02<br>MS Scholar | • Conferred with the "POSOCO Powar System Award(PPSA)-2016" under the Master category for her research work on "System Configuration and Control of DC Microgrid with Variable Generation and Storage" organized by Power System Operation Corporation Ltd.(POSOCO) in association with Foundation for Innovation and Technology Transfer (FITT) at IIT Delhi. |

| | |
|---|---|
| Ms. Tanya Singh<br>11BT91F01<br>Research Student | • Awarded Best Young Researcher Award in different Technical Sessions of Asian Congress on Biotechnology (ACB 2015) held at Kuala Lumpur (Malaysia) during November 15-19, 2015. |
| Mr. Ganeswara Rao Jada<br>11EE 91R09<br>Research Scholar | • Conferred with the "POSOCO Power System Award (PPSA)-2016" under the Doctoral category for her research work on "Improved Distance Relay Performance During Power Swing Using Innovative Algorithms" organized by Power System Operation Corporation Ltd. (POSOCO) in association with Foundation for Innovation and Technology Transfer (FITT) at IIT Delhi. |
| Mr. Arghya Mitra<br>10EE9405<br>Research Scholar | • Conferred with the "POSOCO Power System Award (PPSA)-2016" under the Doctoral category for her research work on "Impacts of Integration of Doubly Fed Induction Generator Based Wind Farms on the Transient Stability of Power Systems" organized by Power System Operation Corporation Ltd. (POSOCO) in association with Foundation for Innovation and Technology Transfer (FITT) at IIT Delhi. |
| Mr. Avik Pradhan<br>11MA91R02<br>Research Scholar | • Selected for B.G. Raghavendra Memorial Award (as a Best Application Award) based on his paper presentation entitled "Multi-Objective Multi-Choice Random Linear Programming Problem" at 48th Annual Convention of Operational Research Society of India held at ITER, SOA University, Bhubaneswar during December 17-19, 2015. |
| Mr. Sandeep Panchal<br>13MI91Q01<br>Research Scholar | • Received TAMOTIA award (IIME best paper award on "Environmental issues related to mineral processing" at International Seminar on Mineral Processing Technology (MPT-2016) held at Pune During 5-7 January 2016 |
| Ms. Sneha Rani<br>11MI91R01<br>Research Scholar | • Got the first prize on the theme "Sorption and pore-characterization of some Indian gas Shales" in the International Workshop on Shale Gas and Oil organized at New Delhi by the Directorate General Hydrocarbons. |
| Mr. Uddipta Kar<br>14PH62R08<br>M.Tech Student | • Awarded Best Poster Award in the 5th National Conference on Processing & Characterization of Materials held at NIT Rourkela during 12-13 December 2015. The title of the poster was "Electrical Spin Injection from Co2CrAl into p-Si using SiO2 Tunnel Barrier for Spin-Electronics". |
| Mr. Dibyendu Dey<br>13PH91R03<br>Research Scholar | • Conferred with "Best Poster Award" I in 60th DAE Solid "State Physics Symposium held at Amity University UP, NOI(DA during December 21-25, 2015. |
| Mr. Goyal Anubhav Vijay 12IM30007<br>Mr. Anush Gupta 12MA20008<br>Mr. Lakshya Kalra 12IM10015 and<br>Mr. Shreshtha Mundra 12CS10047<br>(4th year B.Tech) | • Team "Aces" comprising of four 4th year undergraduate students of IIT Kharagpur secured 1st place in the finals of the PAN India HULT Prize competition held at IIM Ahmedabad on January 9, 2016. Top 30 teams from all over India had pitched their ideas to a panel of 13 eminent judges. |
| Ms. Thakur Jagruti Ramsing<br>13RJ91R01<br>Research Scholar | • Awarded Bhaskara Advanced Solar jkEnergy (BASE) 2016 Internship Program supported by the Department of Science and Technology, Govt. of India, and the Indo-U.S. Science and Technology Forum (IUSSTF). For the internship, she would be travelling to Lawrence Berkeley National Lab, Berkeley for a period of 5 months. |

| | |
|---|---|
| Mr. Ashok Kumar Koilakonda<br>12AG92S01<br>Research Scholar | • Conferred"International Plant Nutrition Institute Scholar Award" of INR 1,20,000/- for continuation of his study and research. Also, he has been presented a Certificate in recognition of his outstanding scholastic record, and in appreciation of his contributions to the agricultural sciences. |
| Ms. Nandini Bhandaru<br>12CH91R04<br>Research Scholar | • Conferred "Young Scientist Award" by European Materials Research Society in recognition of an outstanding paper contributed to the 2016 E-MRS Spring Meeting Symposium F Advanced materials for printing. |

**SCHOLARSHIPS**

| Type | No. of Ph.D. Students |
|---|---|
| TCS Research Scholarship | 18 |
| Google India Fellowship | 2 |
| Microsoft Research India Fellowship | 2 |
| SAP-Labs Fellowship | 2 |
| **Type** | **No. of Undergraduate Students** |
| NTPC scholarship | 5 |
| Steel scholarship | 10 |
| EIL scholarship | 3 |
| ONGC scholarship | 1 |
| ST Engineering scholarship | 9 |
| FAEA scholarship | 7 |
| KVPY scholarship | 10 |
| Aditya Birla Scholarship | 5 |
| Rajashri Shahu Maharaj scholarship | 10 |
| NHFDC Scholarship | 1 |

**STUDENT INNOVATION AND ENTREPRENEURSHIP**

Top 3 winners in 2016 in the DST-Lockheed Martin India Innovation Growth Programme (IIGP), a PAN India Innovators' Competition held at FICCI, New Delhi are from IIT Kharagpur. Students have received three DBT sponsored BIRAC-SRISTI awards in Gandhian Young Technology Innovation (GYTI) award ceremony held at Rashtrapati Bhawan in 2016 under "Medical and Biotech" innovations. Appreciation under "Engineering" innovations was also given for cost effective mechanical testing equipment.

Student groups of IIT Kharagpur have secured top two positions in the design competition on "Innovative Use of Steel" hosted by the Institute of Steel Development and Growth, Ministry of Steel. IIT Kharagpur has also been placed joint second for the 5th National Award for Technology Innovation in the category of Polymers in Public Health Care. A team of six students from Mining Engineering won the second prize at the SME/NSSGA Student Design Competition held at the SME Annual Meeting and Exhibition in Denver, USA.

A two-member team from IIT-Kharagpur bagged the top awards at the international Go-Green competition in Paris with an innovative technology that could help conserve electricity by auctioning units. Two teams from IIT Kharagpur have made it to the stage 2 of Shell Idea 360 global student competition Shell Idea 360.

A team of 4 students from the Institute have secured 1st place in the finals of PAN India HULT Prize competition at IIM Ahmedabad. The team had come up with a mobile application along the lines of Mechanical Turk to provide people with a means of stable income by utilizing their non-productive broken time. A team of 13 students has won the 'Gold award' for their 'i-Bike' project at the KPIT Sparkle 2016, a national design and development innovation contest for engineering and science students across India.

Among student entrepreneurial ventures, M/s Auro Robotics Pvt. Ltd. has been selected in Y Combinator startup incubator-cum-accelerator program in California, US for their project on autonomous driving system for ground vehicle, M/s SG Art Heart Pvt. Ltd. has been awarded as the best Innovator's Pitch in BIRAC Innovators Meet 2014 for their project titled: 'Keyhole Surgery Replaceable Artificial Heart', and M/s Amnivor Medicare Pvt. Ltd. and their R&D team have been awarded by BIRAC SRISTI (2015) and Gandhian Young Technologists Innovation Award (2016).

M/s Capillary Technologies Pvt. Ltd. has been a very successful student entrepreneurship venture and has created Companies in Singapore, UK, and USA among other countries (total employment ~600 and turn over ~ INR 95 Crore). M/s Suncraft Energy Pvt Ltd is another such company currently doing business in West Bengal, Assam, and Jharkhand for their products including inverters and smart management devices.

**CENTRAL LIBRARY**

Central Library of IIT Kharagpur is one of the largest and finest technical libraries in Asia. It is regarded as the heart of our institute to fulfil the informational needs of the users mainly towards the completion of their academic programmes as well as the research activities. At present, the Library is catering to the needs of more than ten thousand students of undergraduates, postgraduates, research scholars, seven hundred faculty members and more than one thousand staff members of the Institute. The Central Library is having two internally connected buildings (main and annex) with a carpet area of about 8000 sq.m. It is a matter of prestige that the Central Library has been certified with ISO 9001:2008 since 2014 and the certification has been extended for one more year after satisfactory quality audit by the external auditors.

MHRD, under its NMEICT mission, has entrusted IIT Kharagpur to host, coordinate and set-up National Digital Library (NDL) towards building a national asset. The objective of the project is to integrate all the existing digitized and digital contents across educational institutions of the nation to provide a single-window access with e-learning facility to different groups of users ranging from primary level to higher education level of our county. NDL will harvest metadata and contents from all the Institutional Digital Repositories (IDR) of Universities and Institutions, all other digital library initiatives, and NMEICT projects and index in National Digital Library Server so that all the e-contents can be searched, browsed and accessed in the full-text by the users through a single window. The NDL project workstation is situated in the Central Library, Annexe Building.

The Library is using LIBSYS, an integrated library management software package, with all the modules for automated library operations. The Central Library houses and maintains nearly 3.9 lakh of print documents comprising of books, reports, theses and bound volume journals. The Library procured 3727 print books for the academic year 2015-2016. There is large collection of e-resources comprising of full text e-journals, e-books, online databases, etc.

Central Library has six air-conditioned reading halls with 2000 seating capacity for the users. The Central Library introduced the facility of 24 x 7 hours reading room facility for 15 days during semester examinations. Library users can make payment for their Library fines, photocopying, printing and scanning through debit and credit card. Web scale discovery service has been introduced in our library where the users can search and browse all subscribed full text e-resources using open source software Vufind, which is linked with Library website.

Central Library has developed two open source software namely (i) Online Document Delivery Service (ii) CD Library Online Service for Library professionals who can download, configure and use the software for their Libraries.

Besides, the regular support to the users, Central Library had also organized several 'Author workshop' to motivate researchers to publish research articles in reputed journals. Regular Library orientation programs as well as three technical workshops have also been organized by the library during the period to increase awareness and optimum utilization of resources.

## CAREER DEVELOPMENT CENTRE

The Career Development Centre is responsible for arranging practical training for 3rd year B. Tech/Dual Degree and 4th year of Five year Integrated M.Sc. degree students and job placement of final year students graduating from the Institute that includes Ph.Ds. The Centre is actively engaged in forging synergistic relationships between the Institute and various industries and user systems of technical and scientific manpower. Based on these interactions, the CDC gives feedback to the Institute on the academic programmes.

### Summer Training Details

Eight weeks of summer practical training at the end of 3rd year B. Tech./Dual Degree and 4th year of Five year Integrated M.Sc. degree is a compulsory part of the curriculum at IIT Kharagpur, carrying 2 credits. All efforts are made to place the concerned students in the best of organizations in India and abroad for summer training through Training and Placement section and various departmental supports. An emergent trend is that more and more students are seeking summer training abroad.

A total of 1350 companies/ organizations in India are contacted for training facilities for the current summer internships of our students during May- July 2016. Out of which 77 companies either visited the campus or conducted interviews through telephonic interviews and 15 companies allotted seats after seeking nominations. The details of internship are as follows.

| Period of Intern-ship | No. of students enlisted | Number of students attending Internship in India | | | Intern-ship at foreign Univ./Org. | Highest Stipend offered | |
|---|---|---|---|---|---|---|---|
| | | Selected by the company | Nominated by the Dept | Self-arranged | | India | Abroad |
| May-July 2016 | 1178 | 335 | 51 | 725 | 67 | Rs.1,20,000/- p.m. | US $ 2500 p.m. |

### Placement Details

480 companies / organizations registered for hiring students for final placement out of which 240 companies offered our students for employment during 2015-2016. The details of number of students who had registered for placement and those actually placed through campus interviews including those who have opted either for higher studies or arranged job through off campus as on 01.06.2016 are as follows:

| Degree | Student Registered | Student Placed | Percentage Placed |
|---|---|---|---|
| B.ARCH | 31 | 24 | 77% |
| B.TECH | 563 | 468 | 83% |
| DUAL DEGREE | 491 | 422 | 86% |
| LLB | 23 | 20 | 87% |
| M.SC(2YR) | 88 | 56 | 64% |
| M.SC(5YR) | 175 | 146 | 83% |
| M.TECH | 534 | 333 | 62% |
| MCP | 35 | 6 | 17% |
| MHRM | 14 | 13 | 93% |
| MS | 4 | 3 | 75% |
| PHD | 40 | 19 | 48% |
| **Grand Total** | **1998** | **1510** | **76%** |

The highest salary for overseas offer received in 2015-16 is $200000 per annum and the highest salary received is INR 41 lakh per annum.

IIT Kharagpur attracted the highest number of PPOs among all IITs and also registered the highest placement record among all IITs.

The numbers of PPOs received are 185 and number of accepted offers was 129 out of which 4 offers were from Overseas.

**Student Participation**

Career Development Centre at IIT Kharagpur has taken an initiative to harness the students' management skills through a formal system during the placement season since 2005-2006. The system has progressed extremely well and from year 2010 onwards, the CDC has immensely benefitted from Students' Placement Team. CDC also conducts 2 in-house Pre-Assessment Tests to prepare the students for the placement season. This test score is also used by the companies as one of their shortlisting criteria in many cases.

The organizational skill of team has helped CDC to conduct 20-25 companies' placement interviews per day and round the clock. During the placement season students/CDC staff play an active role from contacting the companies to the final selection at campus by providing complete logistic support.

**New Initiatives**

In addition to the existing roles, Career Development Centre at IIT Kharagpur has taken some initiatives to help student explore a better career. CDC is hosting the following novel events with the help of Vice Chairmen:

1. Faculty/ Corporate and Alumni interactions on various career options.
2. Alternative career options
3. Personality Development activities including Soft Skills and Leadership Workshops
4. The feedbacks received from various organizations are addressed to concern departments / authorities for new programmes / curriculum revisions.

**Achievements**

1. Continuously achieved more than 1000 placements for last three years in Phase I.
2. Highest number of pre- placement offers in leading organizations.
3. Highest number of internships

Rated the most employable institute in the country by an international survey for higher educational institutions by Quacquarelli Symonds (QS) global employability rankings

**NEHRU MUSEUM OF SCIENCE AND TECHNOLOGY (NMST)**

The Nehru Museum of Science and Technology, a unique effort of its type in the IIT system, continually strives to reach out to the public for the spreading of the knowledge of science and technology, and also to inculcate feelings for the country to which all of us can contribute. This year, apart from its ongoing activities, the NMST hosted two programs for the school children from the North East of the country under the Ishan Vikas programme and also organized a short workshop on basic electronics for the campus school children.

**STUDENTS' AFFAIRS**

Like every year this year also the students under the auspice of TSG participated in a variety of activities not only for the utilization of their leisure time but also for fun, fitness, enjoyment, keeping themselves away from boredom, reviving their energy after academic workload and for their overall development. The highlights of the year are as follows:

**Inter-IIT Sports Meet**

The 51$^{st}$ Inter-IIT Sports Meet began with the Inter IIT Aquatic Meet held at IIT Madras from 1$^{st}$ to 4$^{th}$ Oct 2015 at IIT Madras. IIT Kharagpur secured overall 2nd position, in the process also securing the first position in Water polo. Wonderful performances were shown by the swimmers of IIT Kharagpur. Siraj Modiwala of Mechanical Dept. from

Nehru Hall of residence showed exceptional performance by winning the Gold in all back stroke events i.e., 50m., 100m., and 200m. He clocked a time of 32.46 sec for the 50m. backstroke setting a new Meet record.

**Institute Awards and Medals**

| Event | Institute Blue /Order of merit | Honourable Mention | Special Mention |
|---|---|---|---|
| Sports & Games | 26 | 16 | 12 |
| Social & Cultural | 08 | 10 | 07 |
| Technology | 08 | 08 | - |

**Alumni Cup**

Alumni Cup in Sports & Games was shared jointly by three students – Saket Thavanani, 13MT10030 (Badminton), Siraj Modiwala, 13ME10054 (Swimming), Udit Narayan, 14AG10017 (Weightlifting). The G.S. Sanyal Cup was awarded to Ashish Daga, 11ME32006. Alumni Cup in Soc. &Cult is awarded to Mr. Rachit Madhukar, 13AG3FP05. Shrimati Chandiramani Cup was given to Abhishek Sultania, 11IM30023.

**International Yoga Day**

International Yoga Day was observed at the campus on 21st June 2015. A morning yoga session was conducted where more than 900 people participated. This was followed by a lecture on yoga in the evening.

**National Youth day**

National Youth day was celebrated on 12th Jan 2016; a Youth Rally was organized. More than 800 students, staff and faculty member participated in the run. In evening a Debate session was organized.

**Rangoli and Illumination**

Rangoli and Illumination events were organized in a grand manner on Deepawali day. Almost all the halls of residences participated in the events.

**Students' Achievements in outside participation**

Students participated in various sports & games outside IIT Kharagpur viz. Cricket, Basketball, Tennis, Badminton, Weight Lifting etc. In XLRI competition Football & Basketball teams won Gold at Tata Nagar. In Ajoy Ghosh Memorial Cricket tournament the boys team reached the semi-finals, In Spardha at IIT BHU, the boys badminton team secured the Gold medal. The Weight Lifting team won overall Bronze in weight lifting and Silver in Power Lifting at the 'UDGHOSH' tournament held at IIT Kanpur. The same team also won overall Silver in weight lifting and overall Gold in Power Lifting at the 'SANGRAM' tournament held at IIT Roorkee.

**Overall General Championship Results**

| Sports & Games | Soc.& Cult | Technology |
|---|---|---|
| LBS Hall (Boys) & SN Hall (Girls) | Nehru Hall | LBS Hall |

**SPRING FEST 2016**

SPRING FEST' 2016 was organized from 29th January 2016 to 1st February 2016. A plethora of more than 65 events ranging from varied genres provided a platform to the students where they proved their mettle and calibre in social and cultural activities.

**KSHITIJ 2016**

KSHITIJ 2016, the tech fest, held from 21st January 2016 to 24th January 2016) provided a platform for the confluence of students, academia and the industry. The fest was graced by the presence of luminaries who are looked up to for their distinguished contribution in their respective fields. Kshitij provided an opportunity for interaction with leaders

from the corporate sector, research scientists, celebrities, and faculty of IIT Kharagpur. More than 65 Tech events, Workshops Lectures, exhibitions were organized by the students.

**4th Inter IIT Tech Meet**

4th Inter IIT Tech Meet was hosted by IIT Mandi. IIT Kharagpur won the General Championship.

## EXTRA ACADEMIC ACTIVITIES

The extra academic activity (EAA) at IIT Kharagpur involves undergraduate students in the National Service Scheme (NSS), National Cadet Corps (NCC) and sports and fitness activities over four semesters. In each semester, each student gets involved in approximately 45 hours of field work in EAA. Specific Highlights of the EAA program in 2015-2016 academic year are as follows:

National Service Scheme of EAA covered about 1000 students in 2015-2016. The students typically spent three hours per week over entire semesters working on social issues at about 25 villages and slums around Kharagpur. There, they facilitated the education of underprivileged school children by organizing scholarships, prizes, study materials, stationery, bicycles and utensils. They monitored drinking water quality at villages and provided nutritional supplements to primary school children to ameliorate endemic malnutrition among tribal population. They also organized blood donation and medical camps and awareness programs on issues such as substance abuse, health and hygiene and nutrition. They planted and maintained saplings and participated in facility and infrastructure maintenance, e.g., repair of rural roads, painting and maintaining school buildings and furniture. They also organized vocational training programs for unemployed youth and women, using internal resources as well as external funding from agencies such as Society for Self-employment of Unemployed Youth of West Bengal Government. The trainings cover a variety of trades such as basic tailoring; domestic wiring; repair and maintenance of household electrical equipment, e.g., air conditioner and fridge; two- three- wheeler servicing, repair and maintenance; and plumbing. Details on these activities can be found at nssiitkgp.blogspot.com.

1 Beng EME and 3 Tech Air NCC, each comprising 200 cadets form an essential part of the EAA mainly for the first two years of the undergraduate programme of IIT Kharagpur. For the first time, 16 girl students were inducted into 3 Tech Air NCC in this academic session. They, along with other IIT Kharagpur NCC cadets, participated in the Republic Day parade on 26th January 2016.

The Health and Fitness program of EAA covers about 900 UG students in 2015-2016. Ten faculty members and one program coordinator supervised the activities as program officers. Additionally, students were introduced to Yoga, Karate and disaster management in special sessions. The students organized awareness rallies and published a newsletter on healthy living at regular intervals. There were cleaning drives by students to improve the health and hygiene and inculcate a sense of cleanliness.

## GRADUATES OF THE YEAR

In this Convocation, we are going to confer degrees on outgoing students. I am very glad to announce that the following students are recipients of Institute Gold Medals for their academic excellence and all round performance in the year 2014-2015.

- **Shri Sikhar Patranabis** of the Department of Computer Science and Engineering is the recipient of the *President of India Gold Medal 2014-2015* for the best academic performance among the outgoing B. Tech (Hons.) and B. Arch. (Hons.) students.

- **Shri Rishav Jain** of the Department of Electronics and Electrical Communication Engineering has won the *Dr. Bidhan Chandra Roy Memorial Gold Medal 2014-2015* for the best all-round performance among the B. Tech (Hons) and B. Arch (Hons.) outgoing students.

- *The Prime Minister of India Gold Medal 2014-2015* for the best academic performance among the Dual degree and Integrated M.Sc. outgoing students goes to **Shri Abhisek Datta** of the Department of Physics.

- *Dr. Jnan Chandra Ghosh Memorial Gold Medal 2014-2015* for the best all-round performance among the outgoing Dual Degree and Integrated M.Sc. students is awarded to **Shri Som Bose** of the Department of Electronic & Electrical Communication Engineering.

- **Ms. Urmimala Dey** of the Department of Physics has won the *Professor Jagadish Chandra Bose Memorial Gold Medal 2014-2015* for the best academic performance among the outgoing students of all 2-year M.Sc. courses in the Science Disciplines.

- **Ms. Kritika Kothari** of the Department of Agricultural and Food Engineering is the recipient of *The Director's Gold Medal* for the best academic performance among the students completing M. Tech and MCP courses.

Today, as I stand here, memories of more than thirty years flash across my mind and I remember myself sitting like of all you on my graduation day thinking what this degree means to me. Like all of you today, I was then firm on the belief that this degree empowers me to face and overcome challenges in my future endeavors. The insight, knowledge and education I received at this Institution has been the core strength of my life, making me wiser day after day. The education not only meant the technical knowledge that was imparted to me but the fundamental principles that an IIT student stands for, which includes personal integrity, strength of character and the ability to strive constantly to learn, share and care. As Albert Einstein said, *"Only a life lived for others is a life worthwhile"*.

It is my great pleasure to inform you that, our Honorable Chief Guest, **Professor Lord Sushantha Kumar Bhattacharyya** and the Chairman, Board of Governors, Dr. Srikumar Banerjee, have memorable connections with this Institute.

I offer my heartiest congratulations to all the Medal Winners and graduating students.

Before concluding, I wish to share what my parents told me on my graduation day. When I went home and showed my father my degree certificate, he smiled and told me "Remember my son that the people of India have paid for your IIT education; even the poorest of the poor who buys soap from a shop has contributed something for your IIT education. Remember this throughout your life". Wisdom is not a product of schooling, but the product of a lifelong attempt to acquire it. Therefore, my friends, while you go out and engage yourself in the pursuit of conquering the world; *motivated by an irresistible longing to understand the secrets of nature*, please do so with tender care for our fellow countrymen who have supported your education in the sincere hope that you will make their world better. Please try your best to ensure a smile at your fellow citizens through whatever you do.

**Jai Hind**

Kharagpur
Convocation Dates: August 7 & 9, 2015

Professor Partha Pratim Chakrabarti
Director, IIT Kharagpur

*

# Courses of Study

**Advance Technology Development Centre**

- M.Tech. – Embedded Controls and Software

**Aerospace Engineering**

- B.Tech.- Aerospace Engineering
- Dual Degree - Aerospace Engineering
- Dual Degree - Aerospace Engineering/Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Aerospace Engineering

**Agricultural and Food Engineering**

- B.Tech.- Agricultural & Food Engineering
- Dual Degree - Agricultural & Food Engineering/ Farm Machinery & Power
- Dual Degree - Agricultural & Food Engineering/Post Harvest Engineering
- Dual Degree - Agricultural & Food Engineering/Dairy & Food Engineering
- Dual Degree - Agricultural & Food Engineering/Food Process Engineering
- Dual Degree - Agricultural & Food Engineering/Aqua Cultural Engineering
- Dual Degree - Agricultural & Food Engineering/Agricultural Systems & Management
- Dual Degree - Agricultural & Food Engineering/Land Water Resources Engineering
- Dual Degree - Agricultural & Food Engineering/Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Farm Machinery and Power
- M. Tech. – Land and Water Resources Engineering
- M. Tech. – Food Process Engineering
- M. Tech. – Agricultural Biotechnology
- M. Tech. - Aquacultural Engineering
- M. Tech. - Agricultural Systems and Management

**Architecture and Regional Planning**

- B.Arch.
- Master of City Planning

**Biotechnology**

- B.Tech.- Biotechnology & Biochemical Engineering
- Dual Degree - Biotechnology & Biochemical Engineering
- Dual Degree - Biotechnology & Biochemical Engineering/ Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Biotechnology and Biochemical Engineering

**Chemical Engineering**

- B.Tech.- Chemical Engineering
- Dual Degree - Chemical Engineering

- Dual Degree - Chemical Engineering/Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Chemical Engineering

**Chemistry**

- M.Sc. - Chemistry (2Yr. M.Sc.)
- M.Sc. – Chemistry (5Yr. M.Sc.)
- Joint M.Sc.- Ph.D. in Chemistry

**Civil Engineering**

- B.Tech.- Civil Engineering
- Dual Degree - Civil Engineering/ Hydraulic & Water Resources Engineering
- Dual Degree - Civil Engineering/ Transportation Engineering
- Dual Degree - Civil Engineering/ Geotechnical Engineering
- Dual Degree - Civil Engineering/ Structural Engineering
- Dual Degree - Civil Engineering/ Environmental Engineering & Management
- Dual Degree - Civil Engineering/Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Hydraulic and Water Resources Engineering
- M. Tech. - Transportation Engineering
- M. Tech. - Environmental Engineering and Management
- M. Tech. - Geotechnical Engineering
- M. Tech. - Structural Engineering
- M.Tech in Railway Engineering

**Computer Science and Engineering**

- B.Tech.- Computer Science & Engineering
- Dual Degree - Computer Science & Engineering
- Dual Degree - Computer Sc. & Engineering/Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Computer Science and Engineering

**Centre for Educational Technology**

- M. Tech. - Multimedia Information Processing

**Centre for Oceans, Rivers, Atmosphere and Land Sciences**

- M. Tech. - Earth System Science and Technology

**Cryogenic Engineering**

- M. Tech. - Cryogenic Engineering

**Electrical Engineering**

- B.Tech.- Electrical Engineering
- B.Tech.- Instrumentation Engineering
- Dual Degree - Electrical Engineering/ Machine Drives & Power Electronics
- Dual Degree - Electrical Engineering/ Control System Engineering
- Dual Degree - Electrical Engineering/ Power System Engineering
- Dual Degree - Instrumentation and Signal Processing Engineering
- Dual Degree - Instrumentation Engineering/ Control Systems Engineering
- Dual Degree - Electrical Engineering/Engineering Entrepreneurship/ Financial Engineering

- Dual Degree - Instrumentation Engineering/Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Machine Drives and Power Electronics
- M. Tech. - Control System Engineering
- M. Tech. - Power and Energy Systems
- M. Tech. - Instrumentation and Signal Processing

**Electronics and Electrical Communication Engineering**

- B.Tech.- Electronics & Electrical Communication Engineering
- Dual Degree - Electronics & Elect. Comm. Engineering/ Fibre Optics and Lightwave Engineering
- Dual Degree - Electronics & Elect. Comm. Engineering/ Microelectronics & VLSI Design
- Dual Degree - Electronics & Elect. Comm. Engineering/ RF and Microwave Engg.
- Dual Degree - Electronics & Elect. Comm. Engineering/ Visual Information & Embedded System
- Dual Degree - Electronics & Elect. Comm. Engineering/ Telecommunications System Engg.
- Dual Degree - Electronics & Elect. Comm. Engineering/ Engineering Entrepreneurship/Financial Engineering
- M. Tech. - Fibre Optics and Light wave Engineering
- M. Tech. - Microelectronics and VLSI Design
- M. Tech. - RF and Microwave Engineering
- M. Tech. - Telecommunication Systems Engineering
- M. Tech. - Visual Information and Embedded Systems Engineering

**Geology and Geophysics**

- M.Sc. - Exploration Geophysics (M.Sc. 5Yr.)
- M.Sc. Applied Geology (5Yr. M.Sc.)
- M.Sc. – Geophysics (2Yr. M.Sc.)
- M.Sc. - Geology (2Yr. M.Sc.)
- Joint M.Sc.- Ph.D. in Geophysics
- Joint M.Sc.- Ph.D. in Geology
- M. Tech. - Exploration Geosciences

**Humanities and Social Sciences**

- M.Sc. - Economics (M.Sc. 5Yr.)
- Master of Human Resource Management

**Industrial and Systems Engineering**

- B.Tech.- Industrial Engineering
- Dual Degree - Industrial Engineering/ Industrial Engineering & Management
- Dual Degree – Quality Engineering Design and Manufacturing (Quality Engineering Design and Manufacturing (Industrial Electronics Vertical)
- Dual Degree – Quality Engineering Design and Manufacturing (Quality Engineering Design and Manufacturing (Mechanical Engineering Vertical)
- Dual Degree - Industrial Engineering/Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Industrial Engineering and Management

**Materials Science**

- M. Tech. - Materials Science and Engineering.

**Mathematics**

- M.Sc. - Mathematics & Computing (M.Sc. 5Yr.)
- M.Sc. – Mathematics (2Yr. M.Sc.)
- Joint M.Sc.- Ph.D. in Mathematics
- M. Tech. - Computer Science and Data Processing

**Mechanical Engineering**

- B.Tech.- Mechanical Engineering
- B.Tech.- Manufacturing Science & Engineering
- Dual Degree - Mechanical Engineering/ Manufacturing Science and Engineering
- Dual Degree - Mechanical Engineering/ Thermal Science and Engineering
- Dual Degree - Mechanical Engineering/ Mechanical Systems Design
- Dual Degree - Manufacturing Science & Engineering/ Industrial Engineering & Management
- Dual Degree - Mechanical Engineeering/ Engineering Entrepreneurship/ Financial Engineering
- Dual Degree - Manufacturing Science & Engineering/ Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Manufacturing Science and Engineering
- M. Tech. - Thermal Science and Engineering
- M. Tech. - Mechanical Systems Design

**Metallurgical and Materials Engineering**

- B.Tech.- Metallurgical and Materials Engineering
- Dual Degree - Metallurgical & Materials Engineering / Metallurgical & Materials Engineering
- Dual Degree - Metallurgical & Materials Engineering/ Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Metallurgical and Materials Engineering

**Mining Engineering**

- B.Tech.- Mining Engg.
- Dual Degree - Mining Engineering/ Mining Engineering
- Dual Degree - Mining Engineering/ Safety Engineering
- Dual Degree - Mining Engineering/Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Mining Engineering

**Ocean Engineering and Naval Architecture**

- B.Tech.- Ocean Engineering and Naval Architecture
- Dual Degree - Ocean Engineering & Naval Architecture / Ocean Engineering & Naval Architecture
- Dual Degree - Ocean Engineering & Naval Architecture/Engineering Entrepreneurship/ Financial Engineering
- M. Tech. - Ocean Engineering and Naval Architecture

**Physics and Meteorology**

- M.Sc. - Physics (5Yr. M.Sc.)
- M.Sc. – Physics (2Yr. M.Sc.)

- Joint M.Sc.- Ph.D. in Physics
- M. Tech. - Solid State Technology

**Rajendra Mishra School of Engineering Entrepreneurship**

- Dual Degree - B.Tech. in Parent Dept/ Entrepreneurship Engineering

**Rajiv Gandhi School of Intellectual Property Law**

- Bachelor of Laws - Intellectual Property Law (3 Years)
- 2-year master of laws (LLM)

**Ranbir & Chitra Gupta School of Infrastructure Design and Management**

- M. Tech. - Infrastructure Design and Management

**Reliability Engineering**

- M. Tech. - Reliability Engineering

**Rubber Technology**

- M. Tech. - Rubber Technology

**School of Information Technology**

- M. Tech. - Information Technology

**School of Medical Science and Technology**

- Master of Medical Science and Technology (3 Years)
- M.Tech – Medical Imaging and Informatics

**School of Water Resources**

- M. Tech. - Water Engineering and Management

**Vinod Gupta School of Management**

- MBA - Business Administration (2 Years) • Executive MBA (3 Years)
- EMBA
- 2-year post graduate diploma in business analytics

**School of Energy Science & Engineering**

- M.Tech. in Energy Science & Engineering

# ACADEMIC DEPARTMENTS

# Department of Aerospace Engineering

***Head***
Prof. Bhrigu Nath Singh

***Professors***

| | |
|---|---|
| Datta, Prosun Kumar | *Ph.D.(Georgia Tech)*, Aerospace Structures |
| Maiti, Dipak K | *Ph.D.(IIT Kharagpur)*, Aerospace Structures, Composite and Smart Structures, Structural Dynamics & Aeroelasticity, Design & Development of MR fluid damper & Landing Gear Dynamics, Structural Health Monitoring |
| Singh, Bhrigu Nath | *Ph.D.(IIT Kanpur)*, Smart and Composite Structures, Uncertainty Quantification in Aircraft Analysis & Design, FGM Plates and Shells, Aerospace Structures, Solid Mechanics |
| Singh, Navtej | *Ph.D.(IIT Kharagpur)*, |
| Sinha Mahapatra, Kalyan Prasad | *Ph.D.(IIT Kharagpur)*, Computational Fluid Dynamics, Aeroacoustics, Large Eddy Simulation, Fluid-Structure Interaction |

***Associate Professors***

| | |
|---|---|
| Laha, Manas Kumar | *Ph.D.(IIT Kharagpur)*, computational fluid dynamics and flight mechanics |
| Pradhan, Suresh Chandra | *Ph.D.(IIT Kanpur)*, Aerospace structures, Nonlocal elasticity, FEM, FGM, Smart Structures, composite materials and nano-composites, Optimization |
| Roy, Arnab | *Ph.D.(IIT Kharagpur)*, Aerodynamics, Computational Fluid Dynamics |
| Sinha, Manoranjan | *Ph.D.(IIT Kanpur)*, Flight Dynamics Controls System-Identification Neural Networks |

***Assistant Professors***

| | |
|---|---|
| Bhattacharyya, Susmita | *Ph.D.(Univ. of Minnesota, USA)*, Fault Detection and Isolation, Global Navigation Satellite Systems (GNSS), Estimation Theory |
| Ghosh, Anup | *Ph.D.(IIT Kharagpur)*, Aerospace Structures, Composite Structures, Micro Air Vehicle, UAV |
| Ghosh, Somnath | *Ph.D. (T.U., Munich)*, DNS, LES, compressible turbulence, turbulence-radiation interaction, turbulent reacting flows, high performance computing |
| Hota, Sikha | *Ph.D.(IISc., Bangalore)*, Path Planning of Autonomous Vehicles, Trajectory Optimization, Dubins Vehicle, Obstacle Avoidance |
| Joarder, Ratan | *Ph.D.(IISc. Bangalore)*, Numerical simulation of compressible and chemically reacting flows, Combustion Driven Shock Tunnel, Laser spectroscopy (new field), Two-Phase Flow Computations, Radiative heat transfer, Combustion |
| Karmakar, Srinibas | *Ph.D.(LSU, USA)*, Combustion of Solid Fuels and Energetic Particles, Droplet and Spray Combustion, Experimental Methods in Combustion, Atomization and Sprays |
| Kaushik, Mrinal | *Ph.D.(IIT Kanpur)*, Jet controls., Hydrodynamics., Aero-acoustics., Shock-Boundary Layer Interactions. |

| | |
|---|---|
| Mistry, Chetan Kumar Sureshbhai | *Ph.D.(IIT Bombay)*, |
| Peyada, Naba Kumar | *Ph.D.*, System Identification/Parameter Estimation - Neural Networks, Flight Dynamics & Control and Flight Testing, Design Guidance and Control of Rockets Parafoil UAV MAV WIG-Craft etc. |
| Saha, Sandeep | *Ph.D.(Imperial College, London)*, Fluid Mechanics |
| Sunny, Mohammed Rabius | *Ph.D.(Virginia)*, Structural Health Monitoring, Fluid Structure Interaction, Composite Structures |

***Thrust Areas***

1. Unmanned Aerial Vehicles and related Technologies
2. Smart and Composite Structure
3. Experimental and Computational Research on Turbulent Flows
4. Propulsion & Combustion
5. Flight Dynamics & Control

***Brief Description of on-going activities***

Department is involved in various research activities in different fields namely; Composite & Smart Structures Structural Dynamics & Aeroelasticity Design & Development of MR-fluid damper. Analysis of aerospace Structures using DQM, DTFM, FEM. Nanomaterials and nanomechanics. Development of reconfigurable autonomous air vehicle. Lunar gravity modeling, topography modeling and orbit determination for the Chandrayaan-I. Fault tolerant and reconfigurable architecture development for the automotive. Real time system identification, system identification using neural sensitivity analysis. Fault detection and identification for aircraft. Low Reynolds number airfoils for micro air vehicles. Analysis of High Reynolds number three dimensional flows. Supersonic and hypersonic flows for various configurations. Large eddy simulation of turbulent flow. Flow-induced vibration and fluid-structure interaction. Development of micro-aerial vehicles Global Navigation Satellite Systems (GNSS). Estimation Theory. Combustion of Solid Fuels and Energetic Particles. Droplet and Spray Combustion. Numerical simulation of compressible and chemically reacting flows. Combustion Driven Shock Tunnel. Two-Phase Flow Computations. Design Guidance and Control of Rockets Parafoil UAV MAV WIG-Craft etc. Turbulence-radiation interaction and turbulent reacting flows.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 9 |
| Fellow - Professional Bodies | 3 |
| Member - Professional Bodies | 17 |
| Member - Editorial Board | 10 |
| Visits Abroad by Faculty Members | 2 |
| Doctoral and MS Degrees Awarded | 4 |
| Sponsored Research Projects | 26 |
| Consultancy Projects | 2 |
| Short-Term Courses and Training Programmes organised | 1 |
| Papers Published in Journals | 33 |
| Papers Presented in Conferences | 19 |

# Department of Agricultural & Food Engineering

***Head***
Prof. Virendra Kumar Tewari

***Professors***

| | |
|---|---|
| Banerjee, Rintu | *Ph.D.(IIT Kharagpur)*, Food Biotechnology, Bioenergy, Enzymology & its Biotechnological applications, Protein Chemistry |
| Bhadoria, P B Singh | *Ph.D.(IIT Kharagpur)*, Development and Transfer of Rural Technnlogy, Soil Science & Plant nutrition, Sustainable Agricultural Production, Design and Developments of Products |
| Chatterjee, Chandranath | *Ph.D (IIT Kharagpur)*, Flood Forecasting, Design Flood Estimation, Flood Inundation Modeling and Hazard Assessment, Remote Sensing and GIS Applications in Surface Water Hydrology, Hydrological Modeling |
| Das, Bhabani Sankar | *Ph.D.(Kansas)*, Digital soil mapping and hyperspectral remote sensing, Water and solute transport, Unsaturated zone hydrology, Measurement and modeling in agricultural systems, Contaminant transport |
| Das, Susanta Kumar | *Ph.D.(IIT Kharagpur)*, Mechanized Food Processing and Food Engineering, By-product utilization, Microwave application in popping of grain, Pneumatic polishing of rice |
| Datta, Ashis Kumar | *Ph.D.(Pennsylvania)*, Dairy and Food Process Engineering, Process Systems Analyses and Simulations |
| Dutta Gupta, Snehasish | *Ph.D.(Kalyani Univ)*, Plant Tissue Culture Engineering, Plant Image Analysis, Impact of LED on Plant Morphogenesis |
| Ghosh, Bijoy Chandra | *Ph.D.(IIT Kharagpur)*, Soil less culture Organic farming Tea production and processing |
| Goswami, Tridib Kumar | *Ph.D.(IIT Kharagpur)*, Cold Storage, CA and MA storage of fruits and vegetables, Cryogenic grinding of spices, Discrete Element Analysis of grinding, CFD analysis of temperature distribution in precooler |
| Jha, Madan Kumar | *Ph.D.(Japan)*, Groundwater Management using RS-GIS and MCDM Techniques, Basin-wide Simulation-Optimization Modeling of Groundwater Systems, Inverse Modeling for Aquifer Parameter Estimation, Rainwater Harvesting and Artificial Recharge, Groundwater Investigation-Recharge Analysis and Seawater Intrusion, Field Investigation and Modeling of Flow and Transport Processes in Vadose-Zone Systems |
| Mal, Bimal Chandra | *Ph.D.(IIT Kharagpur)*, Aquacultural Engineering |
| Mallick, Nirupama | *Ph.D.(BHU, Varanasi)*, Microalgal Biofuel, Biodegradable Polymers (Polyhydroxyalkanoates) from Cyanobacteria, Bioremediation with Microalgae, Bioactives from Microalgae, Cyanobacterial Biofertilizer |
| Mishra, Hari Niwas | *Ph.D.(IIT Kharagpur)*, Algal Food Biotechnology, RTE Health Foods & Nutraceuticals, Innovative Food Processing Technologies, Horticultural & Plantation Crop Products Processing, Food Safety & Quality Control, High pressure processing of high value perishables |

| | |
|---|---|
| Mitra, Adinpunya | *Ph.D.(East Anglia UK)*, Diversion from phenolics to volatile terpenoids biosynthesis in transformed roots of carrot, Understanding molecular oscillations of scent volatiles emission in evening blooming flowers, Evaluating metabolic perturbations in genetically-engineered root cultures of tobacco, Identification of flavour trait(s) in Darjeeling tea accessions by targeted metabolomics, Selection of superior scented rice cultivars through targeted metabolomics, Improvement of floral scent in evening-blooming plants by induced mutagenesis, Ultrastructural analysis of floral tissues for understanding scent volatiles emission |
| Panda, Rabindra Kumar | *Ph.D.(IARI Delhi)*, Watershed Management, Non-point Source Pollution of Soil & Water, Climate Change Effect on Agriculture, Rainwater Managment |
| Panda, Sudhindra Nath | *Ph.D.(PAU, Ludhiana)*, Integrated Land and Water Resources Planning and Management, Water Conservation and Reuse for Climate Resilient Agriculture |
| Raghuwanshi, Narendra Singh | *Ph.D.(California)*, Irrigation and Water Management, Hydrological Modelling, Watershed Management, WSN in Water Management |
| Raheman, Hifjur | *Ph.D.(Bangkok)*, Development of farm Implements, Biofuel production and hybrid power generation, Traction and tillage performance improvement in walking tractor |
| Singh, Rajendra | *Ph.D.(IIT Kharagpur)*, Hydrological Modelling, Irrigation System Mangement |
| Tewari, Virendra Kumar | *Ph.D.(IIT Kharagpur)*, Farm Machinery & Power, Ergonomics & Safety, Precision Agriculture |
| Thomas, E.V. | *Ph.D.(IIT Kharagpur)*, Farm Machinery & Power, Rice Transplanter, Tea Process Machinery, Rural and cottage industries machinery |
| Tiwari, Kamlesh Narayan | *Ph.D.(IARI Delhi)*, Micro Irrigation, Greenhouse Technology, Remote Sensing & GIS Applications in Water Resources and Watershed Management |

***Associate Professors***

| | |
|---|---|
| Das, Madhusweta | *Ph.D.(Jadavpur Univ)*, Functional Foods, Starch based edible and biodegradable film, Utilisation and isolation of bioactive component from food waste |
| Mishra, Ashok | *Ph.D.(IIT Kharagpur)*, Hydrological modelling & Watershed management, Crop yield modelling, Climate change analysis & applications in water and crop management |
| Mitra, Arunabha | *Ph.D.(Calcutta Univ)*, Value based education, Waste utilization in aquaculture, Ecology and environmental pollution, Chemical-free farming, Mind and consciousness, Stress management and control |
| Srinivasa Rao, Pavuluri | *Ph.D.(IIT Kharagpur)*, Recirculatory Aquacultural Systems, Post Harvest & Food Process Engineering, High Pressure Processing of High Value Perishable Commodities, Grain Storage Structures and Stored Grain Quality, Non-thermal Methods of Food Processing, Water and Energy Conservation in Food Processing Industries |
| Srivastav, Prem Prakash | *Ph.D.(IIT Kharagpur)*, Food Science and Technology |
| Swain, Dillip Kumar | *Ph.D.(IIT Kharagpur)*, Sustainable & Precision Production Agriculture, Climate Change Adaptations & Mitigations, Crop Growth & Yield Simulation |

***Assistant Professors***

| | |
|---|---|
| Guha, Proshanta | *Ph.D.(IIT Kharagpur)*, 1.Agronomy 2.Post-harvest Technology 3.Forest Weed & Water Management 4.Food Laws & Standards |
| Mailapalli, Damodhar Rao | *Ph.D.(IIT Kharagpur)*, Agricultural water and waste management, Irrigation hydraulics and modeling, Nonpoint source agricultural pollution, Nanomaterials in Agriculture |
| Mitra, Jayeeta | *Ph.D.(IIT Kharagpur)*, Transport Processes in Food Engineering, Packaging and Storage Studies, Numerical Modelling |
| Mukherjee, Chanchal Kumar | *MS (New Jersey)*, Cage for mariculture |
| Shrivastava, Shanker Lal | *Ph.D.(IIT Kharagpur)*, Post Harvest Engineering, Dairy & Food Process Engineering, Food processing equipment development |
| Tripathy, Punyadarshini Punam | *Ph.D.(IIT Delhi)*, Heat and Mass transfer during drying of food products, Mathematical modeling and simulation in food drying process, CO2 mitigation in solar dryers, CO2 capture and storage |

***Visiting Faculty***

| | |
|---|---|
| Machavaram, Rajendra | *Ph.D.(IIT Madras)*, Design Optimization, Artificial Intelligence and Evolutionary Algorithms, Vibration based Structural Health Monitoring (SHM), Farm Machinery and Renewable Energy |

***Thrust Areas***

Agricultural Biotechnology

1. Agro-Informatics
2. Mechanized Food Processing
3. Natural Resources Management
4. Precision Farming

***Brief Description of on-going activities***

Application of GIS in both command area & watershed management, Application of neural network in hydrology, Ballast management of agricultural tractors, Biofiltration Technology, Bio-fuels from tree-based oils, Biosynthesis of phenolic fragrance and xanthones, Cage for mariculture, Climate change analysis & applications in water and crop management, Coal biotechnology, Design and development of continually variable transmission for tractors, Design , development and field evaluation of a small power tractor, Design and development of slip meter for two-wheel drive tractors, Design and development of automatic depth control system for tractors, Design and development of ergo NVH_ag 1.0 software, Design and development of noise and vibration reducing device for hand tractor, Design and development of noise and vibration reducing device for vertical conveyer reaper, Design of a centrifugal press for semi-continuous production of paneer, Development of aseptic packaging system for milk, Development of environment-friendly aquaculture, Development of food products, Development of machineries and process technology for cereals & pulses based snacks, Development of rice transplanter, Development of a continuous chhana making device, Development of jacketted scraped surface vessel for kneading, heating and concentration of high viscosity liquids and pastes, Development of endless chain pressure dryer for orthodox tea, Design of a centrifugal press for semicontinuous production of paneer, Development of Cashew nut sheller and Cashew peeler, Evaluation of cosmetic properties of Aloe vera L., Flow and solute transport in sub-surface environment, Food Packaging, High pressure processing of high value perishables, Hydrological modelling of small watersheds, Imaging photosynthesis of micropropagated plants, Integration of surface irrigation and two-dimension infiltration model, Machinery systems and ergonomics, Microalgal biofuel, Microbial degradation of plant phenolics for value-added products, Impact of light emitting diodes (LEDs) on plant morphogenesis, Microwave assisted drying of high moisture food, Nutrient management, Polyhydroxyalkanoates from Cyanobacteria, Predicting traction performance using artificial neural network, Process technology for dehydration of mushrooms, Production and processing of tea, Production of tannase

under solid state fermentation, Process technology for dahi powder & dahi powder based energy drink mix, Process technology for antioxidant rich RTE health food, Process technology for manufacture of RTE health food (herbal kurkure), Rainwater harvesting and groundwater recharge, Software development for machinery management, Spectral characterization of soils, Starch based edible and biodegradable film, Thermal analysis of food materials, Traction potential of bias-ply tyres used in agricultural tractors, Water quality and watershed management

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 11 |
| Fellow - Professional Bodies | 22 |
| Member - Professional Bodies | 142 |
| Member - Editorial Board | 65 |
| Visits Abroad by Faculty Members | 16 |
| Doctoral and MS Degrees Awarded | 21 |
| Sponsored Research Projects | 92 |
| Consultancy Projects | 35 |
| Technology Transferred | 30 |
| Patents (filed / granted) | 16 |
| Seminars, Conferences and Workshops Organised | 26 |
| Short-Term Courses and Training Programmes organised | 19 |
| Books Published | 5 |
| Papers Published in Journals | 138 |
| Papers Presented in Conferences | 57 |

# Department of Architecture & Regional Planning

***Head***
Prof. Subrata Chattopadhyay

***Professors***

| | |
|---|---|
| Banerjee, Uttam Kumar | *Ph.D.(IIT Kharagpur)*, Facility Planning, Environmental Management, Disaster Management, Architecture and Urban Planning, Landscape Planning, Infrastructure Information Systems, CAD and GIS |
| Barman, Jaydip | *Ph.D.(IIT Kharagpur)*, Urban Design, Green Buildings and Eco Habitat, Tourism Planning and Management, Urban Waterfront Development, Crime Prevention through Landscape Design in Urban Public Spaces |
| Chattopadhyay, Subrata | *Ph.D.(IIT Kharagpur)*, Identification of smartness quotient of traditional Indian cities, Spatio-temporal study on peri urban dynamics, Modelling energy efficient intervention in affordable housing, Identifying intangibles in Relief and Rehabilitation package, Identifying indicators for mixed use development |
| Datta, Rabindranath | *Ph.D.(IIT Kharagpur)*, City Planning, Urban and Regional Transportation Planning |
| Sen Gupta, Biplab Kanti | *MCP(IIT Kharagpur)*, Architectural Design for Institutional Buildings, Development Management and Finance, Urban and Regional Planning, Architecture and Urban Design |
| Sen, Joy | *Ph.D.(IIT Kharagpur)*, Community and Regional Planning Analyses & Programming, Architecture and Planning related Heritage Studies and Documentation |

***Associate Professors***

| | |
|---|---|
| Basu, Sanghamitra | *Ph.D.(IIT Kharagpur)*, Cultural Heritage Planning & Management, Urban Conservation & Heritage Management, Architectural Design and Pedagogy, Quality of Life in Residential Neighbourhoods with focus on needs of senior citizens, Decision Making and application in GIS in Urban & Regional Planning, Post Modernism & Contemporary Architecture, Quality of Life and Social Cohesion in various types of built environment |
| George, Abraham | *Ph.D.(Calicut University)*, Architecture Design-Pedagogy-Sustainable Age-friendlyDesigns-Landscape-Elderly Housing-Preservation |
| Mazumder, Tarak Nath | *Ph.D (IIT Kharagpur)*, Urban Planning, Transportation Planning, Hazardous Waste Management |
| Pandit, Debapratim | *Ph.D.(Univ. of Tokyo)*, Transportation Planning, Urban Infrastructure utilities and services, Urban Environmental Planning & Management |
| Sen, Somnath | *Ph.D.(IIT Kharagpur)*, Environmental Planning, Land Use and Development Control Planning |

***Assistant Professors***

| | |
|---|---|
| Banerji, Haimanti | *Ph.D.(IIT Kharagpur)*, Barrier Free Architecture, Behavioral Architecture, Urban Design, Town Planning and Settlement Planning, Ergonomics and Product Design, Housing and Neighbourhood Planning |

| | |
|---|---|
| Bhattacharya, Shankha Pratim | *Ph.D. (BIT,Mesra)*, Earthquake Resistant Building, Structural Systems, Building Physics |
| Chakraborty, Banhi | *Ph.D (IIT Kharagpur)*, Consumer Welfare, Culture and Livelihood, Rural and Forest Livelihood, Rural Economics |
| Das, Arup | *Ph.D.(IIT Kharagpur)*, Environmental Planning, Urban Planning, Hazardous Waste Management |
| Das, Sutapa | *Ph.D. (National University of Singapore)*, High performance and intelligent building, Building -occupant interaction, Constrcution project management, Building technology (systems_services_materials and construction methods), Maintainability and facilities management |
| Gupta, Sumana | *Ph.D.(IIT Kharagpur)*, Neighbourhood Planning, Architectural Design, Service Quality Evaluation, Facility Planning |
| Majumdar, Tapan Kumar | *MCP(IIT Kharagpur)*, Work environment in industries for industrial workers, Low cost Construction |
| Paul, Saikat Kumar | *Ph.D.(IIT Kharagpur)*, Computer Application in Built Environment, GIS and Remote Sensing in Planning, Urban and Regional Planning, Architectural Design, Environmental Planning |

***Thrust Areas***

1. Green Architecture sustainable and Energy efficienct designs
2. Urban information system
3. Universal Design in Built Environment
4. Advanced Housing Research
5. Transportation Research
6. Geo informatics

***Brief Description of on-going activities***

Architectural Design, Building Science and Environmental Planning: (Performance studies, Design Simulation and Intelligent Architecture, Building Automation and Management Systems, Sustainable Development, Energy Efficient Design, Appropriate Technologies, Spatial Environmental Planning, Eco-sensitive and Green Architecture)
Art and Architecture: (Indian Traditional Architecture and Heritage studies, Vernacular Architecture, Design, Visual Communication, Visual Simulation, Product design and Industrial design)
Infrastructure and spatial Planning: (Transportation Planning, Traffic Engineering and Management, Hazards and Disaster Mitigation and Management, Urban Design, Eco-tourism, Recreation and Landscape Planning, Conservation and Preservation Studies, Housing and Shelter, Social Infrastructure)
Urban Information System and Planning: (Urban Development Management and Finance, Advanced Planning Informatics, Geographical Information Systems, Decision support systems and Expert systems, Urban Settlement and Systems Dynamics)
Architecture, Media and Communication: (Cultural studies, Media and Architectural journalism, Symbolism and Cultural sustainability)

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 4 |
| Fellow - Professional Bodies | 10 |
| Member - Professional Bodies | 58 |
| Member - Editorial Board | 26 |
| Visits Abroad by Faculty Members | 7 |
| Sponsored Research Projects | 47 |
| Consultancy Projects | 46 |

| | |
|---|---|
| Seminars, Conferences and Workshops Organised | 11 |
| Short-Term Courses and Training Programmes organised | 1 |
| Books Published | 3 |
| Papers Published in Journals | 20 |
| Papers Presented in Conferences | 16 |

# Department of Biotechnology

***Head***
Prof. Sudip Kumar Ghosh

***Professors***

| | |
|---|---|
| Das, Amit Kumar | *Ph.D.(Calcutta Univ)*, Structural Biology and Biochemistry, Crystallographic study of proteins from M.tuberculosis and S. aureus, Structural Bioinformatics |
| Das, Debabrata | *Ph.D.(IIT Delhi)*, Biohydrogen production processes, Algal Biorefinery, Microbial Electrochemical Cell, BIOHYMET process |
| Dey, Satyahari | *Ph.D.(IIT Kharagpur)*, Bio-prospecting genes & molecules. Molecular profiling. Prebiotics pro-/psychobiotics bioproducts |
| Ghosh, Ananta Kumar | *Ph.D.(Calcutta Univ)*, Recombinant DNA Technology, Hybridoma Technology, Molecular Virology, Antimicrobial peptides |
| Ghosh, Sudip Kumar | *Ph.D.(Kalyani Univ)*, Plant Molecular Biology, Nanobiotechnology, Molecular and Cellular Parasitology |
| Kundu, Subhas Chandra | *Ph.D.(BHU, Varanasi)*, Cell based tissue engineering and regenerative medicine, Silk biomaterials and bioactive molecule delivery |
| Maiti, Tapas Kumar | *Ph.D.(Kalyani Univ)*, Plant lectins and lectin derived peptides in cancer therapy, Mushroom derived glucans as immunomodulators, Biomicrofluidics and biochip development, Tissue enginnering through top down and bottom up approach |
| Sen, Ramkrishna | *Ph.D.(IIT Madras)*, Biosensor development, Algal Biofuels and Bio-CCS, Microalgal & Microbial Biorefinery for Biorenewables, Bioprocess Integration Intensification & Optimization, Biochemical & Bioprocess Engineering, Enzymes and Biofuels Technology, Biomass & Bioenergy, Probiotics and Nutraceuticals, Environmental & Marine Biotechnology, Green Process & Product Development for Healthcare Energy & Environment |

***Associate Professors***

| | |
|---|---|
| Bahadur, Ranjit Prasad | *Ph.D.(Jadavpur Univ)*, Bioinformatics and Computational Structural Biology |
| Ghosh, Anindya Sundar | *Ph.D.(Calcutta Univ)*, Biofilm and antimicrobial resistance mechanisms, Molecular Microbiology, Physiology and Biochemistry of cell surface macromolecules |
| Maiti, Mrinal Kumar | *Ph.D.(Calcutta Univ)*, Metabolic engineering of plants fungi and algae for improved storage-lipids, Functional genomics of rice crop for improved productivity, Bioprospecting of endophytic microbes for animal healthcare and plant growth promotion |
| Sar, Pinaki | *Ph.D.(BHU, Varanasi)*, Geomicrobiology of arsenic contaminated groundwater, Metagenomics of petroleum hydrocarbon waste and bioremediation, Exploration of microbial diversity and biogeochemistry in deep biosphere, Microbial diversity and bioremediation of mine waste including acid mine drainage |

***Assistant Professor***

| | |
|---|---|
| Ganguly, Agneyo | *Ph.D.(IICB, Kolkata)*, DNA repair mechanisms in kinetoplastid parasites, DNA repair mechanisms in response to topoisomerase I poisoning, Understanding the molecular interactions between human RecQ1 helicase and replication protein A |

***Thrust Areas***

1. Healthcare Biotechnology (Prospecting novel therapeutics/diagnostics molecules for cancer, protozoan parasites, microbes, tuberculosis, etc. 2. Bio-energy (Production of bio-diesel, bio-ethanol & bio-hydrogen). 3. Bioremediation, Biomaterials and Tissue engineering

***Brief Description of on-going activities***

1. Process development & optimization for the production of an anti-tumor biosurfactant. 2. Alkaline lipase production. 3. Production of Biodiesel and its evaluation. 4. Bioremediation of heavy metals, radionuclides and organic pollutants; molecular analysis of microbial community structure and function at contaminated sites. 5. Development of methods of o-antigens and its relation with pathogenecity in Gram negative bacteria. 6.Bioreactor strategies for the enhanced production of probiotic endospores for Nutraceutical formulations and their clinical evaluation. 7. Molecular characterization of metronidazole activation and deactivation pathways in Entamoeba histolytica. Characterisation of E. histolytica surface proteins. 8. Molecular cloning, expression and characterization of of E. invadens encystation specific proteins. 9. Recombinant protein (therapeutic & diagnostic) expression in plant, animal and microbial systems. 10. Structural and functional studies of protein from M. tuberculosis and S. aureus aiming at drug and inhibitor design. 11. Improvement of hydrogen production from industrial waste using hybrid bioreactor. 12. Continuous hydrogen production by immobilized recombinant E. coli BL-21. 13. Molecular analysis of cypovirus infecting tasar silkworm 14. Phytomedicine and molecular farming. 15. Development of silk ( fibroin and sericin) based Biomaterials and cell based tissue (skin and bone) engineering. 16. Development of low fat content transgenic oilseed plant. 17. Biomicrofluidics and Biochip development 18. Identification and characterization of immunomodulator from natural sources. 19. Microbial fuel cell 20. Characterization of Antarctic microbiota 21. Probiotic nutraceutical development.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 1 |
| Fellow - Professional Bodies | 11 |
| Member - Professional Bodies | 44 |
| Member - Editorial Board | 12 |
| Visits Abroad by Faculty Members | 8 |
| Doctoral and MS Degrees Awarded | 12 |
| Sponsored Research Projects | 83 |
| Consultancy Projects | 4 |
| Patents (filed / granted) | 9 |
| Books Published | 2 |
| Papers Published in Journals | 95 |
| Papers Presented in Conferences | 48 |

# Department of Chemical Engineering

***Head***
Prof. Sirshendu De

***Professors***

| | |
|---|---|
| Basu, Jayanta Kumar | *Ph.D.(IIT Kharagpur)*, Adsorption and Separation Science, Waste Water Treatment, Reaction Engineering |
| Chakraborty, Sudipto | *Ph.D.(IIT Kharagpur)*, Computer Aided Process Engineering, Heat Transfer, Ultra-fast cooling of steel |
| Das, Gargi | *Ph.D.(IIT Kharagpur)*, Multiphase flow, Two phase instrumentation, CFD simulation, Process Intensification |
| DasGupta, Sunando | *Ph.D.(RPI, USA)*, Microscale Transport Process and Microfluidics |
| De, Sirshendu | *Ph.D.(IIT Kanpur)*, Membrane separations, Transport Processes, Flow through microchannels |
| Kundu, Gautam | *Ph.D.(IIT Kharagpur)*, Multiphase Operation, Mineral Beneficiation, Rheology of Suspension, Catalysis |
| Meikap, Bhim Charan | *Ph.D.(IIT Kharagpur)*, Industrial Environmental Pollution Monitoring & Control, Coal Benificiation, CO2 Capturing, Fluidization |
| Mukherjee, Dibyendu | *Ph.D.(IIT Kharagpur)*, Multi Phase Flow, Column Flotation, Modeling & Simulation |
| Neogi, Sudarsan | *Ph.D.(Ohio Univ.,USA)*, Surface Modification And Engineering of Polymer Substrates For Biomedical Applications, Plasma Enhanced Chemical Vapor Deposition, Plasma Sterilization, Adhesive Development, Antimicrobial Coatings, Modeling And Simulation Of Chemical Process Plant, Environmental Pollution Control, Polymer Composites |
| Neogi, Swati | *Ph. D.(Ohio University)*, Advanced composite technology, Lifetime and reliability study, Composite fabrication technology, polymer composite process modeling and simulation |
| Pradhan, Narayan Chandra | *Ph.D.(UDCT Bombay)*, Heterogeneous Catalysis, Chemical Process Development, Petrochemical Technology, Petroleum Refining, Separations Technology |
| Samanta, Amar Nath | *Ph.D.(IIT Kharagpur)*, Process Dynamics & Control, Nonlinear Process Control, Process Modeling & Simulation, Carbon Capture & Sequestrian |

***Associate Professors***

| | |
|---|---|
| Chakrabarty, Saikat | *Ph.D.(Univ. of Houston)*, Chemical Reaction Engineering, Biomedical Engineering, Bioenergy |
| Ganguly, Somenath | *Ph.D.(Univ. of Kansas, USA)*, Structured Fluids, Porous Media, Microencapsulation |
| Mukherjee, Rabibrata | *Ph.D.(IIT Kanpur)*, Polymer Thin Film Instability, Soft Lithography, Structural Super Hydrophobicity, Colloidal Crystals, Soft Nano Fabrication, Sol - Gel Thin Films |

| | |
|---|---|
| Sengupta, Sonali | *Ph.D.(UDCT Mumbai)*, Reaction Engineering, Petroleum engineering, Heterogeneous and Homogeneous Catalysis |

***Assistant Professors***

| | |
|---|---|
| Atta, Arnab | *Ph.D.(IIT Delhi)*, Computational Fluid Dynamics, Multiphase Flow, Complex Fluids, Process Intensification, Interfacial Science and Engineering |
| Chakraborty, Jayanta | *Ph.D.(IISc., Bangalore)*, Particle technology, Population balance modeling, Synthesis of nanoparticles, Preparation of AZO coated glass., Manufacturing of nanomaterial based solar cells |
| Deshpande, Parag Arvind | *Ph.D.(IISc., Bangalore)*, Electronic structure calculations, Computational materials science, Computational biology |
| G, Harikrishnan | *Ph.D.(IIT Bombay)*, |
| Jana, Amiya Kumar | *Ph.D.(IIT Kharagpur)*, Renewable energy, Process intensification, Nonlinear control, Modeling and simulation, Desalination, Fuel cell |
| Padmanabhan, Venkat | *Ph.D.(Columbia Univ.)*, Advanced Functional Materials, Polymer Nanocomposites, Bio-Mechanics of C. elegans, Organic Photovoltaics |
| Ray, Subhabrata | *M.Tech.(IIT Kharagpur)*, |
| Sarkar, Debasis | *Ph.D.(IISc. Bangalore)*, Optimization and control of fed-batch bioreactors, Crystallization process engineering, Multi-objective optimization: Genetic Algorithms, Multivariate image analysis, Computational systems biology |

***Thrust Areas***

1. Environmental Pollution Control
2. Polymer Processing and Composites
3. Plasma Engineering and Surface Science
4. Computational Materials Science
5. Colloid and Interface Engineering
6. Molecular Simulation
7. Computational Fluid Dynamics and Thermal Engineering
8. Catalysis and Reaction Engineering
9. Bioenergy
10. Coal Science and Engineering
11. Petroleum Production Engineering
12. Carbon Capture and Storage
13. Fine Particle Engineering
14. Crystallisation Engineering
15. Process Optimization, Dynamics and Control
16. Membrane Separation
17. Bio- and Energy Materials
18. Soft Nanotechnology
19. Microfluidics and Microscale Transport Engineering
20. Complex Fluid
21. Multiphase Flow

***Brief Description of on-going activities***

1. Heterogeneous reactions with application to chemical process development with special emphasis on greener alternatives 2. Utilisation of non-edible oils for manufacturing of value-added chemicals 3. Steam reforming of peteoleum feedstock in mini-and micro-reactors for production of Hydrogen 4. Advanced separation processes

involving membranes with emphasis on water purification, dye removal, effluent treatment processes etc. 5. Simulation and modeling of coal & biomass combustion processes in pulverized and fluidized combustors 6. Multi-phase processes & reactions in gas-liquid, liquid-solid, solid-liquid and liquid-liquid systems using pipelines, ejector based systems, fluidized bed, column flotation etc. 7. Development of innovative catalysts from fly ash for organic chemical synthesis (alkylation, isomerisation etc.) 8. Plasma assisted surface modification for chemical engineering applications 9. Development & performance of novel bubble column scrubber/reactor for removal of SO2 and fly ash 10. Technology of composite materials 11. Pattern Formation of Soft Materials utilizing Interfacial Instability 12. Microscale transport processes and microfluidics including droplet based digital microfluidics 13. Training of Personnel for construction and maintenance of Bio Gas Plants. 14. Beneficiation of Coal and Mineral by Column Flotation Cell.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 11 |
| Fellow - Professional Bodies | 8 |
| Member - Professional Bodies | 53 |
| Member - Editorial Board | 8 |
| Visits Abroad by Faculty Members | 8 |
| Doctoral and MS Degrees Awarded | 5 |
| Sponsored Research Projects | 81 |
| Consultancy Projects | 45 |
| Technology Transferred | 1 |
| Patents (filed / granted) | 25 |
| Seminars, Conferences and Workshops Organised | 2 |
| Books Published | 9 |
| Papers Published in Journals | 145 |
| Papers Presented in Conferences | 53 |

# Department of Chemistry

***Head***
Prof. Tanmaya Pathak

***Professors***

| | |
|---|---|
| Bandyopadhyay, Sanjoy | *Ph.D.(IISc Bangalore)*, Protein folding, Theoretical and Computational Chemistry, Hydration properties of bio-molecules, Self-assembled molecular films at interfaces, Protein-ligand complexes, Phospholipid membranes, Cyclodextrin-guest interaction, Intrinsically disordered proteins |
| Basak, Amit | *Ph.D.(Cal),D.Phil.(Oxon)*, Bioorganic/Medicinal Chemistry/Selective protein capture/LDI Mass Spectrometry/synthetic Chemistry |
| Bhattacharjee, Manish | *Ph.D.(NEHU)*, Catalysis, Synthetic Inorganic Chemistry |
| Biradha, Kumar | *Ph.D.(Hyderabad)*, Gas sorption studies, Supramolecular Chemistry, Crystal Engineering, Polymorphism, Cooridnation Polymers, Structural Chemistry, Solid state reactions, Soft materials |
| Chattaraj, Pratim Kumar | *Ph.D.(IIT Bombay)*, Density functional theory, Chemical reactivity, ab initio calculations, Quantum chaos, Aromaticity in metal clusters, Noble Gas Chemistry |
| Dasgupta, Swagata | *Ph.D.(RPI New York)*, Protein-protein and Protein-small molecule interactions, Protein aggregation studies |
| Dey, Joykrishna | *Ph.D.(Kanpur)*, Surfactant and Polymer Based Drug Delivery Systems, Polymer- and Protein/Surfactant Interactions, Molecular Gels |
| Hajra, Saumen | *Ph.D.(Pune Univ)*, Catalytic Asymmetric Reactions, Organocatalysis, Total Synthesis of Biologically Active Compounds |
| Mal, Dipak Ranjan | *Ph.D.(Missouri)*, Benzannulation and Hauser annulation, Lateral lithiation Michael-initiated ring closure, Total synthesis of bioactive natural products: angucyclines anthracyclines carbazoles quinonoids, Oxidative dearomatization, Carbonyl-ene reaction |
| Pal, Tarasankar | *Ph.D.(Burdwan Univ.), D.Sc.(Visva Bharati Uni*, Catalysis, Spectroscopy, Nanoscience, Electrochemistry |
| Pathak, Tanmaya | *Ph.D.(Uppsala Sweden)*, Carbohydrates. Nucleosides. Heterocycles. Carbocycles. Dinucleosides as Rnase A inhibitors |
| Raj, C Retna | *Ph.D.(M.K Univ Madurai)*, Optical and electrochemical sensors, Electrocatalysis and fuel cell, Inorganic multifunctional nanomaterials, Energy conversion and storage devices |
| Ray, Debashis | *Ph.D.(Jadavpur Univ)*, High nuclearity coordination clusters of transition metal ions., Solution coordination chemistry and crystal structures., Coordination driven supramolecular metal complex chemistry., Cluster coordination chemistry., Synthesis of ferromagnetic and single molecule magnetic metal complexes., Interaction of DNA and cleavage by heterometallic alkali metal-transition metal clusters., Self-assembly of dinuclear copper(II) motifs and mechanochemical core conversions., Multimetallic constellation through ligand arm hydrolysis., Coordination driven fluorescence enhancement., Evaluation and fluorescence study of metal complexes., Catechol oxidation study using metal complexes. |

| | |
|---|---|
| Ray, Jayanta Kumar | *Ph.D.(Calcutta Univ)*, Synthetic Organic Chemistry |
| Sarkar, Nilmoni | *Ph.D.(Jadavpur Univ)*, Characterization of Ionic Liquid containing Microemulsion and Vesicles, Photoinduced electron transfer in RTIL and RTIL containing confined media., Photophysics and Photodynamics of biologically relevant molecules, Excited state intramolecular proton transfer in organized assemblies, Characterization of surface active ionic liquids, Fluorescene Correlation Spectroscopy, Fluorescence lifetime imaging microscopy at single molecular level, Femtosecond Fluorescence up-conversion in Binary mixtures and organized assemblies |
| Srivastava, Suneel Kumar | *Ph.D.(IIT Kharagpur)*, Semiconducting/Magnetic/Graphitic materials/Natural and Synthetic Clay, Polymer Nanocomposites, Thermoelectric Nanomaterials, Energy (Lithium Ion Battery, Environmental Pollution (EMI shielding and Water purification) and Sensors |
| Taraphder, Srabani | *Ph.D.(IISc Bangalore)*, Theoretical Physical Chemistry, Computer Simulation of Charge Transfer Processes, Theoretical Modelling of Functionalized Carbon Nanotubes |
| ***Associate Professors*** | |
| Dhara, Dibakar | *Ph.D.(Osmania Univ. Hyderabad)*, Synthetic Polymer Chemistry, Colloids and Nanomaterials, Physical Chemistry of Macromolecules |
| Halder, Mintu | *Ph.D.(IACS Kolkata)*, Experimental Physical Chemistry, Biophysics, Photophysics of Nano-materials, Spectroscopy |
| Mahanty (Pathak), Amita | *Ph.D.(IIT Kharagpur)*, Synthesis of Functional Nanostructures and their Application |
| Mani, Ganesan | , Main group and transition metal organometallics and catalysis |
| Nag, Ahindra | *Ph.D.(Jadavpur Univ)*, Isolation and characterization of natural products, Synthesis of important compounds ( enzymatically), Synthesis of value added organic compounds |
| Nanda, Samik | *Ph.D.(IICT-Hyderabad)*, Application of enzymes and microorganisms in organic synthesis, Total synthesis of complex natural products, Asymmetric synthesis |
| Rajakumar Ananthakrishnan | *Ph.D.(M.K.Univ., Madurai)*, Analytical Methods for the detection of heavy metals/water pollutants/ROS (in AOP)., Preparation of hybrid/mixed metal oxides/nanomaterials for photocatalysis and surface applications, Green Methodolody for Selective Organic Transformation/photodegradation under visible light. |
| Singh, N D Pradeep | *Ph.D.(Madras Univ.)*, Development of fluorescent photoremovable protecting groups, Generation of Photoresponsive surfaces and their applications, Two photon induced nanocarrier for regulated drug delivery, Photodynamic therapy (PDT), Visible light induced photocatalysis for organic transformation, single component system for sensing and drug delivery |
| ***Assistant Professors*** | |
| Ayyappan, Anoop | *Ph.D.(Univ. of Hyderabad)*, Computational Chemistry, Reaction Mechanisms, QM/MM studies of biological systems, Computational Photochemistry |

| | |
|---|---|
| Das, Madhab Chandra | *Ph.D.(IIT Kanpur)*, Porous Metal/Covalent Organic Frameworks (MOFs/COFs) |
| Jana, Partha Pratim | *Ph.D.(Univ. of Marburg, Germany)*, Solid State Chemistry & crystallography |
| Maji, Modhu Sudan | *Ph.D.(Germany)*, Dual Catalysis & Asymmetric Synthesis (merging organo-catalysis with transition metal catalysis), Ru- and Rh-catalyzed selective C-H bond functionalization, N-tert.-butanesulfinyl imine in the synthesis of bio-active natural products, Multi Component Reaction in the light of Dual Catalysis |
| Mandal, Sukanta | *Ph.D.(IIT Kanpur)*, Synthetic Bioinorganic Model Chemistry, Bioinspired Redox Catalysis using Transition Metal Complexes, Water Splitting Chemistry by Transition Metal Complexes: Artificial Photosynthesis |
| Mishra, Sabyashachi | *Ph.D.(Tech. Univ., Munich, Germany)*, Theory of Relativistic Vibronic Coupling in Molecular Physics, Relativistic Quantum Chemistry, Molecular Structure and Spectroscopy in Excited States, Reactive Processes in Biology, Network Dynamics in Bio-(chemical/physical) processes |
| Patra, Sanjib Kumar | *Ph.D. (IIT Kanpur)*, Inorganic Chemistry, Functional Polymer Chemistry, Organometallic Chemistry, Materials Chemistry |
| Samanta, Rajarshi | *Ph.D.(IICT, Hyderabad)*, Transition metal catalysis, Asymmetric synthesis, Total synthesis of natural products, Natural product inspired compound library |

***Thrust Areas***

1. Biomimics
2. Transition Metal Cluster Complexes
3. Structural Coordination Chemistry
4. Ferromagnetic Metal Complexes
5. Drug Design and Delivery
6. Chemical and Electrochemical Sensors
7. Molecular Modeling
8. Protein Folding & Enzymatic Catalysis
9. Spectroscopy of Assemblies
10. Green Chemistry
11. Nanochemistry
12. Catalysis

***Brief Description of on-going activities***

The department with 32 faculty members, 170 research scholars, and 150 undergraduate students, is engaged in frontier research embracing both basic and applied areas of chemistry, such as, Catalysis, Chemistry of Biomolecules, Functional Materials, Macromolecules, Organic Synthesis, Organized Assemblies, Organometallic Chemistry, Structural Chemistry, Synthetic Inorganic Chemistry, and Theoretical and Computational Chemistry. The department is equipped with state-of-the art experimental and computational facilities, namely, (only major equipments) Bruker APEX SMART CCD Single Crystal difractometer, Bruker AVANCE II 400 MHz and AVANCE II 200 MHz spectrometer, Shimadzu DT-40 model 883 IR Spectrometer, PW-17291710 X-Ray Diffractometer, Cyclic Voltammeter Model P9001, Chrompac Gas Chromatograph and JASCO DIP 370 digital polarimeter, Spex Fluorolog 3 fluorimeter, Perkin Elmer C, H, N Analyzer, CPU-GPU hydbrid HPC cluster. Currently, the department is handling over 40 sponsored projects from various agencies, including major research grants from DST as FIST level-II support and the Seed Grant for Research Infrastructure in an area of Emerging Thrust (SGDRI) of IIT Kharagpur. In the last year, the department organized the 22nd conference of the National Magnetic Resonance Society. in addition, the department actively participated in the Ishan Vikas 2016 program for School Children, organized by the Nehru Museum of Science & Technology, IIT Kharagpur and sponsored by MHRD.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 11 |
| Fellow - Professional Bodies | 1 |
| Member - Professional Bodies | 53 |
| Member - Editorial Board | 24 |
| Visits Abroad by Faculty Members | 9 |
| Sponsored Research Projects | 62 |
| Consultancy Projects | 2 |
| Patents (filed / granted) | 3 |
| Seminars, Conferences and Workshops Organised | 3 |
| Books Published | 1 |
| Papers Published in Journals | 176 |
| Papers Presented in Conferences | 12 |

# Department of Civil Engineering

***Head***
Prof. Kusam Sudhakar Reddy

***Professors***

| | |
|---|---|
| Baidya, Dilip Kumar | *Ph.D.(IISc Bangalore)*, Reliability in Gotechnical Engg Pile Foundations Soil Dynamics |
| Barai, Sudhir Kumar | *Ph.D.(IISc Bangalore)*, Soft Computing Applications, Structural Health Monitoring, Recycled Construction Materials, Fracture in Concrete |
| Bhattacharya, Baidurya | *Ph.D. (Johns Hopkins Univ)*, Computational materials science, Risk and reliability analysis of infrastructure systems |
| Bhattacharyya, Sriman Kumar | *Ph.D.(IIT Kharagpur)*, Sustainable Material, Fluid-Structure Interaction, Structural Health Monitoring, Structural Rehabilitation and Retrofitting, Disaster Resistant Structural Systems |
| Desai, Venkappayya R | *Ph.D.(Clemson Univ)*, Integrated watershed/ water management & rainwater harvesting/ best management practices (BMPs), Surface water/ Groundwater Hydrology & combating climate change through Green Infrastructure, Hydraulics & Hydropower Engineering |
| Dey, Subhasish | *Ph.D.(IIT Kharagpur)*, Turbulence, Fluvial Hydrodynamics, Analytical Hydrodynamics |
| Dhang, Nirjhar | *Ph.D.(IIT Kharagpur)*, Concrete, Dynamics and Control of Railway Bridges, Biomechanics |
| Ghangrekar, Makarand Madhao | *Ph.D (IIT Bombay)*, Microbial Fuel Cells, UASB reactor for anaerobic wastewater treatment, Water and Wastewater Treatment, Bioenergy recovery during waste management, Wastewater reuse |
| Gupta, Ashok Kumar | *Ph.D.(IIT Bombay)*, Water and Wastewater Treatment, Environmental Impact Assesment, Air Quality Management, Environmental Planning, Water Supply and Sanitation |
| Maitra, Bhargab | *Ph.D.(IIT Bombay)*, 1. Transportation Planning, 2. Traffic Operations and Management, 3. Public Transportation System, 4. Travel Behavior Analysis and Demand Models |
| Maity, Damodar | *Ph.D.(IIT Kharagpur)*, Seismic Analysis of Dam, Health Monitoring of Structures, Cost Effective Housing, Vibration Control of Tall Structures |
| Ramachandra, Lingadahally | *Ph.D.(IIT Chennai)*, Stability of Structures, Nonlinear vibrations, Impact Mechanics, Delaminations in Composites |
| Reddy, Kusam Sudhakar | *Ph.D.(IIT Kharagpur)*, Pavement analysis, Pavement Design, Pavement Evaluation, Pavement Materials |
| Roy, Debasis | *Ph.D(Univ.of British Colo*, Geotechnical Earthquake Engineering, Ground Improvement, Insitu testing of Geomaterials |
| Sen Gupta, Aniruddha | *Ph.D.(Illinois Univ)*, Geotechnical Earthquake Engineering, Landslide Hazard Mitigation, Mechanics of Materials, Soil-Structure Interaction |

| | |
|---|---|
| Sen, Dhrubajyoti | *Ph.D.(IIT Delhi)*, Water resources engineering, Numerical techniques in civil engineering hydraulics |

***Associate Professors***

| | |
|---|---|
| Chakraborty, Sushanta | *Ph.D.(IIT Kharagpur)*, Finite Element Model Updating and its application to FRP structures |
| Dash, Sujit Kumar | *Ph.D.(IIT Madras)*, Reinforced soil structures, Shallow foundation |
| Deb, Arghya | *Ph.D.(Princeton Univ)*, Failure and Debonding in concrete, Impact loading on concrete structures, Discrete Element Modelling |
| Deb, Kousik | *Ph.D.(IIT, Kanpur)*, Soil-Structure Interaction, Ground Improvement, Geosynthetic-Reinforced Earth, Numerical Modeling, Soil Arching, Foundation on Soft Soil, Geotechnical Earthquake Engineering, Optimization in Geotechnical Engineering |
| Dubey, Brajesh Kumar | *Ph.D.(Univ. of Florida, USA)*, Beneficial Reuse and Resource Recovery of Potential Solid Waste Components, Integrated Solid Waste Management Issues, Green Engineering, Pollution Prevention, Sustainable Environmental Technologies, Treatment Technologies with Life Cycle Analysis and Sustainable Design, Environmental Nanotechnology including its Remediation Application, Fate and Transport of Manufactured Nanomaterials in the Environment |
| Goel, Sudha | *Ph.D.(Johns Hopkins Univ)*, Environmental Impact and Risk Assessment, Water Quality and Treatment, Solid and Hazardous Waste Management, Environmental Engineering |
| Maity, Rajib | *Ph.D.(IISc. Bangalore)*, Hydroclimatology, Water Resources Engineering, Stochastic Hydrology, Watershed Development, Soft Computing in Hydrology, Monsoon rainfall |
| Mitra, Nilanjan | *Ph.D.(UW, SEATTLE)*, Earthquake loading of structures, Fluid Structure Interaction, Probabilistic modeling, Multiscale Multiphysics of materials, High strain rate loading (shock waves and impact loading), Sandwich composite structures, Molecular dynamics, Continuum Mechanics, Reinforced concrete structures, Density Functional Theory |
| Mitra, Sudeshna | *Ph.D.(ASU, Phoenix)*, Transportation Safety, Crash Data Analysis and Modelling, Statistical and Econometric Modelling of Transport data, Sustainable Transportation Planning, Traffic Engineering and Operations in heterogenous traffic |
| Pal, Anjali | *Ph.D (Calcutta Univ.)*, Nanoparticle mediated wastewater treatment, Photocatalytic degradation of organic pollutants, Arsenic remediation in groundwater, Adsorption / adsolubilization for wastewater management |
| Shaws, Amit | *Ph.D.(IISc Bangalore)*, Computational Mechanics, Ballistic Response of Nano-Composite Armour, Impact Mechanics, Underwater blast |
| Verma, Shubha | *Ph.D.(IIT Bombay)*, Environmental Engineering, Air Pollution, Aerosol Modelling and Climate Impacts |

***Assistant Professors***

| | |
|---|---|
| Banerjee, Biswanath | *Ph.D.(IISc., Bangalore)*, Computational Mechanics, Inverse Problems |
| Bhattacharya, Paramita | *Ph.D.(IISc. Bangalore)*, Computational Geotechnical Engineering, Experimental modeling on Geotechnical Engineering Problem, Seismic Analysis of Underground Structures |
| Biligiri, Krishna Prapoorna | *Ph.D.(Arizona St. Univ. USA)*, Pavement Design & Analysis, Sustainable Materials in Highways & Environment, Advanced Pavement Materials Characterization, Transportation-Related Noise Evaluation & Modeling, Statistical Applications in Transportation Engineering & Constitutive Modeling, Pavement Performance & Management, Impact of Alternative Materials on Climate Change |
| Chakraborty, Debarghya | *Ph.D.(IISc Bangalore)*, Soil Dynamics, Computational Geomechanics, Reinforced Soil Structures, Geotechnical Earthquake Engineering |
| Dhar, Anirban | *Ph.D.(IIT, Kanpur)*, Groundwater Hydrology, Computational Hydraulics |
| Hossain, Shaikh Jahangir | *Ph.D.(IIT Kharagpur)*, computational mechanics, Finite Element Method, Nonlinear Mechanics |
| Reddy, Hanmaiahgari Prashanth | *Ph.D.(IIT Madras)*, Hydrodynamics, Turbulence, Sediment transport, Pipeline engineering, Unsteady flows |

***Thrust Areas***

1. EnE: Water and Wastewater treatment, Solid Waste Engineering, Environmental Microbiology, Environmental Impact Assessment, Air Pollution Modeling, Bio-energy
2. SE: Reliability engineering, nonlinear mechanics, structural health monitoring, fluid-structure interaction.
3. HWRE: Submerged Jets, Coherant Turbulent Structure, Sediment Transport and Scour, Numerical Study of Surface Flow, Hydrological Model.
4. TE: Pavement Design, Traffic Planning and Design, Low-cost Road Construction.
5. GTE: Geotechnical earthquake engineering, slope stability, ground improvement, microbe-soil interaction, static and cyclic soil-structure interaction and foundation strengthening of monumental structures.

***Brief Description of on-going activities***

EnvE: Microbial Fuel Cells, wastewater treatment and energy recovery, on-site treatment of domestic sewage, granulation in UASB reactor treating low strength wastewater, water quality and health assessment, biological treatment of solid waste, nanoparticle synthesis, photodegradation of organic pollutants, adsolubilization/adsorption, modelling of tropospheric solid state polydisperse aerosols and ozone and assessment of pulmonary deposition; Monitoring and modelling of ambient air quality; removal of fluoride from ground water using low cost adsorbents; removal of arsenic from ground water using low cost adsorbent; photocatalytic degradation of dye containing effluents using Ag+ doped TiO2.

SE: Recycled construction materials, Stability of plates and shells, Biomechanics, Reliability of bridge structures, Low cost housing, Seismic analysis of dams, Fluid-structure Interactions, Structural Health Monitoring, Finite Element Model updating

TE: Cell filled low cost rural roads, Analysis and Evaluation of Concrete and flexible pavements, Specifications for bituminous mixes and Urban transportation planning.

HWRE: Flow on turbulent submerged jets, Coherent turbulent structure over gravel beds and bed-forms, flood inundation models, drought characterization and forecasting, models for flood forecasting.

GTE: Erosion control and mechanical stabilization of soils using natural fibers, ground imrpovenemt, soil-microbe interaction, in situ testing, geotechnical earthquake engineering, landslides and slope stabilisation

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 10 |
| Fellow - Professional Bodies | 15 |
| Member - Professional Bodies | 98 |
| Member - Editorial Board | 50 |
| Visits Abroad by Faculty Members | 10 |
| Doctoral and MS Degrees Awarded | 12 |
| Sponsored Research Projects | 88 |
| Consultancy Projects | 94 |
| Seminars, Conferences and Workshops Organised | 14 |
| Short-Term Courses and Training Programmes organised | 6 |
| Books Published | 8 |
| Papers Published in Journals | 140 |
| Papers Presented in Conferences | 71 |

# Department of Computer Science & Engineering

***Head***
Prof. Sudeshna Sarkar
***Professors***

| | |
|---|---|
| Basu, Anupam | *Ph.D.(IIT Kharagpur)*, |
| Chakrabarti, Partha Pratim | *Ph.D.(IIT Kharagpur)*, Artificial Intelligence, CAD for VLSI & Embedded Systems, Design of Algorithms, Reliable and Fault Tolerant Systems |
| Das, Partha Pratim | *Ph.D.(IIT Kharagpur)*, Computer Vision - Human Activity Tracking, Tools for Productivity and Quality in Software Engineering, Electronic Waste Management, Computer Analysis of Indian Classical Dance, Technology-Enabled Education, Medical Image Processing |
| Dasgupta, Pallab | *Ph.D.(IIT Kharagpur)*, Cyber-Physical Systems, Formal Methods, Electronic Design Automation |
| Ganguly, Niloy | *Ph.D.(BESU, Calcutta)*, Peer-to-peer Networks, Online Social networks, Network Theory, Wireless Internet, Delay Tolerant Networks |
| Ghose, Sujoy | *Ph.D.(IIT Kharagpur)*, System Intelligence, Networking, Algorithms |
| Ghosh, Soumya Kanti | *Ph.D.*, Geospatial Database and Web Services, Cloud Computing |
| Gupta, Arobinda | *Ph.D.(Iowa)*, Distributed Systems, Mobile Computing |
| Kumar, Rajeev | *Ph.D.(Sheffield)*, Programming Language & Software Engineering, Multiobjective Optimization & Evolutionary Computing, EDA & Embedded Systems, Multimedia Systems & Video Transcoding, Education Standards & Quality |
| Majumder, Arun Kumar | *Ph.D.(Cal),Ph.D.(Florida)*, Database and Mutimedia Systems, Information Security, Medical Informatics and Telemedicine |
| Mall, Rajib | *Ph.D.(IISc Bangalore)*, program analysis and testing |
| Mandal, Chittaranjan | *Ph.D.(IIT Kharagpur)*, VLSI CAD, Networking, Formal Verification |
| Mukhopadhyay, Jayanta | *Ph.D.(IIT Kharagpur)*, Medical Informatics, Image Processing, Bio-informatics |
| Pal, Ajit | *Ph.D.(Calcutta Univ)*, Embedded Systems, CAD for Low Power, Computer Networks |
| Pal, Sudebkumar Prasant | *Ph.D.(IISc Bangalore)*, Design and analysis of algorithms, Computational and combinatorial geometry, Graph theory and combinatorics |
| Roychowdhury, Dipanwita | *Ph.D.(IIT Kharagpur)*, 1. Cryptography 2. Cellular Automata 3.Error Correcting Code |
| Sarkar, Dipankar | *Ph.D.(IIT Kharagpur)*, Formal Verification of circuits and systems, Logic and Automated theorem Proving |
| Sarkar, Sudeshna | *Ph.D.(IIT Kharagpur)*, Machine learning, Natural Langauge Processing, Data Mining, Information Retrieval |
| Sengupta, Indranil | *Ph.D.(Calcutta Univ)*, VLSI design and testing, Cryptography and network security, Reversible and quantum circuits |

| | |
|---|---|
| Sural, Shamik | *Ph.D*, Data and Application Security, Image and Video Processing |

***Associate Professors***

| | |
|---|---|
| Bhowmick, Partha | *Ph.D.(ISI, Kolkata)*, Algorithmic Art, Geometric Algorithms, Computer Graphics, Visual Pattern Recognition, Digital Geometry, Combinatorial Image Analysis |
| Chakraborty, R S | *Ph.D.(CWR Univ.USA)*, Hardware Security, Digital Watermarking, VLSI Design and Methodologies, Application of Novel Nano-devices to Hardware Security |
| Das, Abhijit | *Ph.D.(IISc Bangalore)*, Cryptography, Computational Number Theory, Parallel and Distributed Implementations |
| Misra, Sudip | *Ph.D.(Carleton Univ., Canada)*, Wireless Ad Hoc and Sensor Networks, Internet of Things and Cyber Physical Systems, Computer Networks, Smart Grid Communication, Cloud Computing, Bio-Sensor Networks |
| Mitra, Pabitra | *Ph.D.(ISI Calcutta)*, Machine Learning, Data Mining, Information Retrieval |
| Mukherjee, Animesh | *Ph.D.(IIT Kharagpur)*, Complex systems, language dynamics, social computation, web social media |
| Mukhopadhyay, Debdeep | *Ph.D.(IIT Kharagpur)*, Computer Architecture and Security, Cryptology, VLSI, Embedded systems for Cryptographic Systems, Side Channel Analysis, Internet of Things |
| Samanta, Debasis | *Ph.D.(IIT Kharagpur)*, Biometric-Based Information Security, Big Data Analytics, Human Computer Interaction, Computational Intelligence, Brain Computing Interaction |
| Sreenivasa Rao, Krothapalli | *Ph.D.(IIT, Madras)*, Speech Processing, Multimedia Signal Processing, Pattern Recognition, Neural Networks, Music Signal Processing |

***Assistant Professors***

| | |
|---|---|
| Bhattacharya, Sourangshu | *Ph.D.(IISc. Bangalore)*, Big Data Analytics, Machine Learning, Optimization, Internet Sciences |
| Chakraborty, Sandip | *Ph.D. (IIT Guwahati)*, Wireless Networks, Mobile Computing, Distributed Computing |
| Dey, Soumyajit | *Ph.D.(IIT Kharagpur)*, Formal Methods for Embedded System Design and Verification, High Performance Architecture, Assistive Technologies, For more information: http://cse.iitkgp.ac.in/~soumya/ |
| Goyal, Pawan | *Ph.D.(University of Ulster, UK)*, Natural Language Processing, Information Retrieval and Extraction, Sanskrit Computational Linguistics |
| Mathew, Rogers | *Ph.D. (IISc, Bangalore)*, Combinatorics. Graph theory. Graph algorithms. |
| Mitra, Bivas | *Ph.D.(IIT Kharagpur)*, Technological network modeling, Complex and dynamic networks, Interdependent networks, Mobile networks |
| Mitra, Pralay | *Ph.D.(IISc. Bangalore)*, Computational Biology, Bioinformatics |
| Sahay, Rajiv Ranjan | *Ph.D.(IIT Madras)*, Image Processing, Computer Vision, Multimedia |

***Lecturer***

| | |
|---|---|
| Dey, Partha Sarathi | *M.Tech.(IIT Kharagpur)*, Multi Core Architecture, Operating System, VLSI, Embedded Systems |

***Thrust Areas***

Artificial Intelligence

1. VLSI Design and CAD tools
2. Cryptography
3. Hardware and Embedded Security
4. Natural Language Processing
5. Image Processing
6. Complex and Social Networks
7. Computational Biology and Bioinformatics
8. Algorithms Design and Analysis
9. Mobile and Wireless Network Research
10. Formal Methods

***Brief Description of on-going activities***

Artificial Intelligence, Bioinformatics, Combinatorial and Computational Geometry, Computer Graphics, Digital Geometry, Design and Analysis of Algorithms, Graph/hypergraph theory and algorithms, Computer Networks, Cryptography, Hardware Security, Computer Architecture, Databases, Embedded Systems, Fault Tolerant Computing, Formal Verification, Image Processing and Computer Vision, Mobile Computing, Multimedia, Natural Language Processing, Object Oriented Design Tools, Parallel and Distributed Processing, Real Time Systems, Software Engineering, Speech Recognition and Synthesis, VLSI Design and CAD tools, Complex Networks, Language Processing, Cognitive Science, Assistive Technology

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 10 |
| Fellow - Professional Bodies | 15 |
| Member - Professional Bodies | 49 |
| Member - Editorial Board | 22 |
| Visits Abroad by Faculty Members | 21 |
| Doctoral and MS Degrees Awarded | 27 |
| Sponsored Research Projects | 135 |
| Consultancy Projects | 28 |
| Patents (filed / granted) | 11 |
| Seminars, Conferences and Workshops Organised | 22 |
| Short-Term Courses and Training Programmes organised | 1 |
| Books Published | 5 |
| Papers Published in Journals | 99 |
| Papers Presented in Conferences | 121 |

# Department of Electrical Engineering

***Head***
Prof. Siddhartha Sen

***Professors***

| | |
|---|---|
| Barua, Alok | *Ph.D.(IIT Kharagpur)*, Fault Diagnosis of Analog and Mixed Signal Circuit Bio-reactor design and Instrumentation |
| Bhattacharya, Tapas Kumar | *Ph.D.(IIT Kharagpur)*, Electrical Machines & Electromagnetic field calculation |
| Chakraborty, Chandan | *Ph.D.(IIT Kharagpur)*, Electric Machines, Sensorless & Fault Tolerant Control of Industrial Drives, Power Electronics, Renewable Energy Systems, Solar Power Converters, Microgrid, AC & DC Grid |
| Das, Debapriya | *Ph.D.(IIT Delhi)*, Microgrid Operation, Power System Operation and Control, Electric Power Distribution System. |
| Das, Sarit Kumar | *Ph.D.(IIT Kharagpur)*, Control Systems |
| Dutta, Pranab Kumar | *Ph.D.(IIT Kharagpur)*, Biomedical Image Processing, Signal processing, Optoelectronics and optical imaging, Pattern analysis and machine vision |
| Kastha, Debaprasad | *Ph.D.(Tennessee)*, Wind Electrical Systems, Switched Mode Power Supplies, Machine Drives |
| Kishore, N K | *Ph.D.(IISc Bangalore)*, Power and Energy Systems |
| Maka, Srinivasu | *Ph.D.(IIT Kharagpur)*, Control Systems & Instrumentation Engineering, Biomedical Engineering |
| Mohan, Bosukonda Murali | *Ph.D.(IIT Kharagpur)*, Computational Intelligence in Control Systems, Orthogonal Functions Applications in Control Systems, Control Systems |
| Mukhopadhyay, Siddhartha | *Ph.D.(IIT Kharagpur)*, Dynamic Systems Estimation and Control, Behavioral Modeling CAD and Testing of Analog and Mixed Signal VLSI Systems, Industrial Instrumentation Control and Automation, Aerospace Tracking Control and Guidance, Modeling Estimation and Control of Switching Circuits and systems, Failure Diagnostics Prognostics and Tolerance for Vehicular and Industrial Systems, Validation of Cyber Physical Systems, Integrated Vehicle Health Management (IVHM), Electric and Hybrid Vehicles |
| Pal, Jayanta | *Ph.D.(IIT Roorkee)*, Controller Design, Model Order Reduction, Power Systems Control, Genetic Algorithm Applications, Fractional Order Systems, Magnetic Levitation, Neural Networks |
| Patra, Amit | *Ph.D.(IIT Kharagpur)*, Cyber Physical Systems and Internet of Things, Diagnostics an d Prognostics of Li-ion Batteries, DC Power Conversion for Low Voltage Applications, Power Management in Sensor Nodes |
| Pradhan, Ashok Kumar | *Ph.D (Sambalpur Univ.)*, Power System Protection - Wide Area Measurement System- Smart Grid- Applied Signal Processing |
| Ray, Goshaidas | *Ph.D.(IIT Delhi)*, Time-Delay System, Decentralized Control and State Estimation, Intelligent Control, Network Control Systems, Robust Stabilization |

| | |
|---|---|
| Routray, Aurobinda | *Ph.D.(Sambalpur Univ)*, Cognitive Modelling and Human Monitoring, Embedded Systems Design for Real Time Signal and Image Processing, Data Analytics |
| Sen Gupta, Sabyasachi | *Ph.D.(IIT Kharagpur)*, |
| Sen, Siddhartha | *Ph.D.(IIT Kharagpur)*, Fractional Order Circuits and Systems, MEMS capacitive accelerometers, Control Allocation, Robust Control |
| Sinha, Avinash Kumar | *Ph.D.(Pilani)*, Smart Grid, Electrical Energy Systems, Power Systems |

***Associate Professors***

| | |
|---|---|
| Bajpai, Prabodh | *Ph.D.(IIT Kanpur)*, 1. Renewable Energy Systems, 2. Power System Restructuring |
| Biswas, Karabi | *Ph.D.(IIT Kharagpur)*, Sensor Design, Development of Instrumentation System, Study of Fractional Order Systems |
| Deb, Alok Kanti | *Ph.D.(IIT Delhi)*, Control Systems, Computational Intelligence, Fault Diagnosis |
| Mukherjee, Anirban | *Ph.D. (IIT Kharagpur)*, Machine learning for Healthcare Applications, Medical Signal Processing |
| Poddar, Gautam | *Ph.D.(IISc Bangalore)*, Medium voltage converter with high frequency isolation |

***Assistant Professors***

| | |
|---|---|
| Bhattacharya, Tanmoy | *Ph.D.(IISc. Bangalore)*, Power Converters and Machine Drives, Power converter topology and control for HVDC and FACTS |
| C S, Anoop | *Ph.D.(IIT Madras)*, Sensors and Interface Electronics, Measurements and Instrumentation, Biomedical Electronic Systems |
| Chatterjee, Dheeman | *Ph.D.(IIT Kanpur)*, Power System Dynamics, Grid Integration of Wind Power, HVDC Transmission and FACTS controllers |
| Chattopadhyay, Souvik | *Ph.D (IISc. Bangalore)*, Digital Control of Power Converters, Soft-switched dc dc converters |
| Das, Sarasij | *Ph.D.(Univ. of Wester Ontario, Canada)*, Smart Grid, Power System Protection, Renewable Energy |
| Ghosh, Arun | *Ph.D.(IIT Kharagpur)*, Multivariable Control Systems, Periodic control, Robust control |
| Ghosh, Nirmalya | *Ph.D.(Univ. of California, Riverside, USA)*, Computer vision, Medical image informatics, Machine learning |
| Kapat, Santanu | *Ph.D.(IIT Kharagpur)*, High Performance Boundary Control in DC Nano-grid, Energy Efficient Ultra-fast Power Supply for LED Driving, Modeling and Analysis of Digitally Controlled DC-DC Converters, High-bandwdith Digital Power for Envelope Tracking Power Amplifiers, Digital Power Management Architecures for DVS-eanbled Processors, High Performance Embedded Control in Switched Mode Power Supply |
| Maiti, Suman | *Ph.D.(IIT Kharagpur)*, Modular Multilevel Converters, Multi-Terminal High Voltage DC Grid, Medium Voltage STACOM, Solar Power Integration with the Grid at High Power Level, Modulation Methods of Multilevel Voltage Source Converters, High Performance AC Machine Drives, Micro-Grid Studies |

| | |
|---|---|
| Patra, Sourav | *Ph.D.(IIT Kharagpur)*, Robust control, Nonlinear control |
| Pramanik, Saurav | *Ph.D. (IISc, Bangalore)*, FRA/SFRA Diagnostics of Power Transformer, Frequency and Time-Domain Spectroscopy of Oil-Paper Insulation in Power Transformer, Transformer Modelling |
| Sheet, Debdoot | *Ph.D.(IIT Kharagpur)*, Computational Medical Imaging, Machine Learning, Image and Multidimensional Signal Processing, Visualization and Augmented Reality |

***Thrust Areas***

1. Efficient Power Converters & Drives.
2. Micro-grid & Renewable Energy.
3. Embedded Sensors & Systems.
4. Integrated Power Management.
5. Automotive Engineering.
6. Cyber Physical Systems.
7. Signal & Image Processing.
8. Machine Learning.
9. Advanced Control Theory & its Application.
10. Estimation & Control of Industrial & Aerospace Systems.

***Brief Description of on-going activities***

From classical to modern, from milli watts to tens of kilo watts, from conventional to non-conventional, the electrical engineering department investigates these all. The range of investigation for this department is one of the broadest in this institute. The major on going activities are categorized as follows.

Machine Drives and Power Electronics: * Magnetic Levitation * Superconducting magnetic energy storage * Variable frequency AC-Drives * Simulation of power electronic circuits * Resonant Converters * Design of integrated circuits for Power Management * Nonlinear phenomena in Power Electronics * Automotive Electronics * Diagnostic of drives * Drive fatigue analysis.

Control and Dynamic Systems: * Neuro-fuzzy controllers * Control of chaotic systems * Discrete event and hybrid systems * Fault-tolerant control of aero-space systems * Attitude control of satellites and launch vehicles * Robust stabilization using periodic controllers * Reduced order modeling * Control of Variable Air-Volume Air-Conditioning Systems * Bifurcation theory of hybrid dynamical systems * Delta domain digital control analysis and design * Neural networks applications in control * Genetic algorithm applications in control * Decentralized control of large scale systems * Nonlinear dynamics * Fractional order system and their applications.

Power and Energy Systems: * Wind turbines * Power system dynamics * Real-time digital simulation of power systems * Power system protection * Intelligent relaying * State estimation of power systems * Condition and Diagnostic Monitoring of Power Apparatus * Energy audit and management * Power system planning and optimisation * Wavelet Application to Power system Transients * Neural Net Application to Partial Discharge Phenomenon * Electric Field Computations, Lightning Protection, Material Characterization * FACTs.

Instrumentation and Signal Processing: * Laser based profile measurement * Image based measurement systems * Motion estimation using MRI and colour Doppler imaging * Non-Linear and Statistical Signal Processing * Real Time Algorithms for Detection and Diagnostics * Condition monitoring of machines and power apparatus * Testing of analog and digital VLSI circuits * Fault detection and diagnosis of analog circuits * Control and instrumentation of bio-reactors * Fibre-optic components and sensors * Biomedical signal processing * Analysis of ECG signals * Sensors fusion * Multimedia Security * Convex Optimization and LMI applications to Signal Processing * Design and development of MEMS accelerometer * Seismic signal processing, active noise control * Fast algorithms for real time signal processing.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 4 |
| Member - Professional Bodies | 20 |
| Member - Editorial Board | 13 |
| Visits Abroad by Faculty Members | 22 |
| Doctoral and MS Degrees Awarded | 7 |
| Sponsored Research Projects | 52 |
| Consultancy Projects | 23 |
| Technology Transferred | 1 |
| Patents (filed / granted) | 2 |
| Seminars, Conferences and Workshops Organised | 4 |
| Short-Term Courses and Training Programmes organised | 5 |
| Books Published | 1 |
| Papers Published in Journals | 69 |
| Papers Presented in Conferences | 78 |

# Department of Electronics & Electrical Communication Engineering

***Head***
Prof. Prabir Kumar Biswas

***Professors***

| | |
|---|---|
| Bandyopadhyay, Kalyan Kumar | *Ph.D.(Jadavpur University)*, satellite communication |
| Banerjee, Swapna | *Ph.D.(IIT Kharagpur)*, VLSI based embedded system design for signal/image processing, Biomedical Instrumentation, Device modeling, Low power circuits, Mixed-signal design |
| Bhattacharyya, Tarun Kanti | *Ph.D.(Jadavpur Univ)*, MEMS and Microsystems, RF and Analog VLSI, Thinfilms, Nano- electronics, Nano-scale Biosystems Engineering |
| Biswas, Dhrubes | *Ph.D. (Illinois USA)*, Gallium Nitride based high power RF switches for advanced multi-band front end applications., Integrated product design and development for low cost healthcare delivery system., Business architecture and product development strategies through effective technology interventions, Education enterprise model for developmental entrepreneurship for higher education institution., Social media based reduction of information asymmetry for health care service delivery., Nitride based MOS power devices with insulating heterostructures., Novel InAlN/GaN & AlGaN/GaN heterostructures for resonant tunneling applications., Metamorphic buffer for monolithic integration of compound semiconductor RF devices on Silicon., Nonvolatile memory devices based on metal/insulator/compound semiconductor heterostructures., Graded barrier AlGaN/GaNheterostructures for high power front end application. |
| Biswas, Prabir Kumar | *Ph.D.(IIT Kharagpur)*, Image Processing, Computer Vision, Automated Visual Inspection, Multimedia Network, Pattern Recognition, Sensor Network |
| Chakrabarti, Indrajit | *Ph.D. (IIT Kharagpur)*, VLSI Design for Image and Video Processing and Communication |
| Chakraborty, Ajoy | *Ph.D.(IIT Kharagpur)*, EMI/EMC, Electromagnetics, Antennas |
| Chakraborty, Mrityunjoy | *Ph.D.(IIT Delhi)*, Digital Signal Processing, Adaptive Signal Processing, VLSI Signal Processing, Compressive Sensing |
| Chattopadhyay, Santanu | *Ph.D.(IIT Kharagpur)*, Network-on-Chip Design and Test, Low Power Digital Testing, Thermal Aware Testing, Fault Diagnosis |
| Datta, Raja | *Ph.D.(IIT Kharagpur)* , Computer Communication and Networks, Mobile Ad Hoc Networks, Optical WDM Networks, Distributed Systems, Wireless Sensor Networks, Inter Planetary Networks |
| Dhar, Anindya Sundar | *Ph.D.(IIT Kharagpur)*, VLSI Architecture Design |
| Dutta, Debasish | *Ph.D.(IIT Kharagpur)*, Optical networks, Wireless networks |
| Garg, Ramesh | *Ph.D.(IIT Kanpur)*, Electromagnetics |
| Pathak, Sant Sharan | *Ph.D.(IIT Delhi)*, Digital Communication, Switching Network, Secure Communication |
| Rajakumar, Ratnam Varada | *Ph.D.(IIT Kharagpur)*, |

| | |
|---|---|
| Ray, Ajoy Kumar | *Ph.D.(IIT Kharagpur)*, |
| Saha, Goutam | *Ph.D.(IIT Kharagpur)*, Biomedical Signal Processing, Audio / Speech Signal Processing |
| Sanyal, Subrata | *Ph.D.(IIT Kharagpur)*, |

***Associate Professors***

| | |
|---|---|
| Bhattacharya, Amitabha | *Ph.D.(IIT Kharagpur)*, RF & Microwave Communication |
| Ghosh, Bratin | *Ph.D.(Univ. of Manitoba)*, Applied Electromagnetics |
| Mahapatra, Sudipta | *Ph.D.(IIT Kharagpur)*, Parallel and Distributed Systems, Video Coding/Video Streaming, Optical and Wireless Networks |
| Mandal, Pradip | *Ph.D.(IISc Bangalore)*, Design Automation of CMOS Analog circuits and Systems, On-chip power management system, Analog Interface circuits for high speed data link, Analog circuits for signal acquisition front-end system |
| Mukhopadhyay, Sudipta | *Ph.D. (IIT Kanpur)*, Medical Image and Signal Processing, Content based Medical Image Retrieval, Video Processing, Continuous Authentication |
| Roy, Rajarshi | *Ph.D (Brooklyn Univ.)*, Complex Communication Networks, Cooperative Communication, Queuing Theory Stochastic Processes and performance evaluation, Optimal resource allocation Optimization and network control, Learning and Self-organization and Emergent Phenomena in random environment, Network Coding, Cognitive Radio, Wireless communication and Geometry, Complex Networks like communication networks and social networks smart grid transportation network |
| Roy, Rajat | *Ph.D.(Univ. of Mumbai)*, Numerical computation of wave functions |
| Varshney, Shailendra Kumar | *Ph.D.(University of Delhi)*, Quantum optical communication, Speciality fibers-Photonic crystal fibers, Fiber optic sensors, Photonic devices for next generation communication, Plasmonics, Nanophotonics, THz photonics, mid-IR photonics, Under-water optical communications, LiFi (Optical Wireless) |

***Assistant Professors***

| | |
|---|---|
| Bandyopadhyay, Sharba | *Ph.D.(Johns Hopkins Univ.)*, Auditory Neuroscience, Neural Information Processing |
| De, Arijit | *Ph.D.(Syracuse Univ)*, Eelectromagnetics, EMI/EMC, RF/Microwave, Digital Signal Processing, Array Processing, Computatioanl Methods |
| Dixit, Vivek | *Ph.D.(National Univ. of Singapore)*, Photonics, Optoelectronics, Device modeling and simulation, Metamaterials |
| Guha, Debatosh | , |
| Guha, Prasanta Kumar | , Sensor, MEMS, Interface Electronics, Integration with CMOS platform, Nano Electronics |
| Layek, Ritwik Kumar | *Ph.D., Texas A&M Univ., College Station*, Bacterial Chemotaxis |
| Mandal, Mrinal Kanti | *Ph.D.(IIT Kharagpur)*, Microwave and millimeter wave circuit and components. |

| | |
|---|---|
| Mohan, Akhilesh | *Ph.D.(IIT Kanpur)*, Microwave Filters, Ultra-Wideband (UWB) Antenna and Filters, Metamaterials |
| Nag, Sudip | *Ph.D.(IIT Bombay)*, Bioelectronics, Instrumentation Techniques, Nano/Micro Electronics, Implantable Systems |
| Sen, Debashis | *Ph.D.(Jadavpur Univ.)*, Vision, Image and Video Processing, Uncertainty Handling, Bio-inspired Computation, Eye Movement Analysis, Computational Visual Perception, Multimedia Signal Processing |
| Sharad, Mrigank | *Ph.D. (Purdue Univ. Indiana, USA)*, Nanoelectronics and VLSI Design (Digital/Mixed-Signal Circuit/Architecture), Application Specific Signal Processing, Bioelectronics and Neuromorphic Computing, Spintronics (Spin Memory and Logic) |
| Singhal, Chetna | *Ph.D. (IIT Delhi)*, Wireless Networks and Systems, Adaptive Multimedia Transmission, Heterogeneous Networks, Resource Allocation and Cross-layer optimization, Application-centric handovers and mobile computing |

***Thrust Areas***

1. Photonics and Broadband Communication Networks
2. Nanoelectronics Spintronics and VLSI Circuits and Systems
3. Design and Development of Embedded Systems for Computer Vision, Image, and Signal Processing
4. Computational modelling of forward and inverse radar problems and advanced antenna array processing
5. Systems Biology
6. Compressive Sensing and Sparse Signal Processing
7. Sensor Networks
8. Analog/Mixed Signal and RF Design

***Brief Description of on-going activities***

The following research activities are currently carried out in the department: a) Analog/Mixed Signal and RF Design. b) CNT and Graphine based sensors for environmental monitoring. c) Fault tolerant design of Network on Chip. d) Development of Bridge Health monitoring for Indian Railways with Wireless sensor Networks. e) Protocol Development for Interplanetory Network for deep space communication. f) Computational Electromagnetics and Modelling of Antennas above multilayered ground plane and Microwave Circuits and study of EMI/EMC effects. g) Radar Signal Processing and advanced array processing for subsurface target detection. h) 3 D Imaging, VLSI Architecture for low bit rate Video Coding, Medical Image Processing, Gesture Recognition from Video Sequences, Face recognition, Image and Video Coding, Fuzzy Neural Network. i) Development of block floating point based schemes for implementing adaptive filters in digital hardware. j) Functional Imaging of Neural Activity. k) Systems Biology: Bacterial motion analysis, Biofilm dynamics, Control in Boolean Network, Inference of parameters in Biological Networks. l) Auditory Neuroscience and Neural information Processing

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 10 |
| Fellow - Professional Bodies | 6 |
| Member - Professional Bodies | 47 |
| Member - Editorial Board | 19 |
| Visits Abroad by Faculty Members | 14 |
| Doctoral and MS Degrees Awarded | 17 |
| Sponsored Research Projects | 91 |
| Consultancy Projects | 6 |
| Technology Transferred | 1 |
| Patents (filed / granted) | 27 |
| Seminars, Conferences and Workshops Organised | 13 |
| Short-Term Courses and Training Programmes organised | 13 |
| Books Published | 1 |
| Papers Published in Journals | 108 |
| Papers Presented in Conferences | 73 |

# Department of Geology & Geophysics

***Head***
Prof. Anindya Sarkar

***Professors***

| | |
|---|---|
| Bhattacharya, Abhijit | *Ph.D.(IIT Kharagpur)*, |
| Bhowmik, Santanu Kumar | *Ph.D.(Jadavpur Univ)*, Metamorphic Petrology, Accessory Mineral Petrology |
| Das, Subhasish | *Ph.D.(IIT Kharagpur)*, Sedimentology, Basin Tectonics |
| Gupta, Anil Kumar | *Ph.D.(BHU, Varanasi)*, |
| Gupta, Saibal | *Ph.D.(Cantab)*, Structural Geology, Metamorphic Petrology, Tectonics |
| Mamtani, Manish A | *Ph.D.(MSU, Baroda)*, Structural Geology, Microtectonics |
| Mishra, Biswajit | *Ph.D.(IIT Kharagpur)*, Ore Mineralogy and Geochemistry |
| Mohanty, William Kumar | *Ph.D.(Delhi Univ.)*, Seismology, Seismic Hazard Assessment, Gravity & Magnetic Methods of Prospecting, Reservoir Characterization |
| Nath, Sankar Kumar | *Ph.D.(IIT Kharagpur)*, Earthquake and Engineering Seismology, Seismic Hazard Vulnerability & Risk Microzonation, Seismic Prospecting, Geophysical Signal Processing, Geophysical Tomography, Computational Geophysics, Seismic Damage Scenario and Loss Assessment, Disaster Mitigation and Management, Sequence Stratigraphy, Hydrocarbon Exploration, Computational Seismology |
| Panigrahi, Mruganka Kumar | *Ph.D.(IIT Kharagpur)*, Economic Geology, Crustal Fluids, Computer Applications |
| Sarkar, Anindya | *Ph.D (Gujrat Univ.)*, Stable Isotope Geochemistry, Sedimentology, Palaeoclimatology |
| Sen Gupta, Debashish | *Ph.D.(PRL, Ahamdabad)*, Resource Evaluation of Unconventional Hydrocarbons and Modeling for TENORM & NORM evaluation |
| Sharma, Shashi Prakash | *Ph.D.(BHU, Varanasi)*, Electrical and EM Geophysics, Integrated Geophysical Research, Modeling and Inversion, Groundwater Geophysics |
| Tripathy, Subhasish | *Ph.D.(IIT Bombay)*, Environmental Geochemistry, Waste Utilization |

***Associate Professors***

| | |
|---|---|
| Basu, Arindam | *Ph.D.(The Univ. of Hong Kong)*, Engineering Geology, Rock Mechanics |
| Mukherjee, Abhijit | *Ph.D.(Univ. of Kentucky, USA)*, Surface water-sea water-groundwater interaction, Mine-site hydrology, Physical Chemical and Isotope Hydrogeology, Contaminant Fate and Transport, Environmental Geochemistry, Effect of Climate Change, Modeling (groundwater flow and transport geochemical hydrostratigraphy and geosystems) |
| Pruseth, Kamal Lochan | *Ph.D.(IIT Kharagpur)*, Sulfide Phase Equilibria, Experimental Petrology, Ore Geology |
| Ravikant, Vadlamani | *Ph.D.(CSIR-NGRI, Hyderabad)*, Isotope geochemistry geochronology crustal evolution |

| | |
|---|---|
| Ray, Sanghamitra | *Ph.D.(Calcutta Univ)*, Vertebrate paleobiology, Gondwana stratigraphy and sedimentation |
| Upadhyay, Dewashish | *Ph.D.(Univ. of Bonn, Germany)*, Geochemistry and Geochronology, Petrology and Crustal Evolution, Cosmochemistry |

***Assistant Professors***

| | |
|---|---|
| Agrahari, Sudha | *Ph.D.*, Application of electrical and electromagnetic methods to environmental problems, Helicopter-borne electromagnetics (for imaging shallow earth structures), Joint inversion of electrical and electromagnetic methods, Unconventional energy resources (reservoir potential evaluation through modelling and simulation) |
| Bera, Melinda Kumar | *Ph.D.(IIT Kharagpur)*, Sedimentology, Sequence Stratigraphy, Stable Isotope Geochemistry, Paleoclimate |
| Ghosh, Sujoy Kanti | *Ph.D.(Tohoku Univ. Japan)*, Experimental Petrology, Mineral Physics, Mantle Petrology |
| Maiti, Sabyasachi | *Ph.D.(IIT Kharagpur)*, Remote Sensing, Geographic Information System, Quantitative Geomorphology, Mineral exploration |
| Sengupta, Probal | *Ph.D.(IIT Kharagpur)*, Seismology, Geoexploration, Seismic prospecting, Near surface geophysics |
| Singh, Arun | *Ph.D.(NGRI)*, Seismic anisotropy: Mantle deformation Patterns, Lithospheric Structure and geodynamics, Teleseismic tomography |
| Singh, Chandrani | *Ph.D.(NGRI)*, Reservoir Triggered Seismicity, Attenuation characteristics of seismic waves, Seismotectonics |

***Thrust Areas***

1. Seismology
2. Paleoclimatology (Paleontology, Geochemistry)
3. Crustal Evolution and Metallogeny
4. Environmental Hazards and Mitigation

***Brief Description of on-going activities***

Tectonic evolution of craton – mobile belt ensembles in parts of the Indian shield; Gold mineralization in greenstone belts of Dharwar Craton; Metamorphic remobilization of massive sulphide deposits; Studies on Indian microvertebrates, Lithospheric structure across Himalaya, Deformation at Collisional boundaries, Stable isotopes in Himalayan foreland sediments; Paleogene climate of Kutch, Rajasthan, Environment in ancient sedimentary basins in India; Seismic Hazard assessment and microzonation in the NE India and metropolitan cities, Improvement of rock index test methods and mechanical characterization of rock materials, Groundwater potential assessment and pollution by natural and anthropogenic causes; Waste utilizations, wasteland development and acid marine drainage; Natural radiation hazard estimation.Studies on Indian monsoon (both modern and ancient) and paleoclimate studies of the Indian subcontinent and paleoceanography of the Indian Ocean.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 7 |
| Fellow - Professional Bodies | 16 |
| Member - Professional Bodies | 42 |
| Member - Editorial Board | 22 |
| Visits Abroad by Faculty Members | 2 |
| Doctoral and MS Degrees Awarded | 10 |
| Sponsored Research Projects | 77 |
| Consultancy Projects | 15 |
| Seminars, Conferences and Workshops Organised | 3 |
| Papers Published in Journals | 85 |
| Papers Presented in Conferences | 31 |

# Department of Humanities & Social Sciences

***Head***
Prof. Vijai Nath Giri

***Professors***

| | |
|---|---|
| Chakraborti, Chhanda | *Ph.D.(Univ of Utah)*, Bioethics, Business ethics, Philosophy of Mind, Logic and Philosophy of logic |
| Chaterjee, Suhita Chopra | *Ph.D.(Bombay)*, Sociology of Health /Medical Sociology |
| Chatterjee, Bani | *Ph.D.(BHU, Varanasi)*, Development Planning, Manpower Management, International Finance |
| Giri, Vijai Nath | *Ph.D.(IIT Kharagpur)*, Conflict Resolution and Negotiation, Organizational Communication, Intercultural Communication, Interpersonal Communication |
| Nayak, Narayan Chandra | *Ph.D.(Utkal Univ)*, Development and Macro Economics |
| Patnaik, Priyadarshi | *Ph.D.(Utkal Univ)*, Indian aesthetics, Visual Culture and Communication, Cultural Translation theory and practice, Media and Multimedia Studies, Emotions and nonverbal communication, Music Perception and Communication |
| Roy, Anjali | *Ph.D.(Bombay)*, Postmodern and Post-colonial Theory, Post-colonial Literatures in English, Oral Histories, Punjab Studies, Diaspora and Globalization, Cultural and Media Studies |
| Srivastava, Kailash Bihari Lal | *Ph.D.(IIT Kanpur)*, Human Resource Management and Development, Organizational Behaviour, Knowledge management and innovation, Performance management, Sustainability Issues |
| Suar, Damodar | *Ph.D.(IIT Kharagpur)*, Social and organizational psychology, Neuropsychology and cognitive psychology |

***Associate Professors***

| | |
|---|---|
| Behera, Bhagirath | *Ph.D.(Univ. of Bonn, Germany)*, Environmental and Natural Resource Economics, Development Economics, New Institutional Economics, Green Economics |
| Chakraborty, Jayshree | *Ph.D.(IIT Kanpur)*, Semantics and Pragmatics, Discourse Analysis, Phonetics, Indian English, Communication |
| Das, Saswat Samay | *Ph.D.(Utkal Univ.)*, Postmodern and postcolonial studies, Critical Theory, Continental Philosophy with emphasis on Deleuze Zizek Negri and Badiou |
| Goswami, Kishor | *Ph.D.(IIT Kharagpur)*, Development Economics (Globalization/ Gender and Trade/ Poverty/ Food Security/ Entrepreneurship), Agricultural Economics, Economics of Biofuels |
| Husain, Zakir | *Ph.D.(Univ. of Calcutta)*, Health Economics, Education, Ageing, Gender studies |
| Komalesha, H. S. | *Ph.D.(IIT Kharagpur)*, Translation, Indian Literatures in English, Poetry, Postcolonial Literatures, Cultural Studies, Gandhi - Ambedkar Studies |

| | |
|---|---|
| Mahakud, Jitendra | *Ph.D.(IIT, Bombay)*, Corporate Finance, Commercial Banking, Financial Econometrics, Financial Economics, Equity Research |
| Mishra, Pulak | *Ph.D (Vidyasagar University)*, Industrial Economics, Public Economics and Policy, Economics of Rural Development, Business Environment and Policy, Economics of Strategy, Economics of Regulation |
| Pradhan, Rabindra Kumar | *Ph.D.(Utkal Univ.)*, Positive Psychology, Human Resource Development and Management, Organizational Behaviour, Health Psychology, Industrial & Organisational Psychology, Business Values & Ethics and Morals |
| Singh, Seema | *Ph.D.(BHU)*, Managerial Communication Styles, Feminist Narratology, Indian Women Writing in English, Subaltern Writing |

***Assistant Professors***

| | |
|---|---|
| Aditya, Anwesha | *Ph.D.(Jadavpur Univ., Kolkata)*, Development Economics, International Trade |
| Chattopadhyay, Siddhartha | *Ph.D.(Univ. at Albany, SUNY)*, Econometrics, Macroeconomics, Dynamic Programing |
| Hiremath, Gourishankar S. | *Ph.D.(Univ. of Hyderabad)*, Efficiency of Financial Markets, International Portfolio and Debt Flows, Food Security, Long Memory Time Series Analysis |
| Sahoo, Bimal Kishore | *Ph.D.(IIT Roorkee)*, Human Development, Labour Economics, Industrial Economics, Productivity and Efficiency Analysis, Food Security and Poverty, International Trade |
| Yadav, Inder Sekhar | *Ph.D.(Univ. of Hyderabad)*, Financial Economics, Macroeconomics, Industrial Economics, Enterprise Risk Management |

***Thrust Areas***

1. Development studies
2. Human resource management and ethics
3. Cultural and communication studies

***Brief Description of on-going activities***

Research and Development on:

1. Quantitative economics, 2. Financial economics, 3. Economics of growth, 4. Industrial economics, 5. Development economics, 6. Environmental and resource economics, 7. Developing world bioethics, 8. Gender and trade, 9. Financial institutions and markets, 10. Sociology of health and medicine, 11. Human resource development, 12. Brain and behavior, 13. Interpersonal, intercultural and organizational communication, 14. Visual aesthetics, 15. Business ethics, corporate social responsibility, 16. Economics of biofuels, 17. Bioethics and Public Health Ethics.

Training and development programmes on: 1. Aesthetics 2. Interpersonal communication 3. Recent trends in human resource development 4. Strategic management 5. Emotional intelligence 6. Logic and applications of logic 7. Research methodology and data analysis 8. Financial modelling and risk management 9. Leadership and teambuilding 10. Language, cognition and communication 11. Understanding culture and practising cross-cultural communication 12. Creative writing, 13. Critical thinking, reading and writing skills

Course development on 1. Economics 2. Human Resource Management 3. Philosophy 4. Psychology

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 1 |
| Member - Professional Bodies | 74 |
| Member - Editorial Board | 36 |
| Visits Abroad by Faculty Members | 9 |
| Doctoral and MS Degrees Awarded | 8 |
| Sponsored Research Projects | 45 |
| Consultancy Projects | 10 |
| Seminars, Conferences and Workshops Organised | 1 |
| Short-Term Courses and Training Programmes organised | 7 |
| Books Published | 4 |
| Papers Published in Journals | 62 |
| Papers Presented in Conferences | 40 |

# Department of Industrial & Systems Engineering

***Head***
Prof. Jhareswar Maiti

***Professors***

| | |
|---|---|
| Mahanty, Biswajit | *Ph.D.(IIT Kharagpur)*, System Dynamics, Operations Research, Information Systems, Project Management |
| Maiti, Jhareswar | *Ph.D.(IIT Kharagpur)*, Quality analytics, Safety analytics, Data analytics, Virtual reality |
| Ray, Pradip Kumar | *Ph.D.(IIT Kharagpur)*, Ergonomics/Human Factors Engineering, Quality Design/Quality Management, Operations and Environmental/Sustainability Management, Performance/Productivity Analysis of Engineering/Service Systems, Healthcare Systems Management |
| Sarmah, Sarada Prasad | *Ph.D.(IIT Kharagpur)*, Reverse logistics and Optimization in business decisions, Supply chain management, Inventory and Operaions Management |
| Tiwari, Manoj Kumar | , Manufacturing Planning and Scheduling, Logistics and Supply Chain Analysis, Computational Intelligence in Manufacturing and Logistics, Optimisation and Simulation |

***Associate Professors***

| | |
|---|---|
| Jenamani, Mamata | *Ph.D.(IIT Kharagpur)*, Information System, E-Business |
| Thakkar, Jitesh J | *Ph.D.(IIT Delhi)*, Supply Chain Optimization, Lean & Six Sigma, Project Management, Service Science, Quality Control and Engineering, Sustainable Supply Chain Management |

***Assistant Professors***

| | |
|---|---|
| Jha, Jitendra Kumar | *Ph.D.(IIT Kanpur)*, Supply Chain Management, Inventory Control, Facility Location |
| Kumar, Akhilesh | *Ph.D. (Wayne State Univ., USA)*, Supply Chain and Logistics: Omni Channel Retail, Product Returns and Remanufacturing, Pricing and Revenue Management, Business Analytics, Condition-Based Maintenance: Autonomous Diagnostics & Prognostics |
| Kumar, Sri Krishna | *Ph.D.(Loughborough, UK)*, Non Linear Programming, Supply Chain and Logistics, Operations Research, Game Theory |
| Sen, Goutam | *Ph.D. (IIT Bombay & Monash Univ.)*, Operations Research (Optimization), Transportation and Network Design |

***Thrust Areas***
1. Manufacturing and Supply Chain Management
2. Industrial Analytics
3. Production, Planning and Control
4. Human Factor and Safety Engineering
5. Optimization and Simulation

6. Quality, Safety and Reliability Engineering
7. Logistics & Supply Chain
8. Decision Support System
9. Big Data
10. Early Warning System
11. E-Business
12. Process Excellence
13. Manufacturing Systems
14. Disaster management
15. Healthcare System
16. Financial Engineering
17. Operations Analytics

***Brief Description of on-going activities***

Since its inception the department has been known across the nation for its excellent research potential and capability in the field of industrial engineering and related areas. As a matter of fact, pioneering research in the following areas of industrial engineering and management are being carried out: Operations Management: Production Planning and Inventory Control, Logistics and Supply Chain Management, E-Business, Quality Engineering and Control, Facility Layout and Design, Total Quality Management and Six Sigma. Simulation and Soft Computing: Genetic Algorithms and its variants, Heuristics, System Dynamics, Discrete Event Simulation. Work System Design: Ergonomics/Human Factors Engineering, Occupational Safety and Health Management, and Probabilistic Risk Assessment. Data Analytics and different domains of Industrial Engineering. The following are the current On-going/Up-coming activities this year: 1) ISWT on "Supply Chain Network - Modelling and Analysis" from June 15 - June 26, 2015. 2) Short-Term Course on "Data Analytics with SAS" during July 1-4. 2015. 3) Executive Training Programme in Process Excelllence (with Sigma XL Software) during July 10-12 2015.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 1 |
| Fellow - Professional Bodies | 3 |
| Member - Professional Bodies | 24 |
| Member - Editorial Board | 37 |
| Visits Abroad by Faculty Members | 6 |
| Doctoral and MS Degrees Awarded | 7 |
| Sponsored Research Projects | 37 |
| Consultancy Projects | 18 |
| Seminars, Conferences and Workshops Organised | 11 |
| Short-Term Courses and Training Programmes organised | 7 |
| Books Published | 1 |
| Papers Published in Journals | 59 |
| Papers Presented in Conferences | 37 |

# Department of Mathematics

***Head***
Prof. Umesh Chandra Gupta

***Professors***

| | |
|---|---|
| Bhattacharyya, Somnath | *Ph.D.(IISc Bangalore)*, Computational Fluid Dynamics, Micro-/nanofluidics Modeling |
| Biswal, Mahendra Prasad | *Ph.D.(IIT Kharagpur)*, 1. Operations Research, 2. Computational Statistics & Stochastic Programming, 3. Fuzzy and Convex Optimization, 4. Game Theory and Applications, 5. Analytic Hierarchy Process ( AHP ), 6. Interior Point Methods ( IPM ), 7. Multi-Objective Multi-Level & Multi-Choice Programming, 8. Decision Sciences |
| Goswami, Adrijit | *Ph.D.(Jadavpur Univ)*, Data Mining, Operations Research, Cryptography and Network Security |
| Gupta, Dharmendra Kumar | *Ph.D.(IIT Kharagpur)*, Numerical Analysis and Computer Science, Constraint Satisfaction Problems |
| Gupta, Umesh Chandra | *Ph.D.(IIT Delhi)*, Statistics, Stochastic Modelling, Queueing Theory |
| Jain, Vinay Kumar | *Ph.D.(IIT Delhi)*, Zeros of polynomials and analytic functions & Extremal problems of polynomials |
| Kumar, Somesh | *Ph.D.(IIT Kanpur)*, Reliability Estimation, Statistical Decision Theory, Reliability Ordering, Entropy Estimation, Estimation Theory, Quantum Information and Computation, Statistical Data Analysis, Experimental Designs, Robust Estimation, Classification under Restrictions, Estimating Parameters of Directional Distributions, Estimation under Constraints, Dependent Trials |
| Murthy, P V S N | *Ph.D.*, Bio-fluid Mechanics, Convective Heat and Mass Transfer in nanofluid |
| Panda, Bhawani Sankar | *Ph.D.(IIT Kanpur)*, Algorithmic Graph Theory, Graph Theory, Combinatorial Optimization, Algorithms |
| Pandey, Rajnikant | *Ph.D*, Differential Equations (Ordinary), Theoretical Numerical Analysis, Singular Boundary Value Problems |
| Raja Sekhar, G P | *Ph.D.(Hyderabad Univ)*, Boundary integral methods for viscous flows, Hydrodynamic and thermocapillary study of viscous drops, Applications of binary mixture theory to biological tissues |
| Sarkar, Anjan | *Ph.D.(IIT Kharagpur)*, Probabilistic Robotics, Remote Sensing Image Analysis, Statistics |
| Srivastava, Parmeshwary Dayal | *Ph.D.(IIT Kanpur)*, Functional Analysis & Cryptography, Fuzzy Sequence Space |

***Associate Professors***

| | |
|---|---|
| Dutta, Ratna | *Ph.D.(ISI, Kolkata)*, Multilinear maps and Obfuscation, Functional Encryption and Attribute Based Cryptosystems, Elliptic Curves and Pairing based Cryptography, Oblivious Transfer and Private Set Intersection, Lattice-Based Cryptography, Secure Multiparty Computation, Broadcast Encryption and Traitor Tracing |

| | |
|---|---|
| Ghoshal, Koeli | *Ph.D.(Jadavpur Univ.)*, Sediment transport, Grain-size distribution in suspension, Secondary current, Study on different parameters of sediment transport, Open channel flow, Entropy based models |
| Kumar, Jitendra | *Ph.D.(Univ. of Magdeburg, Germany)*, Numerical mathematics, Monte-Carlo simulations, Particle technology |
| Kumar, Pawan | *Ph.D.(IIT Kanpur)*, Graph Theory |
| Mukhopadhyay, Sourav | *Ph.D.(ISI, Kolkata)*, Digital rights management, Algebraic Cryptanalysis on Symmetric Cipher., Key pre-distribution for Wireless Sensor Networks, Time/Memory Trade-off Cryptanalysis, Cloud Computing |
| Nahak, Chandal | *Ph.D*, Applied Functional Analysis and Optimization, Variational and Complementarity problems, Frame Theory in Semi Inner Product Spaces, Fractional Calculus, Numerical Optimization, Set Valued optimization, Optimization Problems on Manifolds |
| Nelakanti, Gnaneshwar | *Ph.D.(IIT Bombay)*, Inverse and ill-posed problems, Spectral approximation of integral operators, Approximate solutions of operator equations |
| Panda, Geetanjali | *Ph.D*, Optimization with uncertainty, Convex Optimization, Numerical Optimization, Portfolio Optimization |

***Assistant Professors***

| | |
|---|---|
| Adhikari, Bibhas | *Ph.D.(IIT Guwahati)*, Applied Linear Algebra, Complex Networks, Quantum Entanglement |
| Allu, Vasudeva Rao | *Ph.D.(IIT Madras)*, Univalent Function Theory, Harmonic Mappings (in the Plane), Complex Analysis |
| Bhowmik, Bappaditya | *Ph.D.(IIT Madras)*, Geometric function theory (Complex Analysis), Harmonic and Quasiconformal Mappings, Several Complex Variables |
| Biswas, Debapriya | *Ph.D.(Leeds Univ)*, Functional Analysis, Lie Groups Lie Algebras and their Representation theory, Complex Analysis, Harmonic Analysis, Hyper-Complex Analysis including Clifford Algebras |
| Ganguly, Asish | *Ph.D.(Calcutta Univ.)*, Mathematical & Theoretical Physics, Quantum Mechanics, Soliton Theory and Inverse Scattering Transformation, Non-linear Evolution Equation in Real & Complex Domain, Ordinary and partial differential equations |
| Gayen, Rupanwita | *Ph.D.(Univ of Calcutta)*, Integral equations, Linear water waves |
| Gupta, Nitin | *Ph.D.(IIT Kanpur)*, Reliability Theory, Mathematical Statistics, Applied Probability |
| Khare, Swanand Ravindra | *Ph.D. (IIT Bombay)*, Numerical Linear Algebra, Chemometrics |
| Nanduri, Ramakrishna | *Ph.D.(IIT Madras)*, Commutative Algebra |
| Sekhar, T.Raja | *Ph.D.(IIT Bombay)*, Quasilinear Hyperbolic System of Conservation Laws, Lie Group Analysis for Quasilinear Hyperbolic System of Partial Differential Equations, Symmetry Integration Methods for Differential Equations |

***Thrust Areas***

1. Functional Analysis, Fluid Mechanics, Cryptography, Statistics and Complex Analysis

***Brief Description of on-going activities***

Besides extensive research in the thrust areas viz. Functional Analysis and Fluid Mechanics, significant contribution has also been made by the members of the faculty in the area of Computational Fluid Dynamics, Micro-Nanofluidics Modeling, Sediment Transport in Open Channel, Commutative Algebra, Applied Linear Algebra, Numerical Linear Algebra, Fuzzy Mathematics, Bio-Mechanics, Dynamics of Nonlinear systems, Inventory Management, Graph Theory, Integral Equations, Queuing Theory, Statistical Decision Theory, Statistical Data Analysis, Compiler Design, Combinatorics, Fractional Calculus, Optimization, Theoretical Computer Science, Information and Coding Theory and Cryptography, Complex Networks, Quantum Entanglement, Strategic Network Formation, Data mining, Functional Data Analysis, Image Processing. Faculty members of this department have published number of research papers in reputed international journals on those topics. Number of sponsored research projects are under taken by the faculty members.

Prof. Geetanjali Panda organized a Short term course on "Gradient Based Numerical Optimization Algorithms" under Knowledge Dissemination Program December 7-11 , 2015

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 3 |
| Member - Professional Bodies | 40 |
| Member - Editorial Board | 10 |
| Visits Abroad by Faculty Members | 10 |
| Doctoral and MS Degrees Awarded | 10 |
| Sponsored Research Projects | 38 |
| Seminars, Conferences and Workshops Organised | 3 |
| Papers Published in Journals | 143 |
| Papers Presented in Conferences | 22 |

# Department of Mechanical Engineering

***Head***
Prof. Prasanta Kumar Das

***Professors***

| | |
|---|---|
| Bandyopadhyay, Partha Pratim | *Ph.D.(IIT Kharagpur)*, Thermally Sprayed coatings, Laser processing of materials |
| Bhattacharyya, Ranjan | *Ph.D.(Kentucky)*, Nonlinear Elasticity, Vibration, Dynamical Systems |
| Bhattacharyya, Sati Nath | *Ph.D.(IIT Kharagpur)*, Fluid Mechanics |
| Bhattacharyya, Souvik | *Ph.D.(Texas A & M)*, Thermal science, Natural refrigerant based transcritical heating cooling systems, Thermodynamic modelling and optimization, Natural circulation loops (NCLs), Energy Engineering and Planning |
| Chakraborty, Suman | *Ph.D.*, Microfluidics and Nanofluidics, Interfacial Phenomena and Phase Change, Computational Fluid Dynamics (CFD) |
| Chattopadhyay, Ajay Kumar | *Ph.D.(Jadavpur Univ)*, Metal-Ceramic Joining, Machining, Grinding, Surface Coating |
| Das Gupta, Anirvan | *Ph.D.(Kanpur)*, Wave propagation, Dynamics of discrete and continuous systems, Mechanics of inflatable membrane structures, Vibration induced particle transport |
| Das, Manab Kumar | *Ph.D.(IIT Kanpur)*, Computational Fluid Mechanics Heat Transfer, Large Eddy Simulation, Turbulence Modeling |
| Das, Prasanta Kumar | *Ph.D.(IIT Kharagpur)*, Thermal Engineering, Gas-liquid two phase flow-instrumentation and hydrodynamics, CFD for multiphase flow, Nano fluids, Thermo hydraulics of nuclear reactors, Liquid-liquid two phase flow, Experimental thermo-fluid science |
| Dash, Sukanta Kumar | *Ph.D.(IIT Kharagpur)*, Laminar and Turbulent Natural convection, pressure drop in gas solid flow, free surface flow |
| Guha, Abhijit | *Ph.D.(Cambridge)*, Fluid Mechanics, Thermal Science, Computational Fluid Dynamics (CFD) |
| Gupta, Sanjay | *Ph.D.(Delft)*, Biomechanics, Finite Element Analysis, Design Optimization |
| Kumar, Cheruvu Siva | *Ph.D.(IIT Kharagpur)*, Robotics and Intelligent Systems, Computer and Telecommunication Networks, Additive Manufacturing, Control Systems |
| Maiti, Biswajit | *Ph.D.(IIT Delhi)*, |
| Maiti, Rathindranath | *Ph.D.(IIT Kharagpur)*, Mechanical and Fluid Power Transmission and Gear Engineering, Mechanical and Fluid Power Transmission and Gear Engineering |
| Mohanty, Amiya Ranjan | *Ph.D.(Kentucky)*, Natural Materials for Noise Control, Machinery Condition Monitoring, Acoustics and Noise Control, Underwater Acoustics, Building Acoustics, Mechanical Systems and Signal Processing, Automotive Diagnostics, More information at www.iitnoise.com |

| | |
|---|---|
| Moulic, Sandipan Ghosh | *Ph.D.(Arizona)*, Theoretical and computational fluid dynamics and heat transfer, Hydrodynamic and thermal instability, Spectral methods in fluid dynamics, Perturbation methods in fluid dynamics, Mixed convection |
| Nath, Ashish Kumar | *Ph.D.(Bombay University)*, Laser material interaction and processing, Underwater laser processing, Nontraditional manufacturing processes |
| Pal, Surjya Kanta | *Ph.D (IIT Kharagpur)*, Manufacturing Process Modelling and Simulation, Friction Stir Welding, Ultrafast Cooling Processes |
| Paul, Soumitra | *Ph.D.(IIT Kharagpur)*, Machining and Grinding, Cutting Tool Coating |
| Pratihar, Dilip Kumar | *Ph.D.(IIT Kanpur)*, Soft Computing, Robotics, Manufacturing Science |
| Ramgopal, Maddali | *Ph.D.(IIT Madras)*, Refrigeration & air conditioning, Carbon dioxide based natural circulation loops, Solid sorption systems, Thermal Comfort |
| Ray, Manas Chandra | *Ph.D.(IIT Kharagpur)*, Fuzzy Fiber Reinforced Composites, Smart Materials and Structures, Dynamics and Control of Composite Structures, Nanocomposites, Fluid-structure interaction, Active constrained layer damping, Flexoelectric Solids |
| Roy Chowdhury, Asimava | *Ph.D.(IIT Kharagpur)*, CNC machining of free form (curved) surfaces, Direct slicing (without tessellation) for Rapid prototyping, Laser and electron beam welding of Hastelloy C-276, Wire cut EDM of dissimilar metal sandwitches, multi-directional slicing for reduction of support structures in LM |
| Roy, Subhransu | *Ph.D.(Penn. State)*, Heat Transfer, Laser Processing of Materials, Optical diagnostics for flow and heat transfer, Train Aerodynamics |
| Saha, Partha | *Ph.D.(IIT Kharagpur)*, Laser processing of materials, Micro manufacturing, Nonconventional manufacturing, Rapid prototyping |
| Samantaray, Arun Kumar | *Ph.D (IIT Kharagpur)*, Systems and Control, Vehicle system dynamics, Rotor dynamics, Nonlinear Mechanics |
| Som, Sankar Kumar | *Ph.D.(IIT Kharagpur)*, Thermofluid Science and Combustion Science |

***Associate Professors***

| | |
|---|---|
| Bhattacharya, Anandaroop | *Ph.D. (Univ. of Colorado, Boulder)*, Thermal Management of Electronics and Electrical Systems, Transport in Porous Media, Gas Turbine Heat Transfer |
| Bhattacharyya, Kingshook | *Ph.D (IIT Kharagpur)*, Dynamics |
| Biswas, Kajal | *Ph.D.(IIT Kharagpur)*, Welding Fracture Mechanics |
| Chakraborty, Goutam | *Ph.D (IIT Kanpur)*, Multiscale mechanics of smart materials, Vibration and noise control, Dynamics of MEMS and NEMS devices, Machine Fault Diagnosis and Prognosis |
| Racherla, Vikranth | *Ph.D.(Univ. of Pennsylvania)*, Composite mechanics, Numerical modeling of thermo-mechanical processes, Friction stir welding, Railway engineering, shape memory polymers |
| Ray, Kumar | *Ph.D.(IIT Kharagpur)*, |

| | |
|---|---|
| Sarangi, Mihir | *Ph.D.(IIT Kharagpur)*, Machine Design, Rotor Dynamics, Bearings and Seals, Lubrication Technology, Friction & Wear Analysis, Surface Characterization, Experimental Stress Analysis |

***Assistant Professors***

| | |
|---|---|
| Deb, Sankha | *Ph.D.(Univ. of Montreal, Canada)*, Computer Integrated Manufacturing, Computer-Aided Process Planning for Manufacturing and Assembly, Automation and Robotics, Intelligent Manufacturing Systems, Micromanufacturing Processes, Soft Computing techniques in Manufacturing, Flexible Manufacturing Systems |
| Kalelkar, Chirag Deepak | *Ph.D. (IISc., Bangalore)*, Fluid Dynamics |
| Lakkaraju, Rajaram | *Ph.D.(Univ. of Twente, Netherlands)*, Multiphase flows and Fluid structure interactions |
| Panda, Sushanta Kumar | *Ph.D.(IIT, Delhi)*, Sheet metal forming processes, Sheet and tube hydroforming, Formability testing design and development, Plasticity for metal deformation modelling and simulation, Friction stir processing of sheet metal |
| Paul, Jinu | *Ph.D.(Nanyang Tech. Univ., Singapore)*, Material Processing & Characterization, Polymer Nanocomposites, Joining of Materials, More information: https://sites.google.com/site/jpauliitkgp/home |
| Ramanujam, S | *Ph.D.(IIT Kharagpur)*, IC Engines |
| Sidpara, Ajay Muljibhai | *Ph.D.(IIT Kanpur)*, For more information: https://sites.google.com/site/sidajay80/, Development of nanofinishing processes for complex surfaces, Magnetorheolocal fluid based finishing, Micro machining, Unconventional machining processes |
| Srivastava, Dhananjay Kumar | *Ph.D. (IIT Kanpur)*, Engine Combustion Investigation and Visualization, Engine Emission, Laser Ignition of Engine, Engine Calibration, Gasoline Direct Injection |

***Thrust Areas***

1. High Speed Machining, Grinding and Development of Cutting Tools / Grinding Wheel
2. Micro Manufacturing and Microscale Transport Processes, Laser Materials Processing
3. Bio-mechanics, Bio-micro-fluidics and microscale transport processes, lab-on-a-chip
4. Computational Fluid Mechanics, Experimental Heat Transfer, Refrigeration systems
5. Smart materials and composites, noise & vibration

***Brief Description of on-going activities***

Expert systems and soft computing - various applications like robotics, manufacturing science, medical diagnosis
Bio-micro-fluidics and microscale transport processes, Transport Phenomena in Phase Change Problems, Lab on a chip devices
Material processing - Laser Processing, Non conventional macining,High Efficiency Deep Grinding, surface coating
CFD/Lattice Bolzmann Method in Complex Flows
Design and development of carbon di-oxide based power and refrigeration systems
Digital manufacturing, rapid prototyping, 3-D printing
Noise and vibration engineering
Smart composite materials and structures
Turbulence and instability
Multiphase flow, boiling and condensation
Friction stir welding, Metal forming
Systems and control, vibration induced transport

Rotor dynamics, tribology, wear and lubrication
Biomechanics, biomedical applications
Robotics, automation, flexible manufacturing systems

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 1 |
| Fellow - Professional Bodies | 13 |
| Member - Professional Bodies | 27 |
| Member - Editorial Board | 43 |
| Visits Abroad by Faculty Members | 4 |
| Doctoral and MS Degrees Awarded | 25 |
| Sponsored Research Projects | 91 |
| Consultancy Projects | 16 |
| Patents (filed / granted) | 4 |
| Short-Term Courses and Training Programmes organised | 5 |
| Papers Published in Journals | 133 |
| Papers Presented in Conferences | 21 |

# Department of Metallurgical & Materials Engineering

***Head***
Prof. Gour Gopal Roy

***Professors***

| | |
|---|---|
| Chakraborti, Nirupam | *Ph.D.(Univ. of Washington, USA)*, Computational Materials Science Genetic Algorithms Extractive Metallurgy |
| Chakraborty, Madhusudan | *Ph.D.(IIT Kharagpur)*, Solidification Processing, Metal Matrix Composites, Ti Based Alloys |
| Das, Karabi | *Ph.D.(Wisconsin, USA)*, Metal Matrix Composites, Nanocomposites, Materials Characterization, Electrodeposition |
| Das, Siddhartha | *Ph.D.(Illinois, USA)*, Nano Materials, Composite Materials, Electron Microscopy, Surface Engineering, Energy Materials, Characterization of Materials, Lead Free Solder Materials |
| Dutta Majumdar, Jyotsna | *Ph.D.(IIT Kharagpur)*, Laser Materials Processing, Biomaterials, shape memory alloy, Advanced Welding of Materials, Surface Engineering, Plasma Processing of Materials, Corrosion and Environmental Degradation |
| Ghosh, Sudipto | *Ph.D (IIT Kanpur)*, New Materials for Batteries, Multi-scale Modeling of Material Processes, Solidification Processing of Al alloys and Al-alloy based nanocomposites, Mechanical behavior of Materials |
| Manna, Indranil | *Ph.D.(IIT Kharagpur)* |
| Mitra, Rahul | *Ph.D.(Northwestern Univ., USA)*, Mechanical Behaviour of Materials, Scanning and transmission electron microscopy, Materials for high temperature applications, Composite Materials, Nanocrystalline materials, Thin Film Processing and Characterization, Oxidation behavior of materials |
| Pabi, Shyamal Kumar | *Ph.D.(IIT Kharagpur)*, Nanostructured materials Phase transformations Composites Modelling and simulation |
| Ray, Kalyan Kumar | *Ph.D.(IIT Bombay)*, Mechanical Metallurgy, Physical Metallurgy, Fracture Mechanics, Nondestructive Evaluation, Structural Integrity, Failure Analysis, Advanced Structural Materials, Stereology, Modelling and Simulation, Metal Matrix and Ceramic Matrix Composites |
| Roy, Gour Gopal | *Ph.D.(IIT Kanpur)*, Alternative Routes of Iron & Steel making, Modelling of Heat & Mass Transfer in Materials Processing, Electron Beam Welding |
| Roy, Sanat Kumar | *Ph.D.(IIT Kharagpur)*, Mineral Processing, Extractive Metallurgy, Environmental Degradation of Materials, Materials Processing by Laser, Electronic and magnetic nanomaterials |
| Singh, Shiv Brat | *Ph.D.(Cambridge Univ,UK)*, Physical metallurgy of steel |

***Associate Professors***

| | |
|---|---|
| Acharya, Narendra Nath | *Ph.D.(IIT Kharagpur)*, Artificial Intelligence, Powder Metallurgical Applications, Multi-Media, Educational Technology, Photography |

| | |
|---|---|
| Aich, Shampa | *Ph.D.(Univ.of Nabraska, USA)*, Rapid Solidification, Magnetic Materials, Shape Memory Alloys, Biomaterials |
| Biswas, Koushik | *Ph.D. (Univ.of Stuttgart, Germany)*, Energy materials (Hydrogen storage - Solid Oxide Fuel Cell - Lithium Ion Battery), Abinitio (DFT) and MD Modeling, Electroceramics (Ferroelectric - Pyroelectric - Relaxor - Multiferroics), Structural Ceramics (ZrO2 - Al2O3 - TBC - SiC), Ceramic Reinforced Metal Matrix Composites (steel and Al-based MMC with SiC - TiC-other Carbide), Sintering (Conventional - Microwave - SPS) |
| Chakrabarti, D | *Ph.D.(Univ. of Birmingham, UK)*, Microstructure property correlation in metals, Development of microstructure and texture in thermo-mechnical processing, Fracture toughness and fracture transition behaviour in metals, Development and effect of mixed grain structures in metals, Segregation during solidification and its effect on properties, Modelling based on dislocation theory, Defect initiation and its control in metals |
| Das, Jayanta | *Ph.D.(TU Dresden, Germeny)*, Solidification and Non-equlibrium Processing, Metastable Nanostructured and Functional Alloys, High Temperature Oxidation, Structure-Property Relationship, Phase Transformation |
| Kar, Sujoy Kumar | *Ph.D.(The Ohio State Univ.)*, Physical and Mechnical Metallurgy, Processing-Microstructure-Microtexture-Property Relationship, Materials and property modeling, Ti alloys & TiAl base alloys & Ni based superalloys and steels for energy applications |
| Kundu, Tarun Kumar | *Ph.D(Lulea univ of Tech,Sweden)*, Atomistic Simulations of Materials, Extractive Metallurgy, Computational Fluid Dynamics, Mineral processing, Modeling on Energy Materials |
| Laha, Tapas | *Ph. D.(Florida Int.Univ., Miami)*, Metallic Nanocomposites - Processing & Characterization, Interfacial Phenomena, Surface Engineering & Coating, Bulk Metallic glass Nanocomposites, Materials Processing via Spark Plasma Sintering |

***Assistant Professors***

| | |
|---|---|
| Bandyopadhyay, Tapas Kumar | , Micro-structure Property Co-relation in Steel. Metal Matrix Composite. Intellectual Property |
| Bhaduri, Amit | *M.Tech.(IIT Kanpur)*, STRUCTURE-PROPERTY RELATIONSHIP. |
| Biswas, Somjeet | *Ph.D.(IISc., Bangalore)*, Advanced Magnesium Titanium and Aluminium alloys, Deformation and thermomechanical processing, Microstructure - crystallographic texture and mechanical property correlation, Severe plastic deformation and fracture mechanics, Ni-Ti shape memeory alloys and dual phase steels |
| Mandal, Sumantra | *Ph.D.(IIT Madras)*, Creep Fatigue and Fracture, Grain Boundaries and Interfaces, Hot Deformation and Workability Studies, Recrystallization and Grain Growth, Superplasticity, Constitutive Modeling, Thermo-mechanical Processing, Aqueous and High temperature Corrosion |
| Roy, Mangal | *Ph.D.(Washington State Univ.)*, Biomaterials, Ceramics, surface modification |
| Sen, Indrani | *Ph.D.(IIS)*, Mechanical Behavior of Materials, Small scale deformation characteristics, Nanoindentation, Fracture and Fatigue of Materials, Failure Analysis, NiTi-based Shape memory alloys, Ti alloys, Steels, Fatigue testing of wires |

***Thrust Areas***

1. CLASSICAL METALLURGY AND MATERIALS SCIENCE i. Extractive metallurgy; ii. Solidification and nonequilibrium processing; iii. Metastable alloys and Phase transformation; iv. Deformation and fracture behavior; v. Joining of metals; vi. Corrosion behavior and high temperature oxidation; vii. Powder Metallurgy
2. COMPUTATIONAL MATERIAL SCIENCE i. Modeling and simulation in process metallurgy; ii. Modeling of phase transformation kinetics; iii. Molecular dynamics; iv. Design & scale-up of metallurgical processes; v. Modeling and simulation of iron making processes
3. IRON AND STEEL i. Raw material processing and mineral beneficiation; ii. Advanced auto-grade steel; iii. Improvement in mechanical properties like creep, fatigue, fracture and non-destructive testing
4. ADVANCED MATERIALS i. Composites & functionally graded materials; ii. Nanomaterials and nanocomposites; iii. Surface engineering & Interfacial phenomena; iv. Thin film coatings; v. Biomaterials; vi. Lithium ion battery; vii. Solid oxide fuel cells (SOFCs)

***Brief Description of on-going activities***

The Research and Development Program of the Department encompasses various areas like Corrosion Science and Technology, Extractive Metallurgy, Mechanical Metallurgy, Melting, Casting and Solidification Processing, Modeling, Simulation and Multimedia in Metallurgical Engineering, Physical Metallurgy, Powder Metallurgy, Surface Engineering etc. In the field of Extractive Metallurgy significant contributions for metal value extraction, particularly Cu, Ni and Co from sea nodules has been made. Direct reduction of iron ore using mine generated ore and coal fines is another major research area. Understanding CO2 mitigation in steel industry through process models has emerged as a developed area of research. In the domain of Mechanical Metallurgy, a pioneering achievement has been the design and development of fatigue testing using rotating bending machine to study short, long and non-propagating crack behaviour in several steels. Investigations related to structure-property relationship of various ceramic and metal-matrix composites, high temperature materials and advanced alloys are thrust areas of activity. Development of newer grades of dual phase and micro alloyed steels through fracture based studies, correlation between fracture and wear characteristics of materials, development of thin sheet steel components are some important fronts in this direction. In addition, research is progressing in the area of mechanical behaviour of small volume materials. The major areas in the field of Melting, Casting and Solidification Processing include: development of cast micro-alloyed steels, studies on the hot tearing of long freezing range Al alloys, austempered ductile iron through non-conventional route, grain refinement of Al alloys and the development of cast metal matrix composites. Success has been achieved in improving the mechanical properties of some hypoeutectic and eutectic Al-Si alloys by combined grain refinement and modification treatment using indigenously developed Al-B and B rich Al-Ti-B master alloys and Sr, respectively. In addition to mathematical modeling works in the areas of surface engineering, phase transformation, solidification processing, facture & fatigue, some more new areas have surfaced and these are: application of genetic algorithm for the optimization of metallurgical systems, mathematical simulation of welding, iron and steel making, and other high temperature metallurgical systems by application of computational fluid dynamics, and heat and mass transfer, atomistic simulation of gas hydrates, molecular dynamic simulation of nanostructured materials etc. Several Al-Cu-TM and Al-TM-Si (TM = transition metal) Al-Ni-Ti ternary alloys, and Al-alloys containing rare earth metals have been synthesized and characterized to explore the possibility of developing bulk amorphous Al-alloy by mechanical alloying and identifying the criteria of selection of such amorphous alloy compositions. The present activities of the Powder Metallurgy group include synthesis of particulate reinforced mullite and their property evaluation, production of Al2O3 reinforced Ni3Al thorough reaction sintering route, reaction sintering of silicon carbide, recovery of copper from printed circuit etchant sludge and production of silicon carbide from fly ash silica. Research has been initiated in the area of semi-solid processing for casting and forming operations of Al-alloy matrix composites. In addition, significant progress has been achieved in the synthesis of Fe-TiC, Fe-ZrC and Fe-TiB2 composites from cheaper raw materials by aluminothermic reduction method. Development of low temperature copper based composites, steel matrix composites are also prominent areas in the area of composite materials. Activities related to surface engineering involves laser assisted surface modification, ion implantation and plasma spray deposition, development of nano-structured coating by electro-deposition. The research activities in the area of Environmental Degradation embraces fundamental studies relating to film/scale growth processes on different metal-oxygen and metal-halogen systems with emphasis on kinetics and growth mechanisms, defect structures of compounds, transport properties of different species, adhesion and protective properties of the scales etc. Studies on high temperature oxidation behaviour of multi-phase refractory metal-silicides like Molybdenum and Niobium Silicides are in progress. In the area of aqueous corrosion, the current

activities are concentrated on the studies relating to corrosion behaviour of amorphous and nanocrystalline Zr-based binary alloys, corrosion and stress corrosion performance of aluminum based composites and Al-Ni alloys and stress corrosion cracking of nickel alloys in hydrogen fluoride environment. Development of lead free Sn based solder material, and solid oxide fuel cell are also some areas of active research. In the area of joining research on joining of similar and dissimilar materials using electron beam welding is getting prominence. Development of Lithium Ion Battery (LIB) Technology for applications in Electric Vehicles in India has taken the role of a prominent research area in the Department.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 5 |
| Fellow - Professional Bodies | 14 |
| Member - Professional Bodies | 69 |
| Member - Editorial Board | 27 |
| Visits Abroad by Faculty Members | 8 |
| Doctoral and MS Degrees Awarded | 8 |
| Sponsored Research Projects | 75 |
| Consultancy Projects | 21 |
| Seminars, Conferences and Workshops Organised | 2 |
| Books Published | 1 |
| Papers Published in Journals | 103 |
| Papers Presented in Conferences | 40 |

# Department of Mining Engineering

***Head***
Prof. Khanindra Pathak

***Professors***

| | |
|---|---|
| Bhattacharya, Jayanta | *Ph.D.(IIT Kharagpur)*, Mine Planning, Environmental Engineering, Environmental Nanotechnology, Wastewater Treatment Technologies and Process Developments, Management Social Impacts, Reliability Engineering, Mine Reclamation, Biodiversity protection |
| Bhattacherjee, Ashis | *Ph.D.(Penn-State)*, Occupational Health and Safety and Operations Research applications in mining |
| Das, Samir Kumar | *Ph.D.(ISM Dhanbad)*, Strata Control and Rock Mechanics, Mines Safety Engineering, Mine Environment |
| Deb, Debasis | *Ph.D.(Alabama Univ, USA)*, Rock Mechanics, Analytical and numerical methods in design of geo-structures, Mine Design, Ground Control, Extended Finite Element Methods in bolt mechanics and support design, Mesh-free numerical methods in geomechanics |
| Pal, Samir Kumar | *Ph.D.(IIT Kharagpur)*, Geomechanics - Roof fall prediction in underground coal mines, Mine Void Filling – Blind backfilling of abandoned mines using sand and other waste material, Wear of Elastomers in Mining – Abrasion of elastomers against different rock types. |
| Pathak, Khanindra | *Ph.D.(London Univ)*, Environmental Management in Surface Mining and Mine Site Restoration, Application of Remote Sensing and GIS, Vetiver System Implementation for CSR-EMP Integration, Oil Spill Management, Coal Bed Methane, Pedagogy and Educational Technology |
| Rao, Karanam Uma Maheshwar | *Ph.D.(IIT Kharagpur)*, Rock Mechanics, Mine Development, Underground Metal Mining, Back filling of mine voids |
| Sastry, Bhamidipati Suryan | *Ph.D.(Utah)*, Underground Environment, Aerosols Characterization |

***Associate Professors***

| | |
|---|---|
| Annavarapu | *Ph.D. (Univ. of Arizona)*, Underground Metal Mining |
| Chakravarty, Debashish | *Ph.D (IIT Kharagpur)*, SLAM Mine Mapping and Locational Surveliance using Digital Photogrammetry, GeoResource Exploitation using Geoinformatics and GPS & GIS, Mineral Resource Mapping using Geodesy and InSAR Technologies, Geo-technical and Numerical Stability Analysis of Slopes, Hyperspectral Imaging for Mineral Identification, Subsidence monitoring using InSAR and numerical analysis, Rescue Robotics and Robotic Mapping (Aerial UAV and Terrestrial) |
| Jha, Ajay Kumar | *Ph.D. (IIT Kharagpur)*, Rock Blasting and Fragmentation Numerical Modelling in Blasting Demolition Technology Rock Dynamics |
| Majumder, Arun Kumar | *Ph.D.(Univ. of Queensland)*, Mineral Processing, Coal Washing, Solid-Fluid Interactions, Fine Particle Processing |

| | |
|---|---|
| Samanta, Biswajit | *Ph.D.(IIT Kharagpur)*, Mine planning, Geostatistics, Mine environment and ventilation |

***Assistant Professors***

| | |
|---|---|
| Dey, Kaushik | *Ph.D.(ISM, Dhanbad)*, Rock excavation by blasting and mechanised rock cutting Surface mining |
| Patra, Aditya Kumar | *Ph.D.(Imperial College, London)*, Air pollution measurement and modelling, Greenhouse gas emissions from mines, Human vibration in mines and allied industries, Industrial safety assessment and audit |
| Prusty, Basanta Kumar | *Ph.D.(Southern Ilinois)*, Coalbed methane and Bio-CBM, Geological Carbon Sequestration, Underground Coal Gasification, Shale Gas |
| Verma, Abhiram Kumar | *Ph.D.(IIT Kharagpur)*, Rock Mechanics and Ground Control, Slope Design, Numerical Modeling, Rock Fracture Mechanics |

***Visiting Professor***

| | |
|---|---|
| Dikshit, Mukti Pada | *Ph.D. (IIEST, Shibpur)* |

***Thrust Areas***

1. Rock Mechanics and Ground Control
2. Surface and sub-surface Environment
3. Mine Safety and Systems Engineering
4. Advanced Surveying and Geo-informatics
5. Safety Engineering
6. Clean Coal Technology

***Brief Description of on-going activities***

Environment and Safety- Application of LCA, GIS and remote sensing for soil and water analysis as a part of mine closure planning; Experimental and computational fluid dynamics studies for shock loss determination in mine air flow; Biological and passive treatment of mine waste water; Investigation of soil and water contamination vis-á-vis land use changes near mining fields. Study of human behaviour related accidents in mines; Epidemiological investigations to identify possible risk factor of occupational injuries in mines; The statistical methods for assessing risk factors included logistical regression, loglinear modeling and structural equation modeling.

Rock Mechanics / Ground Control- Finite element analysis for longwall strata control problems, and design of shield supports; Rock Joints and their influence on the stability of underground openings; Rock Mass characterization, Land reclamation and soil mechanics; Assessment of Fly ash composites as a substitute fill material for underground mine voids; Risk analysis for the safety management of coalmines; On the mechanics of rock fragmentation by drilling and cutting- studies on the linear cutting machine (LCM).

Mine Planning / Modeling- Application of various grade estimation techniques namely kriging, cokriging, stichastic simulation and neural networks for estimation of mining blocks for quality control in mines; Investigation of different statistical quality control techniques including univariate and multivariate control charts for controlling the grade of mineral at various locations; Grade control aspects in limestone and bauxite operations. Fault Tree Analyses and algorithm development for a Coal Handling Plant.

Advanced Surveying & Geoinformatics: Integration of GPS & I.SAR ground deformation data over mining areas. Use of lasers for assessment of stability of dumps. Vision based semi-automatic mine navigation system.

Collaborative Research- Collaborative research is ongoing with the French National Institute of Health and Medical Research (INSERM) for conducting research on injury epidemiology. In this study, the public health prevention methods were applied to occupational injuries in mines.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 7 |
| Fellow - Professional Bodies | 5 |
| Member - Professional Bodies | 65 |
| Member - Editorial Board | 15 |
| Visits Abroad by Faculty Members | 7 |
| Sponsored Research Projects | 66 |
| Consultancy Projects | 96 |
| Patents (filed / granted) | 1 |
| Seminars, Conferences and Workshops Organised | 3 |
| Short-Term Courses and Training Programmes organised | 8 |
| Books Published | 3 |
| Papers Published in Journals | 42 |
| Papers Presented in Conferences | 26 |

# Department of Ocean Engineering & Naval Architecture

***Head***
Prof. Trilochan Sahoo

***Professors***

| | |
|---|---|
| Bhaskaran, Prasad K | *Ph.D (Kurukshetra)*, Wind-Wave Modeling, Marine Acoustics, Coastal Processes, Coastal Sediment Dynamics, Physical & Dynamical Oceanography, Port & Harbour Engineering, Ocean Wave Climate Projections |
| Mandal, Nisith Ranjan | *Dr.Inz.(Poland)*, Wave and Tidal Energy, Computational Weld Mechanics and Welding Technology |
| Sahoo, Trilochan | *Ph.D.(IISc Bangalore)*, Coastal Hydrodynamics, Wave past porous structures, Boundary value problems, Hydroelasticity |
| Satsangi, Subir Kumar | *Ph.D.(IIT Kharagpur)*, Ship Structures Structural Engineering Composite Materials Naval Architecture. |
| Sen, Debabrata | *Ph.D.(Canada)*, Free Surface Hydrodynamics, Marine Hydrodynamics, Dynamics of Marine Vehicles, Seakeeping and Maneuvering |
| Sha, Om Prakash | *Ph.D.(IIT Kharagpur)*, Marine Design and Production |

***Associate Professors***

| | |
|---|---|
| Bhar, Ashoke | *Ph.D.(IIT Kharagpur)*, Marine Structural Engineering |
| Warrior, Hari V | , Turbulence Modeling in Oceanography, Computational Fluid Dynamics |

***Assistant Professors***

| | |
|---|---|
| Bhattacharjee, Joydip | *Ph.D.(IIT Kharagpur)*, Marine Hydrodynamics, Wave-Structure Interaction, Wave Energy Converters, Tidal energy |
| Datta, Nabanita | *Ph.D.(Univ. of Michigan, USA)*, Marine Dynamics, Vibrations |
| Datta, Ranadev | *Ph.D.*, Numerical Ship Hydrodynamics, Hydroelasticity of Floating Structures and Ships, Computational Geometry |
| Sarkar, Arunjyoti | *Ph.D. (Univ. of Stavanger, Norway)*, Marine operation for subsea installation, Structural vibration control, Wave Structure Interaction |
| Vijayan, Kiran | *Ph.D.(Univ, of Cambridge)*, Linear and Nonlinear Structural dynamics, Energy harvesting, Drilling vibrations and mitigation, Vibration of discrete and continuous system, Wave structure interaction |
| Vishwanath, Nagarajan | *Ph.D.(Osaka Univ. Japan)*, Ship dynamics, Mathematical modelling |

***Thrust Areas***

1. The thrust areas of the Department includes: Marine and Ocean Hydrodynamics, Marine design and Production, Numerical Hydrodynamics, Coastal Marine Hazards, Ocean Structures, Marine Structural Analysis, Ocean Wave & Circulation Modeling, Marine Design and Production, Welding Technology, Coastal Processes and Engineering, Offshore Technology, Hydroelasticity, Storm Surge Prediction & Tsunamis, Suspended Sediment Dynamics, Marine Acoustics, Port and Harbour Engineering, Marine Vibration, Wave Energy, Subsea engineering.

***Brief Description of on-going activities***

The Department is continuously changing the teaching courses as per the need of industry and trend in academics. New electives were introduced during the current academic session. Some of the current research and development activities of the Department involve energy efficient hull forms design for shipbuilding industry, measurement of flow characteristics around ships to improve propulsion efficiency, studies on climate change and ocean wave modeling, under water robotics, hydrodynamic studies on ships and offshore structures, hydroelastic analysis of ship and marine structures, coastal hydrodynamics, wave energy, subsea engineering and marine vibration. GIAN and micro credit courses are being introduced from the current session. The Department runs a National Program in Marine Hydrodynamics sponsored by Naval Research Board (DRDO) which aims to bridge the knowledge gap in Marine Hydrodynamics and develop indigenous R & D capabilities on Naval Systems. Department has organized various outreach programs like short-term courses and workshops for interacting with industry experts and researchers of sister Institutions in the broad area of Ocean Engineering and Naval Architecture. Moreover in collaboration with Royal Institutions of Naval Architects, Dept. organized the biennial conference ICSOT-INDIA, 2015 in December which is the fourth in the series. Department is in the process of upgrading the infrastructure and augmenting the existing laboratory.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 1 |
| Member - Professional Bodies | 11 |
| Member - Editorial Board | 6 |
| Doctoral and MS Degrees Awarded | 6 |
| Sponsored Research Projects | 11 |
| Consultancy Projects | 22 |
| Seminars, Conferences and Workshops Organised | 3 |
| Short-Term Courses and Training Programmes organised | 5 |
| Books Published | 1 |
| Papers Published in Journals | 29 |
| Papers Presented in Conferences | 19 |

# Department of Physics

***Head***
Prof. Arghya Taraphder

***Professors***

| | |
|---|---|
| Bharadwaj, Somnath | *Ph.D.(IISc Bangalore)*, Astrophysics, Cosmology |
| Datta, Prasanta Kumar | *Ph.D.(Burdwan Univ)*, Ultrafast Lasers and Nonlinear Optics, Photonics |
| Dhar, Achintya | *Ph.D.(Jadavpur Univ)*, Organic Semiconductors, Semiconductor Nanostructures, Heterostructure Devices, Organic Solar Cells |
| Kar, Sayan | *Ph.D.(IIT Kanpur)*, Gravitation and Geometry, High Energy Physics, Quantum mechanics |
| Kumar, Krishna | *Ph.D.(IIT Kanpur)*, Pattern-forming instabilities, Hydrodynamic flows |
| Mandal, Sudhansu Sekhar | *Ph.D.(IIT Kanpur)*, Theoretical Condensed Matter Physics:, Fractional Quantum Hall Effect, Strongly Correlated Systems, Disordered Superconductors |
| Nath, Tapan Kumar | *Ph.D.(IIT Kanpur)*, Magnetic oxide thin films and multilayers, Spin electronics, Nanostructured Magnetic oxides, Magnetic Alloys, Multiferroics, Condensed Matter Physics (Low temperature Physics), Magnetism and Superconductivity, Magnetic semiconductors, Strongly Correlated System |
| Ray, Samit Kumar | *Ph.D.(IIT Kharagpur)*, Semiconductor nanostructures, Condensed Matter Physics, Thin Films, Photovoltaics |
| Roy, Anushree | *Ph.D.(IISc Bangalore)*, Raman spectroscopy |
| Sharma, Shivcharan Lal | *Ph.D.(IIT Kanpur)*, Effect of Ionizing Radiation on Thin Films and Devices, Radiation Physics, Monte Carlo Simulation of Radiation Detectors, Semiconductor Physics and Physics of Semiconductor Devices, Fission Dynamics |
| Shukla, Pragya | *Ph.D.(JNU Delhi)*, Random matrix theory and Quantum Chaos, Condensed Matter Physics, Statistical Studies of Complex Systems, Theoretical Physics |
| Taraphder, Arghya | *Ph.D.(IISc Bangalore)*, Condensed matter physics, Condensed matter physics |

***Associate Professors***

| | |
|---|---|
| Das, Amal Kumar | *Ph.D.(IOP Bhubaneswar)*, Experimental Condensed Matter Physics, Magnetism including spintronics, Ferromagnet/Semiconductor heterostructures for spintronic devices, Mechanical and magnetic stress characterization using cantilever beam magnetometer |
| Goswami, Dipak Kumar | *Ph.D.(Institute of Physics, Bhubaneswar)*, Surfaces and Interfaces Science, Nanoscale Science, Organic Semiconductors Thin Films and Nanostructrues Growth, Organic Field-Effect Transistors (OFETs): Fabrication and Characterization, X-ray Physics, Ion-solid Interaction |
| Majumder, Sonjoy | *Ph.D.(IIA Bangalore)*, Computational Many-body physics, Atomic & Molecular Physics, Light-matter interaction, Astronomy and Astrophysics, Physics of Ultra-Cold atom |

| | |
|---|---|
| Panigrahi, Kamal Lochan | *Ph.D.(Institute of Physics, Bhubaneswar)*, String Theory, High Energy Physics, String Inspired Cosmology |
| Roy Chaudhuri, Partha | *Ph.D.(IIT Delhi)*, Fiber & Integrated Optics and Optoelectronics, Experimental Bio-Photonics & Nano-Photonics |
| Srivastava, Sanjeev Kumar | *Ph.D.(JNU, New Delhi)*, Materials Engineering using Ion Beams, Nuclear Condensed Matter Physics, Quantum Criticality |

***Assistant Professors***

| | |
|---|---|
| Banerjee, Debamalya | *Ph.D.(IISc. Bangalore)*, Electron Paramagnetic Resonance (EPR), Supercooled liquid dynamics, Physics of photovoltaic materials |
| Bhaktha, Shivakiran B N | *Ph.D.(Univ of Hyderabad)*, Glass Photonics, Optofluidics, Random Laser |
| Burada, Poornachandra Sekhar | *Ph.D.(Univ. of Augsburg, Germany)*, Stochastic processes : diffusion - entropic rectification - particle separation - resonance, Active Brownian motion : Escape rate - influence of nonlinear friction - bifurcation analysis, Swimming of microrganisms : Chiral motion - flow patterns - hydrodynamic interactions |
| Chandra, Amreesh | *Ph.D.(I.T., B.H.U.)*, Multiferroics ceramics, Hollow nanostructures for catalysis, Experimental Condensed Matter Physics, Microbial Fuel Cells, Supercapacitors |
| Choudhury, Debraj | *Ph.D.(IISc, Bangalore)*, Experimental investigations of magnetic - electronic - dielectric properties |
| Gupta, Amar Nath | *Ph.D.(JNU)*, Biophysics and Soft Matter Physics |
| Khastgir, Sugata Pratik | *Ph.D.(IOP Bhubaneswar)*, Mathematical Physics/High Energy Physics |
| Manoj, Brundavanam Maruthi | *Ph.D.(Hyderabad Univ.)*, Singular Optics, Applied Optics, Ultrafast Laser Filamentation |
| Ray, Tirtha Sankar | *Ph.D.(SINP, Kolkata)*, Supersymmetry Extra Dimensions and Composite Higgs Models, High Energy Physics, Beyond Standard Model Phenomenology |
| Roy, Nirupam | *Ph.D.(TIFR, Mumbai)*, Astronomy and Astrophysics, Cosmology, Radio Astronomy, Interstellar Medium, Astrophysical Turbulence, Novae & accretion |
| Roy, Samudra | *Ph.D.(Jadavpur Univ.)*, Silicon Photonics, Nonlinear Photonics, Plasmonics, Fiber Optics |

***Visiting Professor***

| | |
|---|---|
| Mathur, Balbir Kumar | *Ph.D.(IIT Kharagpur)*, Web Based Service and website, Microprocessor, ERP in PHP, Thin Films |

***Thrust Areas***

1. Condensed Matter Physics
2. Optics and Photonics
3. Atomic, nuclear and high energy physics, Astrophysics.
4. Nonlinear dynamics and complex systems

***Brief Description of on-going activities***

The Department is engaged in a variety of academic and research activities through the active participation of undergraduate and post-graduate students, research scholars, post-doctoral fellows and faculty. The academic atmosphere of the Department is maintained through regular seminars by visitors as well as students and faculty. In research, apart from using in-house facilities, collaborative work is carried out with other departments, centres as well as with other institutes in India and abroad. The broad areas of research include: Astrophysics, cosmology and gravitation; Atomic and Molecular Physics; Biophysics; Condensed Matter Physics and Nano-Science; Mathematical Physics; Nonlinear dynamics and complex systems; Nuclear and High Energy Physics; Optics and Photonics.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 2 |
| Fellow - Professional Bodies | 4 |
| Member - Professional Bodies | 39 |
| Member - Editorial Board | 20 |
| Visits Abroad by Faculty Members | 10 |
| Doctoral and MS Degrees Awarded | 9 |
| Sponsored Research Projects | 54 |
| Consultancy Projects | 7 |
| Patents (filed / granted) | 3 |
| Seminars, Conferences and Workshops Organised | 16 |
| Books Published | 8 |
| Papers Published in Journals | 125 |
| Papers Presented in Conferences | 70 |

# ACADEMIC CENTERS

# Centre for Educational Technology

***Head***
Prof. Anupam Basu

***Associate Professor***

| | |
|---|---|
| Bhattacharya, Bani | *Ph.D.(IIT Kharagpur)*, Instructional Design Distance Education Technology Enhanced Learning Pedagogical Research |

***Assistant Professors***

| | |
|---|---|
| Bhowmick, Plaban Kumar | *Ph.D.(IIT Kharagpur)*, Natural Langauge Processing in Education, Artificial Intelligence in Education, Computer Aided Education |
| Das Mandal, Shyamal Kumar | *Ph.D.(Jadavpur Univ)*, Speech and Signal Processing, Pedagogy of teaching learning process |
| Mohanty, Atasi | *Ph.D.(Utkal University)*, Educational Psychology Teacher Education HRD, Cognitive Psychology Human Resource Development Health & Counselling Psychology, Educational Psychology Teacher Education |

***Visiting Faculty***

| | |
|---|---|
| Paik, Jiaul Hoque | , |

***Thrust Areas***

1. The center has produced nearly 4,800 hours of video courses in various engineering subjects. These are in use in more than 250 engineering colleges, universities and R & D laboratories. These courses are primarily used for self-learning by faculty, staff and students. Significant demand for them exists in overseas markets also. CD & DVD versions of these courses are available. CET is now also making the courses available on HDDs – to be used in the Video-on-Demand (VOD) mode by institutions within their internal LAN. This allows access to any course on the LAN to a large number of users at any point of time along with the ability to control all normal play functions at will. More than 3700 users access these courses on any single day within the LAN of IIT Kharagpur.
2. Instructional Design; Technology Enhanced Learning; Teaching-Learning Process; Distance Education; Speech and Image processing; Speech Technology development for Indian Language and ICT application; Cognitive Psychology & Human Resource Development; E-learning; Natural Language Processing for e-Learning; Artificial Intelligence in Education;

***Brief Description of on-going activities***

CET, IIT Kharagpur is offering an M.Tech Programme on “Multimedia Information Processing”. Students with B.Tech./B.E. or equivalent qualification in CSE/ECE/EE/Instrumentation Engineering /IT are eligible to apply. CET also offers Ph.D and M.S. programmes in both, areas related to educational pedagogy and in Speech and Image processing. Research scholars are already working in these areas. 12 research scholars are already working in the area of Educational Technology and Speech Processing.

Ongoing Sponsored Projects : 1) National Program on Technology Enhanced Learning - CET, IIT Kharagpur has already developed more than 200 courses as a part of NPTEL phase I & II. 2) Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning. 90 courses have been completed in the pilot phase. The main phase program with objective of development of 200 courses has been started. These courses consist detailed curriculum documents with instructional objectives, assessment and references to learning resource materials. 3) Language Technology for E-learning Applications 4) Centre organized several faculty development programs on "Faculty development Programme for Effective Teaching" under TEQIP-II

***Academic Performance***

| | |
|---|---|
| Member - Professional Bodies | 12 |
| Member - Editorial Board | 5 |
| Sponsored Research Projects | 9 |
| Patents (filed / granted) | 1 |
| Seminars, Conferences and Workshops Organised | 2 |
| Short-Term Courses and Training Programmes organised | 2 |
| Papers Published in Journals | 4 |
| Papers Presented in Conferences | 11 |

# Centre for Oceans, Rivers, Atmosphere and Land Sciences

***Head***
Prof. Arun Chakraborty

***Associate Professors***

| | |
|---|---|
| Chakraborty, Arun | *Ph.D (IIT Delhi)*, Ocean Dynamics and Ocean Circulation Modeling of the Bay of Bengal, Data Assimilation |
| Dash, Mihir Kumar | *Ph.D. (Gujarat University)*, Satellite Oceanography, Mesoscale Ocean Modeling, Cryospheric Studies |
| Mandal, Manabottam | *Ph.D.(IIT Delhi)*, Observations and modeling of land surface processes, Modeling of extreme weather events - tropical cyclones and thunderstorms, Regional climate modeling, Cloud Microphysics, Mesoscale and land surface data assimilation |
| Satyanarayana, Achanta Naga Venkata | *Ph.D (BHU)*, Atmospheric Boundary layer: Observations Modeling, Meso-scale Modeling of weather events (e.g. Thunderstorms Monsoon), Air Sea Interactions, Monsoon Meteorology, Air Pollution Modeling |

***Assistant Professors***

| | |
|---|---|
| Jayanarayanan, K. | *Ph.D.(Univ. Bremen, Germany)*, Numerical modelling of Ocean and Atmosphere, Atmospheric Chemistry and Physics, Physical Oceanography, Climate Change and Climate modelling |
| Shaji, C | *Ph.D. (IIT Delhi)*, Climate Variations, Ocean Modeling and Analysis, Coastal Processes, Monsoon Oceanography |

***Thrust Areas***
1. Ocean modeling for Bay of Bengal, Indian Ocean and North Indian Ocean
2. Observation and modeling of thunderstorm
3. Modeling and prediction of tropical cyclone
4. Study of Forest Biomass and Carbon Sequestration
5. Monsoon Meteorology
6. Air pollution study
7. Observations and modeling of land surface processes
8. Mesoscale and land surface data assimilation
9. Cloud Microphysics
10. Cryospheric Studies
11. Satellite Oceanography
12. Regional Coupled Modeling for extreme weather events study

***Brief Description of on-going activities***
The Centre is established in March 2005 with a vision to impart quality education in Earth System Science & Technology and conduct advance research on the multi-disciplinary aspects of earth and climate sciences with major focus on Land-Ocean-Atmospheric sciences interactions. Since 2006, the centre is offering M.Tech. degree in Earth System Science and Technology. The Centre has been actively participating in various programs of research and application importance at national and international levels. Beside, M.Tech. degree in Earth System Science and Technology the Centre is also offering Ph.D. and MS degrees. The Centre has set its goals, made strategies to meet the goals in phases in corroboration with the Institute's broad vision. The Centre is leading Digital Earth Initiative of the Institute and gearing up for the development of a meso-scale Land-Ocean-Atmosphere coupled model, especially to suitable for Indian sub-continent for better understanding. The Centre aims at being a hub in the Global network of

organizations involved in multi-disciplinary earth system studies and research; also contributing to the national development by informing the policymakers of the technological and scientific advancements in the field. The Centre has prepared a visionary road map and planned to execute in stages towards achieving the broad objectives; i.e., excellence in advanced teaching and research in earth system and climate studies.

***Academic Performance***

| | |
|---|---|
| Fellow - Professional Bodies | 2 |
| Member - Professional Bodies | 20 |
| Member - Editorial Board | 7 |
| Doctoral and MS Degrees Awarded | 5 |
| Sponsored Research Projects | 16 |
| Consultancy Projects | 2 |
| Seminars, Conferences and Workshops Organised | 1 |
| Papers Published in Journals | 28 |
| Papers Presented in Conferences | 28 |

# Cryogenic Engineering Centre

***Head***
Prof. Parthasarathi Ghosh

***Professors***

| | |
|---|---|
| Bandyopadhyay, Syamalendu Sekhar | *Ph.D.(IIT Kharagpur)*, Natural gas processing, Carbon dioxide capture and sequestration, Air breathing propulsion, Separation processes |
| Chowdhury, Kanchan | *Ph.D.(IIT Kharagpur)*, Helium Liquefier and Refrigerator, Cryogenic Air Separation, Prevention of Fire in Oxygen-rich systems, Electrostatics and Safety, Heat Exchanger, Refrigeration Technology and Cold Storage, Closed Cycle Cryorefrigerator |
| Rao, Vutukuru Vasudeva | *Ph.D.(IIT Madras)*, Vacuum Technology, Cryogenic Engineering, Applied Superconductivity |

***Associate Professors***

| | |
|---|---|
| Adyam, Venimadhav | *Ph.D.(IISc. Bangalore)*, Multiferroics Spintronics Multicaloric cooling Nanomaterials and Thin film batterries |
| Ghosh, Parthasarathi | *Ph.D.(IIT Kharagpur)* , Low Temperature Processes and equipment, Cryogenic rotating machines, Large scale helium refrigeration and liquefaction systems |

***Assistant Professors***

| | |
|---|---|
| Ghosh, Indranil | *Ph.D.(IIT, Kharagpur)*, Compact Heat Exchangers, Heat Transfer in Porous Media, Sorption Cooling |
| Nandi, Tapas Kumar | *Ph.D.(IIT Kharagpur)*, Perforated plate matrix heat exchanger, Cryogenic wave expander, Cryogenic rocket propulsion |
| Sandilya, Pavitra | *Ph.D.(IIT Kanpur)*, Gas hydrates, Cryochemical synthesis of materials, Cryogenic carbon capture, Storage of cryogenic liquid |

***Thrust Areas***
1. Cryogenic Engineering
2. Advanced Materials
3. Nonconventional Energy

***Brief Description of on-going activities***
Cryogenic Engineering Centre is engaged in teaching at UG and PG levels, sponsored research and consultancy remain at the core activity of the Centre.
The Centre is also active in Continuing Education through training engineers from industries, faculty from academic institutions, and scienctists from R&D oranisations by conducting short term courses and workshops in specialised areas like Cryogenic Engineering, Air Seapartio, Vacuum Technology etc.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 2 |
| Fellow - Professional Bodies | 2 |
| Member - Professional Bodies | 19 |
| Member - Editorial Board | 1 |
| Visits Abroad by Faculty Members | 2 |
| Doctoral and MS Degrees Awarded | 4 |
| Sponsored Research Projects | 16 |
| Consultancy Projects | 9 |
| Patents (filed / granted) | 1 |
| Short-Term Courses and Training Programmes organised | 2 |
| Papers Published in Journals | 21 |
| Papers Presented in Conferences | 18 |

# Materials Science Centre

***Head***
Prof. Susanta Banerjee

***Professors***

| | |
|---|---|
| Adhikari, Basudam | *Ph.D.(Calcutta Univ)*, Membrane Electrode Based Portable e-Tongue Device for Rapid Taste Characterization of Tea, Development of jute-cement concrete composites, Development of jute based geotextiles, Development of a suitable processing technique for rubber coating of jute, Development of conducting polymer based gas sensors, Polymer based drug deliverry systems, Development of volatile compound based biosensor for pest control, Development of polymer based taste sensor, Development of jute based baby diaper materials, Development of jute based fully biodegradable green composite, Ramie plantation and processing of ramie fiber |
| Banerjee, Susanta | *Ph.D.(IIT Kharagpur)*, Fluorinated High performance polymers, Membrane based separation, Hyperbranched polymers, Light emitting polymers, Polymer synthesis and characterization |
| Banerji, Pallab | *Ph.D.(Jadavpur Univ)*, Low dimensional semiconductors: Structures & Devices, Materials for energy applications such as thermoelectricity and photovoltaics, Photonics, III-V and other compound semiconductors |
| Bhattacharya, Debasis | *Ph.D.(Calcutta Univ)*, Synthesis and processing of meso porous ceramics for catalytic applications, Nano HAP for biomedical applications, High proton conductor for application in solid oxide fuel cell |
| Das, Chapal Kumar | *Ph.D.(IIT Kharagpur)*, Nanocomposites, Direct fluorination, Insitu Nanocomposites for supercapacitor Application, Polymer Blends and its compatibilization, Insitu Nanocomposites for Microwave absorbing Materials, Graphene Based Nanocomposites, Organic Inorganic Hybrid Nanocomposites, Hybrid Materials for Fuel Cell Applications |
| Jacob, Chacko | *Ph.D.(Case Western, USA)*, Materials Science/ Nanomaterials and Nanotechnology/Semiconductors |
| Majumder, Subhasish Basu | *Ph.D.(IIT Kanpur)*, Oxide gas sensors, Lithium rechargeable batteries, Natural fiber reinforced cement composites, Fly ash based ceramic products, Multiferroic thin films and composites |
| Ram, Shanker | *Ph.D.(BHU, Varanasi)*, Glasses and disordered solids, Alloys and intermetallics, Nanoceramics and hybrid composites, Magnetics and magnetocaloric materials, Ferroics and applications, Porous materials and applications, Metallic foams for biological applications, Nanofluids and nanoglues, Films, Optical materials and applications, Biomaterials, Phase transformations and phase transitions, Photonics |

***Associate Professors***

| | |
|---|---|
| Khatua, Bhanu Bhusan | *Ph.D.(IIT Kharagpur)*, Polymer-clay and Polymer-CNT Nanocomposites, Polymer Blends and Composites, Polymer Blend-Clay nanocomposites: Morphology control, Polymeric PTCR composites, Polymer-Graphene Nanocomposites, polymer-carbon nanohorn nanocomposites, Polymeric Supercapacitors, Polymer Composites for EMI Shielding Applications, Polymeric Piezoelectric Materials |

| | |
|---|---|
| Pradhan, Debabrata | *Ph.D.(IIT Bombay)*, Nanostructured Materials, Physical and Material Chemistry, Materials for Energy and Environment, Catalysis |

***Assistant Professors***

| | |
|---|---|
| Chaudhuri, Ayan Roy | *Ph.D.(IISc, Bangalore)*, Functional oxide materials for microelectronic and energy appplications, Physics of thin film growth and epitaxy, Integration of functional materials (e.g. complex oxides) to mainstream semiconductor technology, Strain and defect engineering of oxide and semiconductor heterostructures |
| Das, Rajat Kumar | *Ph.D(IISc,, Bangalore) )*, Self-assembled functional hydrogels, Stimuli responsive polymers, Self-healing elastomers with emergent material properties |
| Roy, Shibayan | *Ph.D.(IISc, Bangalore)*, Meso- and micro-scale characterization and modelling of mechanical properties of materials, Crystallographic texture evolution and processing-microstructure-property correlation of materials, High strain rate deformation and shear localization in materials, Microstructure-processing-property correlation in glass and glass-ceramics |

***Thrust Areas***

1. Nanomaterials / Nanocomposites
2. Energy Materials
3. Electrically Conducting Polymer Nanocomposites
4. Polymer Membranes for Gas Separation and Proton Exchange

***Brief Description of on-going activities***

Apart from teaching various courses in our M. Tech. Program on Materials Science and Engineering, we also teach undergraduate and post graduate level courses on basic materials science and advanced course on ceramics, polymers, and electronic materials to other departments of our Institute. So far as the research activity is concerned our Centre is engaged in development and application of novel polymers, ceramics, and semiconductor materials supported by our Institute as well as by various funding agencies. In the area of polymer materials besides polymer modification we synthesize new polymers for application as electronic materials, membranes for gas separation, nanoclay and carbon nanotube reinforced composites for automobiles and other high performance specialty applications. The Centre is now also engaged in a new field of welding thermoplastics, recycling waste polymers and direct fluorination of polymers. Apart from activities on structural ceramics, and refractories we are also investigating various research issues related to the synthesis of nano-structured oxides for ceramic gas sensor and cathode materials for lithium rechargeable batteries and hydrogen generation through water-splitting. Novel inorganic and organic semiconductor materials are being synthesized and characterized for various electronic and optoelectronic applications. MOCVD growth of InGaP epitaxial layers as well as quantum dots are also being carried out for various applications such as solar cell, etc. Another important area of research is the synthesis and characterization of wide band gap materials like SiC, ZnO and nitride semiconductors and nano materials for device applications. Multiwall carbon nanotubes are also being synthesized by CVD on silicon substrates.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 1 |
| Fellow - Professional Bodies | 1 |
| Member - Professional Bodies | 32 |
| Member - Editorial Board | 15 |
| Visits Abroad by Faculty Members | 3 |
| Doctoral and MS Degrees Awarded | 14 |
| Sponsored Research Projects | 36 |
| Consultancy Projects | 5 |
| Patents (filed / granted) | 1 |
| Short-Term Courses and Training Programmes organised | 1 |
| Books Published | 3 |
| Papers Published in Journals | 67 |
| Papers Presented in Conferences | 24 |

# P. K. Sinha Centre for Bio Energy

**Head**
Prof. Debabrata Das

**Research and Development Activities**

Research and Development activities of P.K. Sinha Center for Bioenergy during 2015-16 are as follows:

a) 13 numbers of research scholars are working under P.K.Sinha Center Center for Bioenergy , in 2015-16 session another 4 students has joined as JRF in the Center.

b) Bioenergy Micro specialization course has been started from autumn 2015 offered by P.K.Sinha Center for Bioenergy.

c) P K .Sinha Center hosting summer intern program , joint collaboration with IIT Kharagpur and UC Berkeley California from June13,2016 to August 11,2016. Two students of UC Berkeley, California will come for summer internship program under the guidance of Prof. Saikat Chakraborty and Prof Ramkrishna Sen.

d) Purchased some sophisticated equipments like New Brunswick fermenter with light illumination; CHN Analyzer, etc. for research purpose from DBT-Pan IIT Project (ICB) which is running under P.K. Sinha Center for Bioenergy .

**Infrastructure Development and new Acquisitions**
**Title and duration of conferences organized**

- School of Energy Science & Engineering and P.K.Sinha Center for Bioenergy jointly organized Research Scholar' Day on March 12, 2016

**Laurels and Distinctions awarded to faculty**

- Fellow of International Association of Hydrogen Energy 2016 was given to Prof. Debabrata Das in World Hydrogen Energy Conference (WHEC 2016), Zaragoza, Spain

- Fellow of Indian National Academy of Engineers 2015 was given to Prof. Debabrata Das at INAE Annual Session, Pune

# Reliability Engineering Centre

***Head***
Prof. V N Achutha Naikan

***Professor***

| | |
|---|---|
| Naikan, V N Achutha | *Ph.D.(IIT Kharagpur)*, Reliability and Quality Engineering, Condition Monitoring, System Simulation |

***Associate Professors***

| | |
|---|---|
| Chaturvedi, Sanjay Kumar | *Ph.D.*, Maintenance Engineeing, System Reliability Modelling and Analysis, Reliability Data Analysis, Reliability Estimation |
| Goyal, Neeraj Kumar | *Ph.D.(IIT Kharagpur)*, Software Reliability, System Reliability Engineering, Probabilistic Risk Assessment, Network Reliability, Accelerated Life Testing |

***Assistant Professor***

| | |
|---|---|
| Sarma, Monalisa | *Ph.D.(IIT Kharagpur)*, Software reliability, Big data analytics, Cloud Data Security, Human Reliability |

***Thrust Areas***

1. Software Reliability and Cloud computing
2. Condition Monitoring and Maintenance
3. Reliability Testing and Estimation
4. Probabilistic Risk and Safety Analysis

***Brief Description of on-going activities***

Experimental research is the current focus of the centre. Accelerated life testing on various engineering components and systems are being carried out in the laboratory. Fault diagnosis of mechanical rotary systems and that of electrical motors are some focus areas. A new Electrical Fault Simulator system is being utilized in the laboratory for doing experimental research on fault diagnosis of electrical motors. New sensors, thermal imaging camera and data acquisition systems are now operational and are extensively used for research in this area. Theoretical research in the areas of network reliability, big data and software quality and reliability, and refinement of maintenance models are some research areas currently in focus. Other activities include organizing short term courses on latest topics of Reliability Engineering for officers and engineers of the Industry, Defense Organizations and R & D Establishments. Safety and reliability studies of nuclear power plants and missile systems are other activities. Reliability Availability Maintainability and safety (RAMS) aspects of Indian Railways is another focus area.

***Academic Performance***

| | |
|---|---|
| Fellow - Professional Bodies | 1 |
| Member - Professional Bodies | 9 |
| Member - Editorial Board | 25 |
| Doctoral and MS Degrees Awarded | 1 |
| Sponsored Research Projects | 5 |
| Consultancy Projects | 6 |
| Patents (filed / granted) | 1 |
| Seminars, Conferences and Workshops Organised | 3 |
| Short-Term Courses and Training Programmes organised | 2 |
| Papers Published in Journals | 26 |
| Papers Presented in Conferences | 6 |

# Rubber Technology Centre

***Head***
Prof. Dipak Khastgir

***Professors***

| | |
|---|---|
| Bhowmick, Anil Kumar | *Ph.D.(IIT Kharagpur)*, Polymer Nanocomposites and Nanomaterials, Thermoplastic Elastomers and Polymer blends, New Polymer from Renewable Sources, Polymer Modification, Rubber Technology, Failure and Degradation of Rubbers, Adhesion and Adhesives, Waste Rubber Recycling |
| Chaki, Tapan Kumar | *Ph.D.(IIT Kharagpur)*, Electron beam modification of polymers, Polymer nanocomposites, Conductive rubber composites for EMI shielding application of Mobile phones and mobile towers, Waste plastics modified bitumen for highway application, Dielectric elastomer for smart functions, High Performance composite as friction materials, Shape Memory Polymer Nanocomposites |
| Khastgir, Dipak | *Ph.D.(IIT Kharagpur)*, Development of Polymer & Composites for Graded Dielctrics and High Voltage Insulation application, Polymer Composites & Nano Composites for Electrical and Electronic applications, Conductive Polymers and Composites as Super Capacitors & Sensors |
| Nando, Golok Behari | *Ph.D.(IIT Kharagpur)*, Rubber Blends and Polymer Alloys through Reactive Pocessing, Chemical modification and Grafting of Rubbers and rubber additives, Nano Material Development and Rubber Nano Composites, Rubber in strategic areas of applications such as in Automoitive tyres Cables and Biomedical applic, Guayule Natural Rubber Compounding Vulcanization and testing, TPEs and TPVs from virgin and waste polymers |
| Singha, Nikhil Kumar | *Ph.D (IIT Bombay)*, Smart self-healing and self-cleaning and shape memory Polymeric materials, Tailor-made polymer nanocomposites, Ionic Liquid in polymer synthesis, Polyurethane synthesis, Tailor-made specialty polymers via controlled / living radical polymerization, Block graft copolymers electro-active & bio-active polymers, Tailor-made Modification of polymers and Elastomers |

***Associate Professors***

| | |
|---|---|
| Chattopadhyay, Santanu | *Ph.D.(IIT Kharagpur)*, Viscoelasticity and magneto-rheology of rubber composites and polymer based nanocomposites, Preparation and evaluation of thermoelectric / stimuli-responsive nanocomposite materials, Self-assembled nanostructures from tailored block copolymer for controlled delivery, Thermoplastic Polyurethane based biomimicked hybrid scaffold for guided bone regeneration |
| Das, Narayan Chandra | *Ph.D.(IIT Kharagpur)*, Polymer nanocomposites, Conductive polymer/polymer composites and EMI shielding materials, Biodegradable polymer and polymer composites, Rheology/morphology and phase behaviour of polymer blends, Small angle X-ray and neutron scattering (SAXS/SANS) on polymers/nanomaterials/ protein/virus, Carbon nanotubes: synthesis/characterization/processing, Thermoplastic elastomers, Conjugated polymers for renewable energy application, Polymer nanocomposites for food packaging, Conductive smart textile materials, Nanocomposites for sensor and fuel cell, Synthesis of graphene and polymer nanocomposites |

| | |
|---|---|
| Naskar, Kinsuk | *Ph.D.(Univ.of Twente, The Netherlands)*, Rubber based nanocomposites, High performance Thermoplastic elastomers (TPEs) and Thermoplastic vulcanizates (TPVs), Electron beam (EB) processing of polymers and elastomers, Green Tyre Technology, Shape memory polymer alloys |

***Thrust Areas***

i) Rubber product design & development ii) Polymer blends and polymer (nano)composites iii) Synthesis of tailor-made polymers and modification polymers/rubbers iv) Green approach in polymer synthesis and technology v) Smart polymer & nanocomposites in novel applications; electrical, self-healing & biomedical applications vi) Recycling of polymers and rubbers vii) Smart textile materials for military and space applications

***Brief Description of on-going activities***

The Centre works in close collaboration with other departments and centers of this Institute and other R & D organizations in India and abroad. Several research projects sponsored by different agencies are in operation.The faculty members are engaged in different research areas : (1) Polymer composites and nanocomposites (2) Chemical modification of rubbers, (3) Thermoplastic elastomers based on novel blends and alloys, (4) Shape memory and self-healing polymer blends (5) Smart textile materials for military and space applications, (6) Conductive rubber composites for electrical and electronics application, (7) Electron beam modification of polymers (8) Rheology and processability of rubber compounds and polymer blends, (9) Polymer foam and microcellular rubber composite for various critical and industrial applications, (10) Development of rubber blends and composites for different industrial application like cable, oil seal, tank track pad, vibration isolators, high voltage insulators (11) Development of adhesives and coatings. (12) Development of biodegradable polymer and recycling of rubber and polymer (13) Controlled radical polymerization, (14) Polymer nanocomposites for food packaging, (15) Phase behavior of polymer blends, (16) Green Tire Technology, (17) Early stage crystallization of polymer in the melt and solution, (18) Development of polymers for, biomedical application,electronic applications, (19) TPEs and TPVs for advanced applications.

***Academic Performance***

| | |
|---|---|
| Member - Professional Bodies | 28 |
| Member - Editorial Board | 12 |
| Visits Abroad by Faculty Members | 11 |
| Doctoral and MS Degrees Awarded | 10 |
| Sponsored Research Projects | 21 |
| Consultancy Projects | 10 |
| Books Published | 1 |
| Papers Published in Journals | 61 |
| Papers Presented in Conferences | 32 |

# Rural Development Centre

***Head***
Prof. Virendra Kumar Tewari

***Associate Professors***

| | |
|---|---|
| Bhowmick, Pradip Kumar | *Ph.D.,D.Litt.*, Tribal & Rural Development Planning |
| Mahapatra, Subhash Chandra | *Ph.D.(IIT Kharagpur)*, Crop Production and Development Transfer & Management of Rural Technology |

***Assistant Professor***

| | |
|---|---|
| Ghosal, Somnath | , |

***Thrust Areas***
1. Development and Transfer of Technology, Resource Planning and Marketing, Tribal Development

***Brief Description of on-going activities***
A. Teaching : two courses viz. RD30002 and RD30004 at undergraduate level as professional breadth B. Research and Development: 1. Essntial oil production technology; 2. Fish feed production from non-conventional biological sources; 3. Farm level technology for processing of agricultural products. C. Extension: 1. Transfer of agricultural products processing technology; 2. Organization of training and workshops on rural technology application

***Academic Performance***

| | |
|---|---|
| Member - Professional Bodies | 15 |
| Member - Editorial Board | 3 |
| Sponsored Research Projects | 4 |
| Patents (filed / granted) | 1 |
| Seminars, Conferences and Workshops Organised | 1 |
| Papers Published in Journals | 2 |

# ACADEMIC SCHOOLS

# G. S. Sanyal School of Telecommunication

***Head***
Prof. Saswat Chakrabarti

***Professor***

| | |
|---|---|
| Chakrabarti, Saswat | *Ph.D.(IIT Kharagpur)*, Wireless Communication and Networking, Optical communication and networking, Statistical signal processing and statistical modeling of high dimensional data |

***Assistant Professors***

| | |
|---|---|
| Das, Goutam | *Ph.D.(Univ. of Melbourn)*, Optical Access Networks, Optical Data-Center Networks, Optical Communication |
| Das, Suvra Sekhar | *Ph.D.(Aalborg Univ., Denmark)*, Broadband Mobile Communications, Physical & MAC Layer, 4G, OFDM, MIMO communications, Packet Scheduling and radio resource allocation with link adaptation, Link Adaptation, heteogeneous networks Femto Cells Device to Device communication, 5G Waveform design GFDM FBMC UFMC, Multi objective optimization for radio access networks, Green radio network design |
| Ray, Priyadip | *Ph.D. (Syracuse Univ.,New York)* , http://pray.mysite.syr.edu/, Detection and estimation theory wireless communication wireless sensor networks cognitive radio |
| Sen, Debarati | *Ph.D.(IIT Kharagpur)*, Wireless Communication, 4G and Beyond, PHY and MAC Layer, Short Range Communication, Green Communication, Coherent Optical Communication |

***Thrust Areas***
1. Wireless communications and networking
2. Optical communications and networking
3. Statistical Signal Processing and Statistical Modeling of High Dimensional Data
4. Millimeter Wave Communications
5. 5G and Beyond
6. Biomedical Signal processing
7. Hybrid Optical Wireless Access Networks
8. Cognitive Radio
9. Green Communications

***Brief Description of on-going activities***
Taking all steps to ensure the introduction of a specialized MTech program in the areas of wireless communications and networks. Seven new subjects have already been launched towards this goal.
Have embarked on an ambitious program of creating a futuristic wireless test-bed with support from IIT Khargpur (SGDRI program - Rs. 2.5 crores), and multiple industry partners with a total projected budget of Rs. ~ 18 crores.

Micro Specialization Course on "Embedded Wireless Systems" is running successfully since 2015.

***Academic Performance***

| | |
|---|---|
| Member - Professional Bodies | 8 |
| Member - Editorial Board | 2 |
| Doctoral and MS Degrees Awarded | 2 |
| Sponsored Research Projects | 8 |
| Consultancy Projects | 2 |
| Patents (filed / granted) | 1 |
| Papers Published in Journals | 8 |
| Papers Presented in Conferences | 5 |

# Rajendra Mishra School of Engineering Entrepreneurship

***Head***
Prof. Partha Pratim Das

***Associate Professor***

| | |
|---|---|
| Dan, Pranab Kumar | *Ph.D.(Jadavpur Univ., Kolkata)*, Engineering Design Process, Product Development and Manufacturing, Technology Entrepreneurship |

***Assistant Professors***

| | |
|---|---|
| Bhattacharjee, Titas | *Fellow (IIM Calcutta)*, Entrepreneurial Finance, Corporate Governance |
| Bhowmick, Bhaskar | *Fellow (IIM Ahmedabad)*, Leadership and succession Strategies, Business Environment and Identifying Measures, Social Entrepreneurship |
| Chakraborty, Basab | *Ph.D.(IIT Madras)*, Smart Grid management in India, Energy Management & Entrepreneurship, E-Waste Management |
| Mondal, Majoj Kumar | *Ph.D.(IIT Kharagpur)*, Financial Economics, Banking, Product Development, Bio-Energy, Entrepreneurship |
| Prabha Bhola | *Ph.D.(IIT Kharagpur)*, Quality Management - Performance Measurement of SMEs, Entrepreneurship and SMEs, Business Analytics, Economics of Entrepreneurial Firms |
| Roy, Ram Babu | *Fellow (IIM Calcutta)*, Business Analytics, Healthcare Operations Management, Complex Networks |

***Thrust Areas***
RMSoEE has identified seven thrust areas of research and project implementations based on the strength and skill sets of faculties in the department;

A. Business Analytics
B. Health care Service delivery
C. Energy Management
D. Start up Environment and ecosystem Analysis
E. Product Design, Analytics and manufacturing
F. E-Waste Management
G. Digital Technology

***Brief Description of on-going activities***

1. Entrepreneurial outreach: RMSOEE being a department of entrepreneurship works in tandem with the aim of providing facilities to the entrepreneurs, with the help of STEP/TBI, TIETS and E-Cell, the different supporting agencies and numerous programs organized at IIT-Kharagpur.

2. STEP-TBI-TIETS works as a conduit between IIT KGP and external world to facilitate technology transfer and convert research outcomes of entrepreneurs to commercially viable propositions. This year TIETS, PRISM and MSME funded 3 start-up companies/innovators of amount Rupees 21.50 Lakh and Rupees 3.00 Lakh to individual innovators as grant money.

3. 3 Screening Committies Meeting under TIDE Scheme of DeitY, Govt. of India were organized on May 20, 2015; November 12, 2015 and March 23, 2016 in which 3 Start-ups of IIT Kharagpur have been funded for product development and commercialization of their innovations Rs. 21.5 lakh

4. The Department of Scientific & Industrial Research (DSIR) has identified IIT Kharagpur as one of its TePPOutreach cum Cluster Innovation Centre (TOCIC) for Promoting Innovations in Individuals, Start-ups and MSMEs (PRISM) scheme. Under this scheme individual innovators are encouraged to submit their project proposals on a regular basis. The proposals are evaluated and the potential innovators are supported with individual grants.

5. The school provides the entrepreneurship training to faculties and students of other Engineering/ Science an Technology schools. This year school conducted 2 FDP and 3 TEDP programs updating 40 faculties and 91 students.

6. Global Entrepreneurship Summit: It is the largest student-level entrepreneurial summit in India. The latest GES 2016 was scheduled at IIT Kharagpur from 08th-10th January, 2016.

-700 students from all over India participated.

**-Programs included:**

- Start-up Camp
- Connect the Dots
- Elevator pitch
- Empressario
- Innovation Exhibition
- Founder's Meet

7. RS Day: Rajendra Mishra School of Engineering Entrepreneurship, IIT Kharagpur has celebrated its second Research Scholars' Day "Insight 2016" on February 15, 2016 at Maitreyee Auditorium, IIT Kharagpur.
8.
   a. The occasion was graced by the esteemed presence of Prof. Devendra Mishra, Adjunct Professor, Decision Science and Marketing, Graziadio School of Business & Management, California and Founder of Media and Entertainment Alliance (MESA), Hollywood IT Society (HITS), and Bio-tech Supply Chain Management Alliance (BSMA) as the Chief Guest.
   b. Prof. K. K Guin, Dean(VGSoM), IIT Kharagpur presided over the function. Prof. Ranjan Sen, Working President of Seva Bharti has given a talk on role of analytics in developing rural India.
   c. The students presented their research through posters which evoked a lot of interest.
   d. The event closed with a visit to Product Analytic & Modelling Lab (PAM Lab) and product demonstration at RMSoEE.
   e.
9. GIAN Program: Prof Paul Lillrank of Alto University, Finland visited the school and shared his research with the PGDBA students and research scholars in the department . Prof. Ram Babu Roy, RMSoEE along with Prof Paul Lillrank of Alto University, Finland has offered a course on Healthcare Operations and Innovation under GIAN program of HRD during summer term 2016.

10. Boot Camp for Start-ups:Four Boot Camps were organized in the campus for selected students. Eminent entrepreneurs, mentors, angel investors delivered lectures and mentors some of the business models presented by the students. Dr.SuryanilGhosh along with Prof. Manoj K Mondal coordinated the entire process.

11. Mentoring:Faculty members of the school mentored increasingly large number of batches of students on their entrepreneurial ideas and ventures on regular basis.

12. Other Activities: The school is committed to design new courses in regular offerings and in Summer-Winter term schools in supporting to build up these areas. In addition to that the faculties are visting to reputed technology and management institutions in bringing the collaborated flavour for teaching and research. Faculties are also writing projects for in-house, national level and international level funding to strengthen the application areas. The academic team is designing teaching labs, research labs, and application labs to support the research and teaching activities in these identified and related fields.

***Academic Performance***

| | |
|---|---|
| Member - Professional Bodies | 4 |
| Member - Editorial Board | 6 |
| Visits Abroad by Faculty Members | 3 |
| Sponsored Research Projects | 15 |
| Technology Transferred | 1 |
| Seminars, Conferences and Workshops Organised | 2 |
| Papers Published in Journals | 18 |
| Papers Presented in Conferences | 25 |

# Rajiv Gandhi School of Intellectual Property Law

***Head***
Prof. Khushal Vibhute

***Associate Professors***

| | |
|---|---|
| Dube, Dipa | *Ph.D.(Calcutta University)*, Gender Violence, Policing in a Democratic Society, Child Rights and Protection |
| Dube, Indrajit | *Ph.D.(Calcutta University)*, Corporate Law & Governance, Environmental Governance, Competition Law |
| M. Padmavati | *Ph.D.(Central Univ. Hyderabad)*, Plant Metabolic Pathways Drug regulation Biodiversity Bioenergy IP and commercialisation |
| Raju, K. D. | *Ph.D.(JNU)*, International Law, Intellectual Property Law, International Trade Law |

***Assistant Professors***

| | |
|---|---|
| Basu, Arindam | *L.L.M.(NALSAR)*, Law and Economics, Social Ecology, Green Patent, Carbon Trading, Law of Contract |
| Shankar, Uday | *Ph.D.(Univ. of Delhi)*, Constitutional Law, Energy Law, Socio-Economic Rights, Labour and Industrial Law |
| Shreya, Matilal | *LL.M.(Case Western)*, Copyright, Legal Theory, Music Licensing |
| Shukla, Gaurav | *L.L.M (D.A.V.V. Indore)*, Direct & Indirect Taxation, International Taxation, Procedure Laws |
| Subramanian | *LLM (Germany), Ph.D.(Nagpur Univ.)*, International law, International Human Rights law, International Investment law |

***Thrust Areas***
1. Intellectual Property Law
2. Corporate Laws
3. Environmental Laws
4. Criminal Law
5. Public Law
6. International Law
7. Energy Law

***Brief Description of on-going activities***
Research in Corporate Legal Affairs with special reference to Corporate Governance under the IICA
Plant Metabolic Pathway Laboratory
Intellectual Property Education, Research and Public Outreach Program
Governing Framework of Future Cities, Ministry of Human Resource Development, Govt. of India.
Designing the Continuing Legal Education for Advocates in India, Ministry of Law and Justice, Govt. of India.
Policy Planning, Legal Assessment and Governance of Smart cities, Ministry of Human Resource Development, Govt. of India.

***Academic Performance***

| | |
|---|---|
| Fellow - Professional Bodies | 5 |
| Member - Professional Bodies | 41 |
| Member - Editorial Board | 19 |
| Visits Abroad by Faculty Members | 6 |
| Doctoral and MS Degrees Awarded | 1 |
| Sponsored Research Projects | 11 |
| Consultancy Projects | 3 |
| Seminars, Conferences and Workshops Organised | 3 |
| Short-Term Courses and Training Programmes organised | 2 |
| Books Published | 4 |
| Papers Published in Journals | 20 |
| Papers Presented in Conferences | 22 |

# Ranbir and Chitra Gupta School of Infrastructure Design and Management

***Head***
Prof. Joy Sen

***Assistant Professor***

Goswami, Arkopal Kishore *Ph.D.(Univ. of Virginia)*, Transport Infrastructure Planning and Management

***Thrust Areas***

1. Transportation engineering (Planning, design, operation and management of highways, airport and seaport infrastructure) Environmental Engineering (Planning, design, operation and management of water supply and waste management systems, Environmental Impact Assessment) Facilities Infrastructure (Urban infrastructure planning and design, Facility programming and specialized building design, building automation systems design, building management systems, regional infrastructure planning and construction) Power systems (Planning, design, operation and management of Thermal, hydel and Nuclear Power Plants, Renewable Power Plants, Power generation, transmission and distribution, power system planning and reliability) Infrastructure Project management Infrastructure Financing and Infrastructure Regulatory Issues
2. The school is focusiing on six principal thrust areas namely, a) Smart urban Health, education and economy-generating Social infrastructure; b) Transport-oriented-development (TOD) based infrastructure; c) Water resources based Economic Zone based Logistics infrastructure; d) Climate-based and disaster responsive mitigation infrastructure; e) IT-enabled and ICT driven regulatory and governance infrastructure and f) Smart Micro-Electro-Mechanical-systems driven intelligent infrastructure. The school is planning to set up and advanced Infrastructure Lab with large scale data analytic systems and a Hub foe Immersive Visual research and e-applications (HIVE) in collaboration with experts from MIT, USA and the Curtin University, Australia.

***Brief Description of on-going activities***

The school was inaugurated by Padma Bhushan Professor Lord Shusantha Kumar Bhattacharyya of Warwick Manufacturing group on 18th of August 2008 (Institute Foundation Day). An advisory Council comprising eminent experts from different fields as external experts has been constituted. The first meeting of teh advisory council meeting was held on 29th March 2009

***Academic Performance***

| | |
|---|---|
| Doctoral and MS Degrees Awarded | 2 |

# School of Bio Science

***Head***
Prof. Amit Basak

***Assistant Professors***

| | |
|---|---|
| De, Soumya | *Ph.D.(Cornell Univ.)*, Solution NMR spectroscopy, Structural biology, Macromolecular interactions: protein-protein/protein-DNA |
| Samanta, Dibyendu | *Ph.D.(Univ. of Calcutta)*, Molecular and Structural Biology, Structure-guided Protein Engineering & Protein-based Therapeutics, Structure-function Relationships of Membrane Proteins/Cell Adhesion Molecules |

***Academic Performance***

| | |
|---|---|
| Member - Editorial Board | 2 |
| Sponsored Research Projects | 2 |
| Papers Published in Journals | 2 |
| Papers Presented in Conferences | 1 |

# School of Energy Science and Engineering

***Head***
Prof. Avinash Kumar Sinha

***Assistant Professors***

| | |
|---|---|
| Ghosh, Amit | *Ph.D.(IISc Bangalore)*, Quantitative Metabolic Systems Biology, Metabolic Engineering and Synthetic Biology, Molecular Dynamics Simulation |
| Puravankara, Sreeraj | *Ph.D.(Univ. of Muenster, Germany)*, Energy Storage, Battery materials, Solid State Chemistry |

***Thrust Areas***
1. Conventional Energy: Mechanical, Chemical, Electrical and Renewable Energy: Solar PV, Solar Thermal, Wind, Bio and Organic Storage Technology

***Brief Description of on-going activities***
Energy Science & Engineering is newly formed school to consolidate the research and academic activities of the Institute in the interdisciplinary area of Energy Science and Engineering. Initial emphasis has been on setting up labs for research activities of various area of Energy. A high end Solar Simulator has already been installed. The recruitment of faculties have been initiated and two of them are expected to join soon. Ph. D. programs have been started and already five Ph.D. students are on roles.
A M.Tech program started 2015-16 academic session . A 40KWp Solar PV (SPV) system is being installed using various type of technologies. Laboratory set-ups for research in the areas of Bio-energy, Solar PV cells and systems, wind energy etc. are getting ready.
1. Dr Sreeraj Purvankara was Co-convener for the workshop on “Li-ion battery technology and Mathematical modelling” , 16th – 18th May 2016, IIT Kharagpur.

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 1 |
| Member - Professional Bodies | 1 |
| Member - Editorial Board | 2 |
| Sponsored Research Projects | 2 |
| Papers Published in Journals | 6 |
| Papers Presented in Conferences | 2 |

# School of Environmental Science and Engineering

***Head***
Prof. Jayanta Bhattacharya
***Thrust Areas***

1. Water and Wastewater treatment
2. Water, Sanitation and Health
3. Air pollution
4. Solid waste management specifically electronic waste management and Acid mine drainage
5. Submarine Groundwater Discharge

***Brief Description of on-going activities***
River Water Quality Evaluation for River-Based Piped Water Supply Scheme Sponsoring agency: Water and Sanitation Support Organization (WSSO), Department of Public Health Engineering, Government of West Bengal.
Study of GCV profiling of coal at National Thermal Power Corporation, Farakka Sponsoring agency: NTPC
Study of GCV profiling of coal at National Thermal Power Corporation, Kahalgaon Sponsoring agency: NTPC

# School of Medical Science & Technology

***Head***
Prof. Suman Chakraborty

***Professor***

| | |
|---|---|
| Guha, Sujoy K | , |

***Associate Professors***

| | |
|---|---|
| Bhattacharya, Sangeeta Das | *MD (Johns Hopkins Univ.)*, Evidence Based Health Policy, Internal medicine and Pediatrics, Vaccine preventable diseases in HIV infected children, Global Health, Development of College Mental Health Programs in the Indian Scenario |
| Chakraborty, Chandan | *Ph.D.(IIT Kharagpur)*, Statistical Computing & Predictive Analytics, Machine Learning for Computer Aided Diagnosis (CAD), Medical Image Analysis, Point-of-Care Diagnosis for Smart Healthcare |
| Chatterjee, Jyotirmoy | *Ph.D. (Burdwan Univ.)*, Multimodal Imaging & Analysis for Wound & Cancer Theranostics Regeneration Traditional Medicines |
| Chaudhury, Koel | *Ph.D.(Delhi)*, Women's health, Respiratory health, Proteomics and metabolomics for biomarker discovery and understanding disease pathogenesis, Nanomedicine, Omics integrated systems biology |
| Das, Soumen | *Ph.D (IIT Kharagpur)*, MEMS BIOMEMS Microfluidic devices and Microsystem Technology, Flexible sensors, Electro-physiological characterisation of biospecies, Medical electronics |
| Dhara, Santanu | *Ph.D.(IIT Kharagpur)*, Biomaterials and Regenerative Medicine: Fabrication-Bioactivation-Biological assay, Customized implant development, Bioactivation of Implant, Tissue Engineering, Near Net Shape Forming, Green machining, Medical Textile, 3D printing and Patterning, Dense and Porous Implants |
| Mandal, Mahitosh | *Ph.D.(Jadavpur Univ.)*, Cancer Biology, Signal Transduction, Apoptosis, Cell Cycle, Angiogenesis, Drug Delivary, Multi Drug Resistance, Cancer Stem Cell |
| Manjunatha M | *Ph.D. (IIT Madras)*, Bioinstrumentation and Biosensors, Functional Electrical Stimulation of Nerve and Muscle, Medical Imaging / Bio-Signal Processing, Neural Engineering and Retinal Prosthesis, Bio-Robotics and Neurorehabilitation |
| Mitra, Analava | *Ph.D.(IIT Kharagpur)*, Natural Products Research, cognitive function mapping, Signals in disease control, Pharmacoepidemiology |

***Assistant Professor***

| | |
|---|---|
| Chakravorty, Nishant | *Ph.D. (Queensland Univ. of Technology)*, Stem Cells, Tissue Engineering, Regenerative Medicine |

***Thrust Areas***

1. Multimodal Medical Imaging & Image Processing
2. Medical Instrumentation
3. Microfluidics for healthcare applications
4. Bio-MEMS & Biomedical sensors
5. Medical Statistics & Pattern Recognition
6. Medical Expert System

7. Tissue Engineering, Regenerative Medicine, Stem cells and Bio-Materials
8. Signal Transduction, Proteomics and reproductive health
9. Signals in disease and health
10. Cognitive function study
11. Pediatrics HIV
12. Customized implant fabrication
13. Wound healing, Pre-cancer, Non-invasive characterization and Theranostics
14. Molecular mechanisms of chemo and radio resistance in cancer, cancer stem cells
15. Cancer Therapeutics and Targeted drug delivery
16. Traditional medicine
17. Integrated biomarker discovery

***Brief Description of on-going activities***

• Development of micro-fluidic Biochips / Bio-MEMS for medical application. • Laser speckle imaging of blood-flow in microcirculation. • Development of statistical analyzer & disease pattern recognizer for Oral Pre-cancer and cancer. • Design of an intelligent diagnostic tool through the extraction of diagnostic rules for asthma. • Proteomics and reproductive health • Vaccine preventable diseases in HIV infected children • Bioimpedance based toxin detection • Polymer based flexible electronics for healthcare application • Integrated macro & micro-imaging on various healing & non-healing wounds including oral & breast precancer & cancer for their early characterization through image processing & analysis • Development of detailed database on respiratory rhythms for identifying their temporal & spatial characteristics in health & disease. • Development of biodegradable scaffold for tissue engineering and wound research. • In vitro screening of anti-diabetes molecules. • Design of a three dimensional scaffold and drug delivery system in arthritic hip joint. • Signal Transduction and cancer biomarker • Oxidative stress and Infertility • Development of natural antioxidant nanoparticles • Proteomics and Metabolomics in Reproductive Health • Neutraceuticals and Herbal medicine • Fiber-Cell construct/Tissue Analogues Comprising Cell Laden unit and Process for Manufacturing thereof • Net Shape Forming via Plastic Dough Processing of Polymer-Metal Powder Blend and applications thereof • Deciphering the molecular mechanism of chemo & radio resistance in cancer with special thrust on novel avenues like cancer stem cell, autophagy & epigenetics • Novel targeted drug delivery systems like liposome, exosome and nano-particles. • Multimodal evaluations of of precancers and cancers • Wound healing using natural healing agents (e.g. honey incorporated silk fibroin/ honey dilutions) both in vitro and in vivo • Exploring molecular attributes in wound healing and oral cancer and pre- cancer progression related to cancer hallmarks. • Live tissue Printing, Placenta derived extracellular matrix, Near Net shape forming of Titanium implants • Exploring the role of microRNAs in beta-thalassemia • Developing implants with superior osseointegrative properties

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 10 |
| Fellow - Professional Bodies | 3 |
| Member - Professional Bodies | 40 |
| Member - Editorial Board | 21 |
| Visits Abroad by Faculty Members | 7 |
| Doctoral and MS Degrees Awarded | 7 |
| Sponsored Research Projects | 48 |
| Consultancy Projects | 2 |
| Patents (filed / granted) | 12 |
| Seminars, Conferences and Workshops Organised | 5 |
| Short-Term Courses and Training Programmes organised | 2 |
| Papers Published in Journals | 79 |
| Papers Presented in Conferences | 53 |

# School of Nano Science & Technology

***Head***
Prof. Samit Kumar Ray

***Academic Performance***

| | |
|---|---|
| Sponsored Research Projects | 1 |
| Papers Published in Journals | 2 |

**Research and Development Activities**

About fifty faculty members across 12 different Departments / Centres are associated with the newly created school working in the area of nanoscience.

- The faculty members are involved in the research activities in the broad areas of

  - Nanofabrication / Nanoelectronic & Photonic Devices / NEMS / Nanosensors;
  - Bulk nanostructured materials for structural applications,
  - Novel nanomaterials : Synthesis, self-assembly and applications;
  - Nanostructured coatings for energy conversion/storage and surface engineering,
  - Nano-biotechnology,
  - Computational nanostructures,
  - Soft Nano Technology etc.

- The school has recently established two new facilities, viz. Spark Plasma Sintering (SPS) of nanopowders for fabrication of compacts and Electron Beam Lithography (EBL) System for fabricating nanoelectronic devices

- **Journal Publications** by the Research scholar and Faculty members affiliated to the school:

  - A. Midya, R. Ghosh, S. Santra, S. K Ray, P. K Guha "Reduced Graphene Oxide-Rose Bengal Hybrid Film for Improved Ammonia Detection with Low Humidity Interference at Room Temperature" Mater. Res. Exp. 2016, 3, 025101.
  - A. Midya, A. Ghorai, S. Mukherjee, R. Maiti, S.K Ray "Hydrothermal Growth of Few Layer 2H $MoS_2$ for visible light photodetection and photocalysis" J. Mater. Chem. A. 2016, 4, 4534 – 4543.
  - A. Midya, N. Gogurla, S. K Ray "Flexible and Transparent Resistive Switching Devices using Au Nanoparticles Decorated Reduced Graphene Oxide in Polyvinyl Alcohol Matrix" *Curr. Appl. Phys.* 2015, 15,706–710,
  - Ravindra Jha, Sumita Santra, Prasanta Kumar Guha, Green Synthesis Route of WS2 Nanosheets using Water Intercalation Material Research Express(accepted on 18 December 2015 )

- **Conference publications** by research scholar and Faculty members affiliated to the school

  - Debasree Burman · Ravindra Kumar Jha · Sumita Santra · Prasanta Kumar Guha; Exfoliated MoS2 Based Humidity Sensing ; Proceedings of International Conference on Materials Science & Technology 2016 (ICMTECH 2016), Vol.1, Page No. 47-48[University of Delhi, New Delhi 1st March-4th March]
  - Ravindra Kumar Jha, Raghubeer Singh, Debasree Burman, Sumita Santra,and Prasanta Kumar Guha; A Novel Technique to Synthesize Monolayers ofWS2 : A Low Boiling Point Liquid ExfoliationApproach; Proceedings of International Conference on Materials Science & Technology 2016 (ICMTECH 2016), Vol. 1, Page No. 63-64[University of Delhi, New Delhi 1st March-4th March]

- Debasree Burman, Ravindra Kumar Jha, and Prasanta Kumar Guha; MoS2 Based Resistive Humidity Sensor; Proceedings of International Conference on Nanoscience and Technology (ICONSAT 2016) [IISER, Pune, Pune 29th Feb-2nd March]
- Ravindra Jha, Debasree Burman, Sumita Santra, and Prasanta Kumar Guha; Densification of WS2 via Spark Plasma Sintering for Morphological Modification; Proceedings of International Conference on Nanoscience and Technology (ICONSAT 2016)[IISER Pune, Pune 29th Feb-2nd March]
- A. Ghorai, A.Midya, S.Mukherjee, R.Maiti and S.K.Ray, "Visible photon detection and photo catalytic activity of 2-dimentional molybdenum disulphide ($MoS_2$)" National Workshop on Advances in Photonics, IIT KGP, Nov 14-16(2015), Page no. 45.
- S. Bera, A. Midya and S.K Ray "Improved Photovoltaic Characteristics of CZTS Nanocrystals and Graphene Nanocomposites, ICMAT2015 & IUMRS-ICA2015, Singapore, 28th June to 3rd July 2015 "
- A. Midya, A. Ghorai, S. Mukherjee, R. Maiti, S. Ray "High Yield Synthesis of $MoS_2$ Layer in Solution Phase for Optoelectronic Studies" ICMAT2015 & IUMRS-ICA2015.

# School of Water Resources

***Head***
Prof. Ashok Kumar Gupta

***Assistant Professors***

| | |
|---|---|
| Sahoo, Bhabagrahi | *Ph.D.(IIT Roorkee)*, Water Management, Flood Analysis, Meso-scale Solute Transport Dynamics, River Basin Management, Hydro- and Agro-meteorology, Soft Computing in Hydrology, Ecohydrology, Surface water - groundwater interaction |
| Tiwari, Manoj Kumar | *Ph.D.(IIT Kanpur)*, Advanced oxidation processes, Fate and transport of pollutants in water and soil mediums, Treatment of hazardous and persistent pollutants in surface and ground waters, Contaminated site management, Water/Wastewater treatment, Development of analytical protocols, Water Supply and Distribution, Water Budgeting and Water Footprint, Water Quality Sensors Devlopment, Wastewater recycling and reuse |

***Thrust Areas***

1. Urban, Sub-urban, Rural water management (Drinking water supply network optimization, pipeline leakage detection, monitoring and supervisory control using instrumentation; Household waste water conservation, reuse and recycling; Disposal of runoff generated from rainfall: Urban flooding and its management)
2. Water economics, pricing and policy (Economics of water supply systems; Domestic and industrial water pricing models; Economics of agricultural water consumptions; Policy framework development)
3. Surface water – groundwater interaction (Conjunctive water use and management in irrigation; Seawater – surface water – groundwater interaction; Impact of over extraction of groundwater on the base flows of rivers)
4. Impact of anthropogenic activities and possible climate change on water resources (Effect on different river basins and urban regions of the country)
5. Water quality management at River basin and Urban scales
6. Hydroinformatics in: Urban water supply and waste water disposal / flood management; Real-time flood prediction over small, medium and large-scale domains; Sensor networking for water related data collection, transmission, storage and processing
7. System approach for water resources management

***Brief Description of on-going activities***

“Development of a 1-D Transient Conservative Pollutant Transport Model for Meso-scale Application” (Sponsor: SRIC, IIT Kharagpur under ISIRD to Dr. B. Sahoo)

"Land Use Land Cover Dynamics in Relation to Human Dimensions and climate change in Mahanadi, Ganga and Brahmaputra River Basin" (Sponsor: Indian Institute of Remote Sensing, ISRO, Dehradun)

"AI-based prediction of storm and inundation from Doppler weather radar" (Sponsor: MHRD, GoI)

"Management of Urban Water Supply Network: Technical, Economic, Feasibility Assessment, and Ensuring Losses Controls and Sustainability" (Sponsor: MHRD (FOC))

"Development of Eco-friendly Treatment Systems for Reuse of Greywater" (Sponsor: SRIC, IIT Kharagpur under ISIRD to Dr. M.K. Tiwari)

"Design of Concept Plan for the Treatment of Acidic Mine Water" (Sponsor: Phoenix Projects Pvt. Ltd)

***Academic Performance***

| | |
|---|---|
| Member - Professional Bodies | 8 |
| Member - Editorial Board | 1 |
| Doctoral and MS Degrees Awarded | 1 |
| Sponsored Research Projects | 5 |
| Consultancy Projects | 1 |
| Short-Term Courses and Training Programmes organised | 1 |
| Papers Published in Journals | 4 |
| Papers Presented in Conferences | 4 |

# Vinod Gupta School of Management

***Head***
Prof. Kalyan Kumar Guin

***Professors***

| | |
|---|---|
| Guin, Kalyan Kumar | *B.Tech.(IIT Kharagpur)*, |
| Rajib, Prabina | *Ph.D.(IIT Kharagpur)*, Corporate Finance, Derivatives ( Financial & Commodity), Indian Capital Market |
| Sinha, Gautam | *Ph.D.(IIT Kharagpur)*, |
| Teltumbde, Anand | , |

***Associate Professors***

| | |
|---|---|
| Datta, Biplab | *Ph.D (IIT Delhi)*, Marketing Management, Leadership and Teamwork, Services Marketing, Customer Relationsip Management |
| Mishra, Chandra Sekhar | *Ph.D.(Utkal University)*, Financial Reporting and Analysis, Mergers and Acquisitions, Business Valuation, Financial Markets |
| Misra, Arun Kumar | *Ph.D.(IIT,Mumbai)*, Capital Market, Financial Markets, Commercial Banking, Corporate Finance, International Finance, Risk Management, Financial Economics, Competition Assessment |
| Pradhan, Rudra Prakash | *Ph.D.(IIT Kharagpur)*, Development Finance, Infrastructure Finance, Financial Markets, Financial Analytics, Financial Econometrics |
| Sahney, Sangeeta | *Ph.D.(IIT Delhi)*, Marketing Management, Consumer Behavior, Services Marketing, Sales and Distribution Management, Organizational Behavior, Quality in Education, Services Quality |

***Assistant Professors***

| | |
|---|---|
| Ahmad, Wasim | *Ph.D. (Univ. of Delhi)*, Macroeconomics, International Trade and Finance, Energy Economics, Applied Econometrics |
| Barai, Parama | *Fellow (XLRI, Jamshedpur)*, |
| Bhattacharya, Sujoy | *Ph.D.(IIIT&Mgt, Gualior)*, Data Analytics, Option Pricing, Quantitative Marketing |
| Chandra, Abhijit | *Ph.D. (Jamia Millia Islamia, New Delhi)*, Corporate Finance, Behavioral Finance, Asset Pricing, Financial Markets |
| Malik, Aradhna | *Ph.D.(Univ of Denver)*, Communication Disorders, Intercultural Communication, Human Technology Interaction, Management of Public Health, Neuro Linguistic Programming (NLP), Ageing, Orality |
| Mukherjee, Tuheena | *Ph.D.(IIT Delhi)*, Social Psychology, Industrial Psychology and Human Resource Management |
| Mukhopadhyay, Susmita | *Ph.D.(Calcutta Univ.)*, Organizational Health and spiritual health, Human Resource Management, Business Ethics, Organizational and behavioural issues Microfinance, Competency Mapping, HR analytics, Employee voice, Employee engagement, Talent management, Soft issues in Knowledge transfer, Job crafting |

| | |
|---|---|
| Nag, Barnali | *Ph.D.(IGIDR, Mumbai),* |
| Sarkar, Ashutosh | *Ph.D.(IIT Kharagpur),* |

***Visiting Faculty***

Ghosh, Kunal Kanti *M.Tech.(IIT Kharagpur),* Supply chain management

***Thrust Areas***

1. Big Data Analytics including Financial Analytics, Marketing Analytics and HR Analytics
2. Banking, Derivatives and Risk Management, Micro finance
3. Management of Family Businesses and Start-ups

***Brief Description of on-going activities***

Currently offering MBA, EMBA, MS, Dual Degree (B Tech + MS in Financial Engineering) and Ph.D. degrees.
Launched VGSoM Working Paper Series in February 2010.
Conducting Management Development Programs and In-House Training Programs for various industries.
VGSOM has been selected as the coordinating department for Post Graduate Diploma in Business Analytics (PGDBA) programme be offered from 2015-16 jointly by IIT Kharagpur, IIM Calcutta and Indian Statistical Institute.
Conducting FDPs, AICTE - QIP for faculty members of other institutes.
Micro and thin specialisation subjects in business analytics
Conducting Global Initiative of Academic Networks (GIAN) Courses.
Conducted three successive Management Development Programmes jointly with RGSOIPL for senior level executives of Ordnance Factory Board in 2015-16

***Academic Performance***

| | |
|---|---|
| Awards & Honours | 2 |
| Member - Professional Bodies | 29 |
| Member - Editorial Board | 60 |
| Visits Abroad by Faculty Members | 7 |
| Doctoral and MS Degrees Awarded | 8 |
| Sponsored Research Projects | 15 |
| Seminars, Conferences and Workshops Organised | 3 |
| Short-Term Courses and Training Programmes organised | 9 |
| Books Published | 1 |
| Papers Published in Journals | 35 |
| Papers Presented in Conferences | 9 |

# CENTRALIZED SERVICES UNITS

# Advanced Technology Centre

***Head***
Prof. Sunando DasGupta

***Visiting Professor***

| | |
|---|---|
| Roy, Jatindra Nath | Advance MOSFET Device & Circuits and Solar PV & Thermal, Solar Photovolataic Solar Thermal VLSI |

***Academic Performance***

| | |
|---|---|
| Fellow - Professional Bodies | 3 |
| Member - Professional Bodies | 1 |
| Member - Editorial Board | 2 |
| Sponsored Research Projects | 2 |
| Papers Published in Journals | 3 |
| Papers Presented in Conferences | 1 |

**LABORATORIES / CENTRES INVOLVED IN ATDC**

a) MEMS and Microelectronics Laboratory
b) MEMS Design Centre
c) Microphotonics Laboratory
d) Micro-fluidics Laboratory
e) Kalpana Chawla Space Technology Cell
f) Microscience Laboratory
g) Advanced VLSI Laboratory
h) Advanced Laboratory for Plant and Genetic Engineering
i) Communication Empowerment Laboratory
j) General Motors Collaborative Research Laboratory
k) P.K. Sinha Centre for Bio-energy
l) Centre for Railway Research
m) Centre for theoretical Studies

**RESEARCH AND DEVELOPMENT**

**Brief descriptions of on-going activities:**
Micromachining and MEMS are one of the major areas of research at Advanced Technology Development Centre. In addition to that, the fabrication of silicon and non silicon based microelectronic / microphotonic devices and ICs are also focused area of research at different laboratories under ATDC. Several government departments including NPSM/ADA, ISRO, DRDO, DST and BARC have funded projects to develop smart sensors and their interfacing circuits for special applications. During the last one year the MEMS devices developed in the laboratory include silicon piezoresistive, capacitive as well as tunneling accelerometer. The technology for fabrication of silicon accelerometer has been transferred to Semiconductor Complex Limited, Chandigarh. Activities have been started on development of high sensitive MEMS accelerometer based on quantum tunneling phenomena and silicon MEMS pressure sensor.Design and development of MEMS based micropropulsion devices for micro/nano satellite programme such as accelerometer

The MEMS design laboratory, a national facility created under NPSM programme is actively involved with design work on MEMS including microfluidic devices. A number of students from various departments like ATDC, E & ECE, Electrical, Mechanical, Biotechnology, Material Science Department/Centre are involved in the Design Centre to do their project/thesis works. Other academic Institutions like IIT Bhubaneswar are also involved in the Design Centre.

Research and development is also undertaken in the field of Integrated Optics& Micro-Photonics. An integrated-optic design software have been developed and copyrighted. This software can design single-mode step-index and graded

index waveguides along with bending losses and mode profiles. Fabrication and characterization of titanium indiffused lithium niobate waveguides, directional couplers, power splitters, switches for fiber-optic communication networks have been performed.Recently polymer based microstructures for microphotonic applications have been developed in the centre. Polymer integrated-optic waveguides have been fabricated and characterized in the centre for possible applications in passive devices.

Research is being carried out on thin film nanostructures, semiconductor, ferroelectric and magneto-resistive films for microelectronics and sensor applications under various government sponsored projects at MicroScience Laboratory of Dept. of Physics & Meteorology. A number of thrust areas have now emerged based on core competency available in the Advanced VLSI Laboratory. These include analog and RF circuits, wireless communication and Baseband processing, direct conversion receivers, power management circuits, processors and IP cores for embedded applications and design for testability. More than 60 different chips have been fabricated and tested. 15 leading companies have joined the AVLSI Consortium. More than 12 ongoing collaborative research projects funded by the Govt. of India and leading companies including National Semiconductors, Intel, Synopsys, Infineon, Texas Instruments, Si2 Microsystems, Agilent, Tessolve, Analog Devices and General Motors.The laboratory also offers regular intensive training to students of IIT Kharagpur. Buoyed by these initial successes, the laboratory is striving to attain still higher levels of excellence. Research directions are diversifying to new areas of mixed-signal SOCs, IP cores for embedded applications and analog DFT..

Microfluidics group of the centre focuses on several cutting edge research topics like healthcare technologies, and on-chip power generation. They are currently working on two devices namely lab-on-a-compact-disk (LOCD) and ‘paper and pencil’ based microfluidic platform.We have developed lab-on-a-CD device aiming towards inexpensive diagnosis of malaria, which holds the potential of eliminating the stereotype clinical methodologies. Currently, we are working towards the optimization of lab-on-a-CD device for haemoglobin-based disorders by the exploiting the rheological properties of blood. The ‘paper-and-pencil’ based devices, developed by us, provide an inexpensive, efficient remedy for spot diagnostics considering the mass usage. We have illustrated the flow characteristics on such ‘paper-and-pencil’ devices and its subsequent use for mixing of two analytes.We have also delineated the utility of the ‘paper-and-pencil’ device for simultaneous detection of multiple analytes. We believe that the aforementioned microfluidic devices hold the potential ofcircumventing the disadvantages of the stereotype clinical practices, and thus ushering in a new paradigm of efficient and affordable diagnostics.We are currently in process of developing another device namely ‘plant-on-chip’ aiming on-chip power generation, by utilizing the streaming potential generated, due to the flow of an electrolyte solution within the micro-conduit.

BioMEMS is a rapidly advancing, inter-disciplinary research field for creation and development of new methods/systems to effectively process or manipulate biological materials with electronic devices and components. Giving a prior importance to the biomedical sensing research, an interdisciplinary R&D work has been initiated to promote MEMS and Biosensor activity that encompasses design, fabrication and engineering of biomedical & microfluidic devices for its electro-physiological characterisation. For the evaluation of electrical and physical properties of bio molecules and cells using suitable micro-fluidic devices, appropriate fabrication of polymeric coated bio-MEMS are being investigated and its utility are evaluated under different microscopic and electrical impedance study. The research also involves development of different BioMEMS transducers and related technologies for sensing various biomedical signals for precise and appropriate diagnostics and therapeutics. Microfabrication technology is being explored to develop various miniature MEMS devices for deployment of in-vivo and in-vitro detection of biomedical signals and its characterisation.

**Thrust Areas:**
Inertial MEMS, Micro Sensors and actuators for automobile, space, and defense applications, Micropropulsion device for micro/nano satellite application, RF-MEMS, Bio-MEMS, Optical-MEMS, Semiconductor devices, Nanotechnology, Photonics, Integrated Optics,Microfluidics, Biophotonics, Nonlinear Sciences, Theoretical condensed matter physics, Wireless communication and Baseband processing,Analog and RF circuits, Plant biotechnology.

**New Acquisitions:**
MEMS vaporising liquid microthruster, Microflow for microvalve, micropump, MEMS flow sensors, SU-8 wire Waveguide Structures, MEMS accelerometer for aircraft motion sensing. Tunneling accelerometer and Capacitive accelerometer, SU-8 smart microneedles.

**FACILITIES NEW ADDITION**
Two photon polymerization tool
Incubator for cell culturing
UV Ozonizer for Surface Oxidation.
Micro particle image velocimetry (micro-PIV)
FESEM/FIB microscope with some attachments for micro-robotics work
Pulsed Laser Deposition (PLD) System
Ultrasonicator
Picoammeter
Nanovoltmeter

# Alumni Affairs and Institutional Development (ID) Program

The alumni of IIT Kharagpur have been the global champions and brand ambassadors of the Institute. On one hand, their accomplishments across various domains have enhanced our global image and brought us recognition, while on the other their spontaneous contributions and support have constantly encouraged us to move forward. Maintaining close relations and being in constant touch with our alumni constitute one of the cornerstones of regular activities of the Institute. The Office of the Dean, Alumni Affairs & International Relations (AA&IR), the Institutional Development (ID) Program Team and the Students Alumni Cell work together to achieve this by organizing alumni events, maintaining connections through our numerous and regular communications and conduct branding and fundraising activities.

The major activities undertaken during 2015-16 are given below:

- **Alumni Connectivity:** Close and sustained connections with our alumni have been top priority for us and the alumni website iitkgp.org has been a key facilitator. Registrations on this portal have crossed the 20000 mark. We also regularly connect with the larger stakeholder group - alumni, students, faculty members, retired faculty members and parents – through our mass mailing system and keep them informed about the latest developments at or related to the Institute. Seasonal Greetings and various fund-raising campaign updates were also sent via mass mails. Mass mailers go out to more than 49000 people, up from 42000 last year. Besides, we are also connected to about 42000 alumni through the University Page on LinkedIn.

- **Branding:** In keeping with our continuous efforts to improve our global brand image, we have reached out to media regularly with news and information on research, academics, student achievements and other developments at the Institute. This systematic focus on visibility enhancement has resulted in to 260 insertions on 74 unique stories (up from 128 insertions on 27 unique stories last year) in a wide variety of media publications. Our branding activities and initiatives have received a further fillip from the establishment of the Students' Branding and Relations Cell. Among other things, this Cell has prepared videos that highlight and communicate the work in individual departments. The website why.iitkgp.ac.in for IIT aspirants and JEE qualifiers was also publicized to help them know more about Institute academics, student life and facilities.

- **Publications:** Our internal publications provide another key tool for us to share Institutional and student-related news as well as encourage participation of alumni in institutional activities. To that end, we have launched a new electronic newsletter 'Clap for KGP' which sends out positive news and achievements of the Institute and all its stakeholders. A new magazine 'IIT KGP Researcher' has also been launched and has received wide appreciation from the academic community. Other regular publications such as the Alumni Annual Report and the annual souvenir "Yearnings of Yore" were published during the Annual Alumni Meet. In additional, we published a steady stream of communication and other material such as brochures for different campaigns, Foundation Day Celebrations, Alumni ID Cards as well as separate Yearbooks for UG, PG and Ph.D students.

- **Awards:** The Distinguished Alumnus Award was conferred by the Institute to the alumni during the Annual Convocation 2015. The distinguished alumni were presented with the Award were Bedabrata Pain (1986/EC/PH): CEO Edict Inc., Chetan Vaidya (77/AR/VS): Director, School of Planning and Architecture, Delhi, Peter Chan (62/EERK): Founder and CEO, Herons Bonsai Ltd., Manoj Gandhi (82/CS/AZ): Executive VP, Verification Group, Synopsys

  Rakesh Verma (69/NA/NH): Executive VP, TAFE, Pradip Dutta (83/ME/AZ): Professor and Chairman, Department of Mechanical Engineering, IISc Bangalore, Venkatesh Shankar (84/NA/NH): Professor and Coleman Chair in Marketing Texas A&M University

- **Fundraising Campaign:** Under theInstitutional Development (ID) Program several fundraising campaigns are being carried out to build corpus through endowment mode to ensure self-sustainability in the long run. The campaigns such as Batch Endowment encourages alumni to contribute in the name of their batch, the collections on being reaching the milestone of INR 50 Lakhs, the batch is commemorated with a classroom named after the batch in the Nalanda Academic Complex. In 2015-16, the batch of 1966 became achieved this target. Hall Endowment is another campaign where alumni are appealed to donate

for the development of their Halls. Two more campaigns were launched in 2015-16 – Students Innovation Endowment and International Endowment. A campaign was also launched to support the M N Faruqui Innovation Centre. An Annual Donation Program is also being run for those alumni who prefer to donate a fixed amount every year.

- **My Imprint Program:** The 'My Imprint Class Gift' programme has been consistently promoted among the graduating students to inculcate the culture of giving back while they are still at the Institute. In 2015-16 the donating students have opted for "Installation of Campus Benches" as "Class Gift from Class of 2015".
- **Institute Website:** The Institute website has been taken under the aegis of Institutional Development Program. The team created and edited content for various section of the website.

**Events**

- **Annual Alumni Meet at IIT Kharagpur:** This is the flagship event of the Office of Alumni Affairs & International Relations. The office along with Students Alumni Cell and technology Alumni Association Kharagpur hosted the 13th annual alumni meet from 15th-17th January, 2016. The special guests of honor were the graduating batches of 1966, 1976 and 1991. The meet was attended by more than 250 alumni along with their families.
- **Foundation Day:** The 65th Foundation Day of IIT Kharagpur was celebrated on August 18, 2015. The Chief Guest was Dr. S Christopher, Director General of the Defense Research and Development Organization, India. In an open house, Dr. Christopher shed light on his journey after graduating from the Institute. Like every year on the occasion of Institute Foundation Day, faculty and staff members who completed 25 years of service were felicitated by the Director. Ms Sujata Roy, the Vice President of IIT Foundation India also graced the ceremony with the announcement of Alumni Sponsored Awards. In the evening, a debate was conducted among the student and faculty members of the Institute. This year's Foundation Day Debate topic was "For the IITs, Leading in the World is more important than Making in India".
- **Guest Lectures:** The Students' Alumni Cell, IIT Kharagpur conducts Guest Lectures throughout the year. The year started with the Students' Alumni Cell hosting the awardee of the Distinguished Alumnus Award as its speaker for the first guest lecture. The Cell hosted Mr. Ranbir Sinha who conducted a workshop on Design Innovation in the month of October. In March, two recently graduated alumni of the Institute, Mr. Amritanshu Anand and Mr. Gaurav Dahake were invited to deliver a guest lecture on theme 'How to Startup'. Both the alumni had established successful business ventures as soon as they graduated from the institute. The event was enthusiastically received by the student community, especially the ones hoping to start up on their own in the near future.
- **Leadership Summit 2:** On the 61st Convocation, a panel discussion titled "KGP AND BEYOND..." was organized. Hundreds of eager students filled the auditorium to draw inspiration from the alumni who have made it large in their professional lives. Seven alumni who have excelled in different fields shared the stage to discuss life, journey and challenges beyond the campus. The following were the guest of honour for the program:
- **Alvida:** The annual farewell dinner, called "Alvida" was organized by the Technology Alumni Association, Kharagpur Chapter in association with the Office of AA&IR on 20th April, 2016. The event started with the Dean of Alumni Affairs & International Relations, Prof. Siddhartha Mukhopadhyay congratulating the students on completing their degree and wishing them a bright career ahead. Also the Director, Prof. Partha Pratim Chakrabarti has marked his gracious presence to give his best wishes of future endeavours to the graduating batch. The event was very well received by the student community and saw a turnout of more than 2000 students. The students enjoyed the food and the music played at the event. The passing out students wrote enthusiastically on the graffiti wall installed at the arena. Students were also motivated to participate in the My Imprint Program and take their first step towards 'giving back' – contributing to the development of the institute by donating their caution money. Overall, the event was a grand success and we hope to conduct more such events in the future.

- **Convocation:** Alumni Cards and Yearbooks were distributed among the degree recipients. The My Imprint program was also actively promoted among the graduating students and the donors who donated their caution money were recognized by star badges. The Office of Dean AA&IR played a major role in recognizing alumni contribution through conferment of the Distinguished Alumnus Awards. The selection process and the local hospitality for all our distinguished alumni were taken care of on behalf of the Institute.

  During the event, Distinguished Alumnus Awards were conferred on the following alumni:

  Dr. Bedabrata Pain, Prof. Chetan Vamanrao Vaidya, Shri Majoj Sumatilal Gandhi, Retired Rear Admiral Mohinder Kumar Badhwar, Shri Peter Chan, Prof. Pradip Dutta, Retired Commodore Rakesh Bahadur Verma, Dr. S. Christopher, Shri Sharat Chandra Bhargava, Shri Sundar Pichai, Prof. Venkatesh Shankar

- **Regional Students' Alumni Meet:** Regional Student Alumni Meets were organized over the year in the cities of Hyderabad, Delhi and Bengaluru. The event was conducted in Hyderabad and Delhi in June and in Bengaluru in December. The Student Alumni Meet aims to connect the alumni of a particular region to the current batch of students from the institute and foster student-alumni relations. The event was very well received by the student and alumni community alike in all the cities. Student Alumni Meets would be conducted in other major cities of the country in the near future.

- **Mentorship Programme:** The Student Alumni Mentorship Programme is one of its flagship programme to foster student-alumni relations. The programme helps connect students to alumni who are working in a field that they are interested in. This way, students get to learn from experiences rather than theoretical knowledge of the field that they would like to work in the future. This was the second year when a dedicated portal was launched for the programme. The portal was enthusiastically received by the students with registrations coming in large numbers after the launch of the portal. The Students' Alumni Cell hopes to continue the legacy of the programme in the upcoming year as well and serve as many students as possible through the programme.

**International Relations**

**Inbound Students Visits**

The following students visited IIT Kharagpur during the period April 2015 – March 2016

| Name | From | Purpose |
|---|---|---|
| Miss Bertille Edith Bella Nke | Laboratoire de Geologie de I'Environment (LGE) Departement des Sciences de la Terre, Universite de Dschange (Cameroon) | to pursue a part of her Ph.D. research |
| Mr. Andrew Keeton | University of California, Berkeley, USA | to undertake summer project under Cal Energy Corps Program of University of California Berkeley |
| Ms. Julia Sawaya | University of California, Berkeley, USA | to undertake summer project under Cal Energy Corps Program of University of California Berkeley |
| Mr. Charles Benjamin Strauber | Stanford University, Californai, USA | to complete United States-India Educational Foundation (USIEF) Program |
| Mr. Philipp Gribisch | Leibniz University, Hannover, Germany | to carry out one semester course work in the Dept. of Physics and lab, IIT Kharagpur |
| Miss Nik Zainab Nik Azizan | University of Sains Malaysia (USM) | to carry out her research work for three months |

| | | |
|---|---|---|
| Mr. Asmaysinh Gharia | University of California, Berkeley, USA | to undertake summer project under Cal Energy Corps Program of University of California Berkeley |
| Mr. Rohan Chakraborty | University of California, Berkeley, USA | to undertake summer project under Cal Energy Corps Program of University of California Berkeley |
| Mr. Izak House | University of Twente, Netherlands | to to internship as requirement for Master's Program at Applied Physics, University of Twente |
| Mr. Gabriel Filipe Werner | Technical University Munich (TUM), Boltzmannstr, Germany, Department of Informatics | to pursue courses |

**Shri Gopal Rajgarhia International Programme (SGRIP) Endowment Fund**

International participation plays a significant role towards improving the world rank of a university. Alumnus Shri Gopal Rajgarhia (68/BTech/CH/NH) has been supporting the Institute in this regard. Shri Gopal Rajgarhia International Programme (SGRIP) endowment fund created from the donation made by him aims to support various schemes to enhance international participation. The Program funds four schemes for attracting international faculty and student to IIT Kharagpur. It also supports students, without additional sources of funding to participate in reputed international events. This year the committee has received 23 applications with contributions from various disciplines. The institutions with which IIT KGP has MoUs may play a key role in participating in such a scheme. Under the leadership of Prof. Partha Pratim Chakrabarti, a five member committee has been constituted under the chairmanship of Dean, AA&IR with the responsibility of taking the core decisions for the programs under SGRIP. Additionally, a faculty coordinator has been appointed to look after the activities. Five programs are proposed to be carried out under the scheme: SGR International faculty outreach program, SGR International research scholar support program, SGR International student scholarship program, SGR international Workshops/Meetings, and SGR student international travel support. The first SGRIP committee meeting was subsequently held on July 31 2015. A total of 10 visits from the Autumn 2015 cycle were successfully completed in this semester and reports have been submitted. In the second call for proposals for Spring 2016, total ten proposals were received out of which nine got approved.

**Students Outbound Visits**

**Students International Internships:** Undergraduate Students are mandated for at least one internship during their B.Tech. courses. Many students also go for optional summer internships. The students at IIT KGP spread across the world in top universities and institutions for global exposure in academics, research and industry orientation. In 2015-16, more than **185** students went for international internships.

**Visit to International Conferences:** More than **400** students and research scholars participated in international conferences for presentation of papers. The Institute funds the international travel of these scholars.

**Exchange Students:** Several students visit foreign universities under DAAD Scholarship and WMG programmes.

**Faculty Visits**

**21** international faculty visited the Institute under the International Summer and Winter Term and Global Initiative of Academic Networks. The faculty visited from reputed foreign universities such as University of Texas at Austin, USA, University of Minnesota, USA, Aalto University, Finland, University of the Negev, Beer-Sheva, Israel, Virginia Ploytechnic Institute and State University, USA, University of London, UK, University of Newcastle, Australia, James Cook University, Australia, Technische Universitaet Berlin, Germany, University of Leeds, UK, and many more.

**MoUs with International Organizations**

The Institute had the following International MoUs during the period April 2014 – March 2015

| | |
|---|---|
| Academic Exchange between IIT Kharagpur and The University of Tokyo, Japan (extended validity) (Agreement) | Signed on 22nd July 2013<br>Annexure signed on 17.08.2015<br>Validity : Upto 27th April 2018 |
| Curtin University, Australia (MoU)<br>Agreement for the Establishment of a Dual Doctoral Degree Program between Curtin University of Technology, Australia | MoU signed on 1st December 2011<br>Validity : 5 years<br>Signed on 15th May, 2015<br>Validity : 5 years |
| IIT Kharagpur and The University of Warwick, as represented by WMG, UK (MOU) | Signed on 18th April, 2008<br>Validity : 5 years<br>Renewed on 4th March, 2015<br>Validity: 5 years |
| Institute of Engineering, Tribhuvan University, Nepal and IIT Kharagpur (MoU) | Signed on 17.1.2006<br>Renewed on 11th June, 2015<br>Validity : 5 years |
| Technical Collaboration Agreement between the George Washington University (GWU), USA and IIT Kharagpur | Signed on 13 January, 2006<br>Validity : 5 years<br>Renewed on 20 July, 2015<br>Validity : 5 years |
| TOTAL France and IIT Kharagpur (MOU) | Signed on 18th February, 2009<br>Validity : 3 years initially<br>Renewed on 16th March, 2015<br>Validity : 3 years |
| University of Southampton, UK and IIT Khargpur (MOU) | Signed on 17th April, 2008<br>Validity : 5 years<br>Signed on 5th March, 2015<br>Validity: 5 years |
| The University of Twente, Enschede, Netherlands and Indian Institute of Technology Kharagpur. (MoU) | Signed on 21 January, 2015<br>Validity: 5 years |
| The University of Alabama, USA and Indian Institute of Technology Kharagpur. (MoU) | Signed on 30 March, 2015<br>Validity: 5 years |
| National Tsing Hua University (NTHU), Taiwan and Indian Institute of Technology Kharagpur. (MoU) | Signed on 15 April, 2015<br>Validity: 5 years |
| Central Building Research Institute (CBRI), Roorkee and Indian Institute of Technology Kharagpur. (MoU) | Signed on 18 April, 2015<br>Validity: 5 years |
| Research and Development Center of Nippon Koei Co. Ltd. (RDCNK), Tsukuba, Japan and Indian Institute of Technology Kharagpur (MoU) | Signed on April, 2015<br>Validity: 5 years |
| Universita Cattolica Del Sacro Cuore (Italy) and Indian Institute of Technology Kharagpur (MoU) | Signed on 29 May, 2015<br>Validity: 5 years |
| Taipei Medical University and Indian Institute of Technology Kharagpur (MoU) | Signed on 21 July, 2015<br>Validity: 5 years |

| | |
|---|---|
| Dwight Look College of Engineering, Texas A&M University (TAMU), USA and Indian Institute of Technology Kharagpur (MoU) | Signed on 17 July, 2015<br>Validity: 5 years |
| The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Telangana State and Indian Institute of Technology Kharagpur (MoU) | Signed on 26 August, 2015<br>Validity: 5 years |
| The University of Liverpool, UK and Indian Institute of Technology Kharagpur (MoU) | Signed on September, 2015<br>Validity: 5 years |
| The Graduate School of Management, Kyoto University and Indian Institute of Technology Kharagpur (MoU) | Signed on 30th September, 2015<br>Validity: 5 years |
| Ben-Gurion University of the Negev (BGU), Israel and Indian Institute of Technology Kharagpur (MoU) | Signed on 14 October, 2015<br>Validity: 5 years |
| The Hebrew University of Jerusalem, Israel and Indian Institute of Technology Kharagpur (MoU) | Signed on 14 October, 2015<br>Validity: 5 years |
| University of Haifa, Israel and Indian Institute of Technology Kharagpur (MoU) | Signed on 14 October, 2015<br>Validity: 5 years |
| Princess Sumaya University for Technology (PSUT), Jordan and Indian Institute of Technology Kharagpur (MoU) | Signed on 11 October, 2015<br>Validity: 5 years |
| The University of Jordan and Indian Institute of Technology Kharagpur (MoU) | Signed on 11 October, 2015<br>Validity: 4 years |
| Ewha Womans University (EWU) and Indian Institute of Technology Kharagpur (MoU) | Signed on 11 November, 2015<br>Validity: 5 years |
| Tamil Nadu Fisheries University, Nagapattinam and Indian Institute of Technology Kharagpur (MoU) | Signed on 1 December, 2015<br>Validity: 5 years |
| Rutgers, The State University of New Jersey, USA and Indian Institute of Technology Kharagpur (MoU) | Signed on 22 January, 2016<br>Validity: 5 years |
| Colorado State University, USA and Indian Institute of Technology Kharagpur (MoU). | Signed on 4 January, 2016<br>Validity: 5 years |
| The Faculty and Graduate School of Agriculture, Kyoto University and Indian Institute of Technology Kharagpur (MoU). | Signed on 22 February, 2016<br>Validity: 5 years |

**MoUs with National Organizations**

The Institute had the following National MoUs during the period April 2014 – March 2015

| | |
|---|---|
| MoU with Hindustan Aeronautics Limited (HAL), Bangalore. | Signed on 30th April, 2014<br>Validity: 3 years |
| Donation by Professor Tapan Prasad Bagchi to IIT Kharagpur (Agreement) | Signed on 25th June, 2014<br>Validity : |
| MoU with SAP Lab India Doctoral Fellowships at IIT Kharagpur | Signed on 3rd July, 2014<br>Validity: 2 years |

| | |
|---|---|
| MoU with Rajasthan University of Veterinary and Animal Science (RAJUVAS), Bikaner. | Signed on 5th August, 2014<br>Validity: 5 years |
| MoU with Delhi Mumbai Industrial Corridor Development Corporation (DMICDC). | Signed on 21st August, 2014<br>Validity: 5 years |
| MoU with Indian Institute of Engineering Science and Technology (IIEST). | Signed on 10 November, 2014<br>Validity: 5 years |
| MoU with Power System Operation Corporation Limited (POSOCO), New Delhi. | Signed on 14 November, 2014<br>Validity: 5 years |
| TVS Motors Chair Professor and IIT Kharagpur (MoU) | Signed on 6th August, 2010<br>Validity: 5 years<br>Extension on August 7, 2015<br>Validity: 5 years |
| Opal-RT Technologies India (P) Ltd. Bangalore and Indian Institute of Technology Kharagpur. (MoU) | Signed on May, 2015<br>Validity: 5 years |
| BEML Limited, Bangalore and Indian Institute of Technology Kharagpur (MoU) | Signed on June, 2015<br>Validity: 5 years |
| Defence Research & Development Organisation (DRDO), Ministry of Defence, Govt. of India and Indian Institute of Technology Kharagpur (MoC) | Signed on 18 August, 2015<br>Validity: 5 years |
| Indian Council of Medical Research (ICMR) and Indian Institute of Technology Kharagpur (MoU). | Signed on 21 January, 2016<br>Validity: 5 years |
| American Society for Quality India Pvt. Limited (ASQ India), New Delhi and Indian Institute of Technology Kharagpur (MoU). | Signed on 3 March, 2016<br>Validity: 3 years |

# Central Library

**Introduction**

The Central Library, IIT Kharagpur is one of the largesttechnical libraries in Asia. It is fully automated and air-conditioned library with an aim to serve more than 11, 000 students and 1623number of employee of the institute. The Library has its dynamic website (http://www.library.iitkgp.ernet.in) with rich in content. The Central Library is having two building (main and annex) internally connected with a carpet area of about 8000 sq.m. The Central Library houses and maintains nearly 3.9 lakh of print documentscomprising of books and bound volume journals. As far as e-resources are concerned, there are huge collection of e-resources comprising of full text e-journals, e-books, online databases (full text and bibliographic) etc. As far as facilities are concerned, the Central Library has six air-conditioned reading halls with 1500 seating capacity for the users. Moreover, the Central Library is ISO 9001:2008 certified library since 2014 and the certification has been extended for one more year after satisfactory audit by external auditors.

**Academic Staff**

**Chairman**

| | |
|---|---|
| Prof. S. Chattopadhyay | Ph. D (IIT Kharagpur), MURP (SPA Delhi), B.Arch(Cal), Cert. Housing (New Castle, UK), Dip. Housing (Lund Sweden), AITP, Housing, Urban Planning and Building Materials |

**Librarian**

| | |
|---|---|
| Bablu Sutradhar | Ph. D (V.U), M. Sc, M. Lib. I. Sc, CCA |

**Deputy Librarian**

| | |
|---|---|
| Kamalendu Majumdar(RGSOIPL) | Ph.D, M. Lib. I. Sc, B.Com, CPDA |
| Samir Kumar Jalal (Central Library) | Ph. D (B.U), MA (Econ), ADIS (ISI) |

**Assistant Librarian**

| | |
|---|---|
| Mr. Uma Shankar | M. Lib. I. Sc, MA |
| Mr. Atin Nandi | M. Lib. I. Sc, M. Sc |
| Mr. A.K. Goswami | M. Lib. I. Sc, M. Sc |
| Mr. Samrat Guha Roy | M. Lib. I. Sc, MCA |
| Mr. Hemanta Kr. Biswal | M. Phil, M. Lib. I. Sc |

**Information Analyst**

| | |
|---|---|
| Mr. M. Manivannan | M. Lib. I. Sc, MCA |

**Retired Staff**

| | |
|---|---|
| Mr. Debasis Mitra | Retired on January 31, 2016 |

**Print Collection: Added during 2015-2016**

| Books | | Print Journals | PhD Theses |
|---|---|---|---|
| General | Text Books | | |
| 2333 | 1394 | 80 | 262 |

**List of e-Resources available from eSS Consortium for the year 2016**

| Sl.No. | Name of the e-database | Publishers |
|---|---|---|
| 1. | MathSciNet | American Mathematical Society |
| 2. | ASCE Journals | American Society of Civil Engineers |
| 3. | ASME Journals | American Society of Mechanical Engineers |

| | | |
|---|---|---|
| 4. | Annual Reviews Online | Annual Reviews Inc |
| 5. | ACM Digital Library | Association for Computing Machinery |
| 6. | ASTM Standards | ASTM International |
| 7. | Capitaline | Capital Market Publishers India Ltd. |
| 8. | SciFinder Scholar | Chemical Abstracts Services |
| 9. | CRISIL Research | CRISIL Ltd. |
| 10. | Economic and Political Weekly | Economic and Political Weekly, Mumbai |
| 11. | Emerald Enhanced | Emerald Group Publishing |
| 12. | Euromonitor | Euromonitor International Ltd. |
| 13. | IEEE Explore | IEE/ IEEE |
| 14. | ISID Database | INFLIBNET |
| 16. | JSTOR Database | JSTOR |
| 17. | JGATE + JCCC | M/s Informatics (I) Ltd. |
| 18. | Manupatra - Legal Databases | Manupatra Information Solutions Pvt. Ltd., Noida |
| 19. | Nature Journal | Nature Pub Group |
| 20. | OSA Journals | Optical Society of America |
| 21. | OUP Journals | Oxford University Press |
| 15. | Project Muse | John Hopkins Univ Press |
| 22. | ABI-INFORM | ProQuest Information & Learning Ltd., UK |
| 23. | SIAM Online | Society for Industrial & Applied Mathematics |
| 24. | Web of Science | Thomson Reuters (Scientific), Inc., Philadelphia |
| 25. | West Law India Academic | Thomson Reuters South Asia,., Hyderabad |

**List of e-resources/ databases subscribed by IIT Kharagpur for the year 2016**

| Sl.No. | Name of the e-database | Publishers |
|---|---|---|
| 1. | ACS Journals with Archive | American Chemical Society |
| 2. | AIP Journals (All) | American Institute of Physics |
| 3. | APS Journals | American Physical Society |
| 4. | Bloomberg Professional Service | Bloomberg Data Service India Pvt. Ltd. |
| 5. | British Standards 15 Modules on DVD-ROM | BSI Group |
| 6. | Business Source Complete | EBSCO Publishing, New Delhi |
| 7. | Cambridge University Press (CUP) Journals **(Selected)** | Cambridge University Press |
| 8. | CapEX (IP based) | Centre for Monitoring Indian Economy Pvt. Ltd., Kolkata |
| 9. | Economic Outlook (IP based) | Centre for Monitoring Indian Economy Pvt. Ltd., Kolkata |
| 10. | GeoRef Databases | GeoScienceWorld |
| 11. | GeoScienceWorld & | GeoScienceWorld |
| 12. | Grammarly@edu writing support suit (100 users) | Kite India |
| 13. | Hein Online | William S Hein & Company Inc |
| 14. | IEC Complete Set (DVD-ROM) | International Electrotechnical Commission |
| 15. | Indian Standards on DVDs (Complete Set) | Bureau of Indian Standards |
| 16. | Indiastat.com (multiuser version) | Datanet India Priavte Limited, New Delhi |
| 17. | Industry Outlook (IP based) | Centre for Monitoring Indian Economy Pvt. Ltd., Kolkata |
| 18. | IOP Science Journals | Instititute of Physics, UK |
| 19. | JSTOR Database | JSTOR |

| | | |
|---|---|---|
| 20. | Nature Journals Package | Nature Pub Group |
| 21. | PDF-4+ 2015 + Sleev+2015 (CD-Version) | International Centre for Diffraction Data, Pensylvania, USA |
| 22. | ProQuest Dissertation & Theses | ProQuest Information & Learning Ltd. Cambridge, UK |
| 23. | Prowess (IP based) | Centre for Monitoring Indian Economy Pvt. Ltd., Kolkata |
| 24. | PsycArticle | American Psychological Association |
| 25. | RSC Gold Package | Royal Society of Chemistry |
| 26. | Science Direct (All titles) | Elsevier Science |
| 27. | Science Online | AAAS |
| 28. | SCOPUS | Elsevier Science |
| 29. | SPIE Digital Library | SPIE |
| 30. | SpringerLink (All titles) | Springer Verlag |
| 31. | T&F Journals **(Selected)** | Taylor & Francis |
| 32. | Turnitin2 – – Anti Plagiarism Web Tool (for 1000 users) | iParadigms, LLC |
| 33. | Wiley Blackwell Journals **(Selected)** | Wiley-Blackwell |
| | World Intellectual Property Search (WIPS) | WIPS Company Ltd. |

**E-Books Databases**

1. Cambridge University Press (Law e-Books)
2. CRCnetBASE ( CRC Press e-Books 2004-2015)
3. Elsevier Book Series (Chemistry)
4. Gale Cengage (Law eBook )
5. Springer E-book(1842 – 2015)
6. Wiley E-Books (Chemistry)

**Bibliographic Databases**

1. MathSciNet
2. SciFinder Scholar
3. Scopus
4. Web of Science (WoS)

**Financial Databases**

1. Bloomberg Database -Offline Accessible Clients from Digital Library & VGSOM
2. IndiaStat(Publisher: Datanet India Pvt. Ltd)
3. Frost & Sullivan - Database for Industries & Markets
4. Capitaline
5. CMIE's Database (CapEX, Economic Outlook, Industry Outlook, Prowess)
6. FRST-AL: Technical Insights (Database for Industries & Markets )
7. Euromonitor

**Law Databases**

1. Hein Online
2. Manupatra Online Legal Database
3. Supreme Court Cases Online (Platinum Plus)
4. Westlaw India Academic
5. WIPS - Worldwide Intellectual Property Search

**List of Standards Subscribed by Central Library**
Following standards may be accessed through the links of library websites within LAN after Disable Proxy:

1. ASME Standards
2. BSI Standard
3. IEC Standards
4. EuroCode Standard (Civil Engg./ Structural Engg.)
5. ISO Standard

**Theses & Dissertation**
ProQuest's Theses & Dissertation

**Off-line Databases and Software**

1. AIR Law College (CD-ROM + Print)
2. Grammarly@edu writing support suit
3. JCPDF Database (CD-ROM Version)
4. Mobility in Cities (CD-ROM version)
5. TurnitIn2 – Anti Plagiarism Software

**Digital Library**
Following section provides information on services provided by Digital Library to the users for the period April 2015 to March 31 2016.

- Total No. of Document Delivery Service : 75 out of 147
- Total No. of Turnitin Anti plagiarism checking Service
  - Student Id : 1232
  - Instructor Id : 25
  - Report Delivered : 188
- Total No. of JCPDS Software Service : 184
- Total No. of Book Accompany CD Copy Delivered : 18
- Total No. of Ph.D. Theses Digitized : 532

**Institutional Digital Repository (IDR)**
The Central Library has developed an Institutional Digital Repository (IDR) using open source software namely DSpace. The IDR collects, preserves and disseminates in digital format of the research output (PhD theses, Technical Reports, Faculty Publications, etc.) within IIT Kharagpur Research Community. It enables the Institute community to deposit (self archiving) their pre-prints, post prints and other scholarly publications using a web interface and organize these publications for easy retrieval. 1710 PhD thesis both full text and abstract level are uploaded in our IDR which is rapidly growing day by day. The Institute research scholars are also using the IDR regularly.The Library also getsmany requests from other universities to provide access to full text content of PhD thesis. The present URL of the IDR is http://www.idr.iitkgp.ac.in/xmlui/.

**Facilities Created for Library Users**

- **Library Facilities- 24 x7 during Semester Exam:** The Central Library introduced the facility of 24 x 7 hours reading room facility for 15 days during Semester Examinations of the Undergraduate Students and Post Graduate Students.

- **Pay Library Dues through Debit Card:** Library users can make payment for their Library fines, photocopying, printing and scanning through debit and credit card.

- **Web Scale Discovery Service:** It is being introduced in our library where the users can search and browse the full text subscribed e-resources using open source software vufind integrated with Summon Solution from ProQuest. A link -http://library.iitkgp.ernet.in/vufind/ is given in our library website.

**National Digital Library (NDL)**

MHRD, under its NMEICT mission, has entrusted IIT Kharagpur to host, coordinate and set-up National Digital Library (NDL) towards building a national asset. For this purpose, a project room has been set up at Annex Building of Central Library. Some of the staff from Central Library are actively engaged and associated with the project. First Phase of NDL Project has been launched in February 2016 with more than 10 lakhs of bibliographic data.

**Workshop/Seminars, Publications& Invited Lectures**

Library has organized 2 workshop/seminars Sutradhar, B. has delivered 6 invited lectures. There are also 2 publications.

# Central Research Facility

**Chairman**
Prof. Rahul Mitra, MME Materials Science Division
Prof. Amit Kumar Das, BT, Life Science Division

**Asscociated Faculty**

| | |
|---|---|
| Prof. A. Basak, | -In charge, CD Polarimeter<br>-In charge, EPR, 600 MHz NMR& Single Crystal X-Ray Diffractometer |
| Prof. S.K. Ghosh | - In charge, FACS |
| Prof. J. Das | - In charge, XRD, HRXRD<br>- In charge, FE-SEM Supra 40 & 3-D Non-contact optical surface profilometer |
| Prof. D.Ray | - In charge, FTIR |
| Prof. T.K. Nath | - In charge, Hall Effect |
| Prof. R. Banerjee | - In charge, HPLC |
| Prof. R.Mitra | - In charge, HRTEM, SEM, Dual Beam FIB-FEG Microscope, |
| Prof. D. Chakrabarti | - In charge, UTM (Instron) |
| Prof. A.K. Das | - In charge, MALDI, XRD (Protein Crystallography) |
| Prof. S. Das Gupta | - In charge, ITC |
| Prof. T. Pathak | - In charge, Mass Spectrometer |
| Prof. K. Biswas | - In charge, OMMT |
| Prof. P. Roy Chowdhury | - In charge, Photolumenescence |
| Prof. A.K. Ghosh | - In charge, PCR, 2-D Gel. DNA Sequencer, RTPCR |
| Prof. S. Das | - In charge, Analytical TEM, TEM Sample Preparation, Scanning Auger Nanoprobe |
| Prof. K. Das | - In charge, Thermal Analysis |
| Prof. S.H. Dey | - In charge, LC-MS/MS |
| Prof. V. Adyam | - In charge, SQUID |
| Prof. A. Roy | - In charge, Raman Spectrometer |
| Prof. T. Laha | - In charge, Nanoindentation&Nanotribology |
| Prof. R. Mukherjee | - In charge, AFM |
| Prof. N.K. Singha& Prof. N.C. Das | - In charge, SAXS |
| Prof. S. Dhara | - In charge, X-Ray Micro-CT |
| Prof. D. Banerjee | - In charge, Pulsed EPR |
| Prof. A. Das | - In charge, VSM |

**Senior Scientific Officers**
M.Sc., Ph. D. (IIT Kanpur), Inorganic Chemistry, Scanning Electron Microscopy and Metal Matrix Composites

**Brief descriptions of on-going activities**
**Life Science Division**

(I) **2D GELElectrophoresis System**: The equipment is used for analyzing protein samples and is a major tool for proteomics work.

(II) **DNA Sequencer:** This equipment is used to determine nucleotide sequence of DNA samples.

(III) **Real Time PCR machine**: This machine is used to analyze gene expression level (quantitative) in different tissue samples.

(IV) **FACS system**: The BD FACSCalibur™ system is four-color, dual-laser, bench top system capable of both cell analysis and sorting. This machine is designed specifically to support a wide range of applications like

immune-phenotyping, absolute counting, residual white blood cell enumeration, stem cell analysis and isolation by sorting.

(V) **High Pressure Liquid Chromatography system:** HPLC is an efficient technique used for the separation of macro/micro molecules such as organic compound, amino acids, nucleotides, aroma/fragrance, enzymes and proteins etc. This equipment has quaternary pumps, along with different detectors like Refractive Index (RI) and Photo diode array at variable wavelengths, manual injecting valves, ports as well as various columns for separating different kinds of molecules.

(VI) **MALDI_ToF Laboratory**: MALDI TOF/TOF Mass spectrometer is used for the determination of molecular mass of different bio-molecules and chemicals e.g. protein, peptide, polymers, organic & inorganic molecules etc. with peptide mass fingerprint (PMF), de-novo protein sequencing, tissue imaging.

(VII) **Protein X-ray Crystallography (PX) System**: RigakuMicromax $007^{HF}$ X-ray generator is equipped with RaxisIV++ detector and Oxford Cryo 800 system to determine 3D structure of proteins in atomic resolution.

(VIII) **Isothermal Titration Calorimetry (iTC200 Systems):** iTC200 is used for characterization of molecular interactions of small molecules, proteins, antibodies, nucleic acids, lipids and other biomolecules. Enzyme kinetics, assessment of the effect of molecular structure changes on binding mechanisms, assessment of biological activity is also possible.

(IX) **TrinocularStereozoom Microscope:** Stereo microscope is used for the assessment of protein crystal morphology as well as crystal mounting in cryo-loop for x-ray crystallography.

**Materials Science Division**

(X) **Field Emission Scanning Electron Microscope Laboratory**: The field emission gun assisted scanning electron microscopy (FE-SEM, Supra 40V, Carl Zeiss, Germany) provides an excellent scope of microstructural characterization using secondary or back scattered imaging, energy dispersive spectroscopy and electron back scattered diffraction analysis. The samples analysed include various metals and alloys, semi-conducting and insulating films, refractories, polymeric and ceramic powders, failed engineering components and hiybrid./composite materials.

(XI) **FTIR Laboratory**: FTIR analysis of different samples in powder, liquid and also film form in MID-IR and FAR-IR range are done at both ambient and above ambient temperatures by our institute students and faculties.

(XII) **Hall Effect Laboratory**: Electrical resistivity (conductivity), Magnetoresistance and Hall voltage measurements of metals, semiconductors, oxides, heterostructures, etc. Are carried out in the temperature range of 10 – 300 K by employing a closed cycle Helium refrigeration cryostat in the magnetic field range of -10 kOe -0 -+10 kOe. The magnetoresistance and Hall measurements employing a Vander Pauw four probe technique are also used for characterization of materials like magnetic oxides, spintronic materials, nanometricmaterials, spin sensor material, magnetic multilayers, semiconducting materials, etc.

(XIII) **High Resolution Transmission Electron Microscope Laboratory**: The HRTEM laboratory is equipped with the JEOL JEM-2100 High Resolution Transmission Electorn Microscope, OXORD INCA EDS microanalytical system and GATAN CCD camera. This instrument is used for observation of specimens to observe the microstructures at high resolution, up to the level of arrangement of atoms, and determination of the crystal structure detects and grain sizes as well as chemical composition at selected positions. In metals, ceramics, polymers rubbers and semiconductor. The machine is routinely used for research on nano-structured materials, bulk alloys, thin films powders, and composites. In addition, it is possible to study phase transitions at low temperatures using the specimen holder operating at the liquid nitrogen temperature.

(XIV) **Scanning Electron Microscope (SEM) Laboratory**: The SEM laboratories are equipped with 1) JEOL JSM-5800, 2) ZEISS EVO-60 Scanning Microscopes. The analytical attachments with these instruments are OXFORD ISIS-300, INCA Energy-250 EDS systems, INCA Wave-500 WDS system and HKL Channel-5 EBSD system. The projects associated with the instrument are aluminium alloys, In-situ composites, failure analysis of materials, Biomaterials, Nanostructured materials, Microallyed steel, Laser surface alloying, Cutting tool materials, Functionally graded materials, Intermetallics, Rubber and Polymer based composites, Ceramic materials etc.

(XV) **TEM Sample Preparation Laboratory**: This laboratory provides services for preparing samples of different types of TEM study using instruments like cryo-ultramicrotome jet polisher, and precision ion polishing system (PIPS) etc.

(XVI) **Thermal Analysis Laboratory**: The thermal analysis laboratory I equipped with Differential Scanning Calorimeter (DSC), Thermo-gravimetric and Differential Thermal Analyzer (TE-DTA) and Thermo Mechanical Analyzer (TMA). The DSC is being extensively used to study the thermal stability of nanocomposites, glass transition temperatures of polymeric materials, and curing of polymeric materials. The recent works of significance done with the TG-DTA system include the evaluation of thermal stability of polymer nano composites, TG studies have been carried out on the calcinations of aqueous combustion synthesized metal oxide powders, analysis of reactions towards formation of new ceramic compounds, effect of mechanical milling on the reaction onset temperature of aluminium based nano composites, etc. The TMA is being used to study the sintering behavior of nano composite materials as well as to determine the thermal expansion coefficients of some newly developed materials.

(XVII) **X-ray Diffraction Laboratory**: X-ray diffraction (XRD) facility includes three units: PW Philips 1710, Expert PRo I and Expert PRo II. While the first unit is used for routine powder diffraction studies, Expert PRo I is dedicated to texture and residual stress analysis and high temperature XRD. Expert PRo II unit is utilized for powder diffraction at normal and high resolution and low angle incidence mode. These units are extensively used to conduct phase analysis and identification, crystallite size determination, plastic strain measurements, texture evolution, surface residual stress measurements, phase transition studies (ex situ and in situ), volume fraction determination and failure analysis of engineering components.

(XVIII) **Circular Dichroism (CD) Spectrometer Laboratory**: Circular Dichroism (CD) J-810-150-S Model, 150W air-cooled Xenon Lamp, Head-on photomultiplier tube, 163-900 nm measurement range Circular Dichroism (CD) is observed when optically active matter absorbs left and right hand circular polarized light slightly differently. It is measured with a CD spectropolarimeter. The instrument needs to be able to measure accurately in the far UV at wavelengths down to 190-170 nm. The difference in left and right handed absorbance A(l)-A(r) is very small (usually in the range of 0.0001) corresponding to an ellipticity of a few 1/100th of a degree. The CD is a function of wavelength. It has become a powerful tool to analyze the structure of biomolecules and their interaction with various ligands.Changes in the CD spectra reflect a perturbation in the structure of biomolecules brought about by changes in conditions like temperature, pH or drug binding. Protein folding/unfolding can be followed by changes in the CD spectra.Stereochemistry of products through enzymatic reactions is also an important activity of CD spectroscopy, which is related to the 3D-structure of the active site of an enzyme. Stereochemistry of products through enzymatic reactions is also an important activity of CD spectroscopy, which is related to the 3D-structure of the active site of an enzyme.

(XIX) **Mass Spectrometer Laboratory**: Mass Spectrometer LCT is a compact, fully integrated, computer controlled, high performance, orthogonal acceleration Time-of-Flight (oa-TOF) Mass Spectrometer that can be configured for a wide range of LC-MS applications. It provides both exact molecular weight (HRMS) and structural information (LRMS) for characterization of mainly organic compounds and some organometallic compounds and metal complexes with excellent sensitivity. Both synthesis and elemental confirmation can be obtained that is essential for the support of patent applications or for the submission of data to scientific journals. The types of projects on which the equipment can be associated with are based on Synthesis Confirmation, Elemental Confirmation, Structure of Natural Products, Drug Discovery, Supramolecular Interactions/Drug-Receptor Interactions, and Environmental Monitoring. The equipment has been rendering extremely valuable service since its inception to the users within IIT, Kharagpur and external users from various academic institutes, R & D laboratories and industries.

(XX) **SQUID VSM Laboratory**: The Quantum Design MPMS SQUID VSM EverCool system features an integrated pulse-tube cryocooler-dewar system. This eliminates the need to use any liquid cryogens for the operation of the MPMS SQUID VSM. It offers $1x10^{-8}$ emu sensitivity with fast data acquisition. A maximum DC magnetic field up to 7T in temperature range 2-1000K is available in both DC and AC magnetization measurements. Information about hysteresis loops, relaxation times, magnetic field and temperature dependence of magnetic moment can be obtained. Magnetic properties of broad range of samples related to materials, geological and biological can be analysed.
System Model No:- SVSM-EC, Serial No. SMT 043

(XXI) **Transmission Electron Microscope Laboratory**: Transmission Electron Microscope with ability to study structure and composition is being procured. The chosen electron microscope is operated at acceleration voltages up to 200 kV. The machine is equipped with high tilt specimen stage, which is essential for examination of structural defects in materials. It will be possible to study specimens using bright and dark

field imaging, selected area diffraction, convergent beam electron diffraction and energy dispersive spectroscopy. The Energy Dispersive X-Ray Analyzer provided with the transmission electron microscope will be able to detect element composition, both qualitatively and quantitatively. The CCD Camera records images on high resolution transmission electron microscope electronically. The accompanying softwares are going to be used in analyses of images. Model FEI-TECNAI G2 20S- TWIN.

(XXII) **Raman Spectrometer Laboratory**: Raman spectroscopy is an efficient non-destructive tool, which provides enormous information on various physical properties of new state of art materials. The Triple Raman Spectrometer, T64000 from JobinYvon, Horiba, France, is equipped with Ar-Kr ion laser (with 10 laser lines) as an excitation source, a triple monochromator and a CCD detector (1024×256 pixels). It has a capability to reject Rayleigh line to a very high extent for all 10 laser lines. Hence, using this instrument one can record spectra from as low as 2 $cm^{-1}$ Raman shift. Other than material characterization, it can be used for resonance Raman measurements and acoustic phonon measurements.

No tool-specific sample preparation is required for the measurements. The incident radiation can directly interact with the sample. The system works for all types of sample, solid (powder or crystalline), liquid and gas.

(XXIII) **Nanoindentation&NanotribologyLaboratory**:Thenanoindenter with nano-tribological testing facility (*TI 950 TriboIndenter, Hysitron Inc.*, USA) in the "Nanoindentation&Nanotribology Laboratory" at Central Research Facility in IIT Kharagpur is a Nanomechanical characterization instrument with in-situ SPM (Scanning Probe Microscopy) imaging, facility, through which mechanical properties like hardness, Young's modulus, stress-strain behavior, creep indentation fatigue resistance and fracture toughness of thin films, coating, individual phases in a multiphase alloy, composites and soft biological tissues can be studied. The instrument is capable of carrying out various mechanical testing operations in nano-scale as well as in micro-scale, owing to its dual head testing capability. The various mechanical testing could be carried out at higher temperature (up to 400$^{o}$C) also. Integrated with low-noise three-plate capacitive transducers and electronics, the multi-layered enclosure and active vibration isolation system provide excellent environmental separation for the instrument.

(XXIV) **High Resolution Mass Spectrometry Laboratory**:Mass Spectrometer Model Xevo G2 QT of waters UK Ltd. The Xevo G2 QTof Mass Spectrometer is a highly sensitive, exact mass bench top system. The instrument is equipped with a T-wave collision cell and with a orthogonal acceleration Time-of-Flight (oa-ToF) mass analyzer with a wide mass range up to 100,000 m/z and a resolving power of 20,000 FWHM. It provides both exact molecular weight (HRMS) and structural information (LRMS) for characterization of mainly organic compounds and some organometallic compounds and metal complexes with excellent sensitivity. The range of compounds for which the instrument can be used varies widely from small organic, inorganic, compounds to oligomers, polymers and biomolecules. The instrument will provide elemental confirmation that is essential for the support of patent applications or for the submission of data to scientific journals. The system incorporates IntelliStart$^{TM}$ technology, for automated system optimization and status monitoring, ensuring that the highest quality data is routinely available to all levels of operation.

(XXV) **AFM Laboratory**: A new Atomic Force Microscope (Model 5500, Agilent Technologies, USA) has been installed in CRF in October 2013, and has been thrown open to users across the Institute. Apart from the regular scanning modes, that is contact and intermittent contact modes, the state of the art instrument is equipped with closed Z loop scanner for measurement of force between two surfaces, under liquid imaging capability, temperature control stage (30 ºC to 250 ºC) with in-situ imaging capability for time resolved experiments, integrated environmentalcontrol (with 6 ports forpurging and venting), EFM (Electrical Force Microscope) and KFM (Kelvin probe microscope) in single pass inamplitude modulation (force) andfrequency modulation (force gradient) modes, external variable magnetic field MFM with a magnetization range of +/– 850 Gauss.Since installation the instrument has been used to scan more than 600 samples till March 2014, spanning across 30 research groups in the Institute. Every day two three hour slots are given to the users, in which typically three samples are scanned. Experiments like EFM, MFM and under water imaging however takes longer time. Different samples that have been scanned successfully include polymer, metals, composites, biological molecules like proteins, quantum dots, nano patterns etc.

(XXVI) **Nuclear Magnetic Resonance (NMR) spectrometer Lab**: Recently, the institute has procured a Bruker Avance III HD 600 MHz ($^{1}$H frequency) Nuclear Magnetic Resonance (NMR) spectrometer, which has been installed in Central Research Facility (CRF). The spectrometer is for recording high resolution one

dimensional (1D) and two dimensional (2D) spectra of chemical and biological samples in solution. It has three probes, (a) broad band probe for recording spectra of all the NMR active nuclei, including $^{19}F$, (b) one three channel ($^{1}H$, $^{13}C$ and $^{15}N$) inverse probe for 1D, 2D and triple resonance spectral measurements and (c) one liquid helium cooled cryoprobe for very high resolution spectral measurements. Also, it has variable temperature attachment for recording spectra at lower or higher temperatures.

(XXVII) **Dual Beam FIB-FEG MicroscopeLab:** (Model: Auriga Compact Cross Beam system, Carl Zeiss, Germany) has been procured at CRF and is undergoing installation. It is equipped with both Electron and Ion Beam sources for applications including scanning electron microscopy, focused ion beam milling and lithography, along facility for TEM sample thinning and lift-out (Omniprope 200, Oxford Instruments), as well as 3D energy dispersive spectroscopy and electron backsctattered diffraction (Aztec, Oxford Instruments). The system can be used for observation using secondary and backscattered electron imaging modes, chemical analysis, orientation mapping, TEM sample preparation, as well as processing of nanostructures.

(XXVIII) **SAXS Lab:** A new state-of-the-art Small Angle X-Ray Scattering (SAXS) Instrument (Model: Xeuss 2.0 SAXS/WAXS, Model HR 300-fm, Manufacturer: Xenocs Ltd, France, Study of nanostructures (such as nanoparticle powder, suspension,…) aims to determine their characteristic lengths (diameter, interparticle distance,…). In SAXS investigation, such parameters are deduced from mathematical model fitting of the collected data. Therefore, accurate data are required to allow relevant and correct data modelization. Large nanostructures with characteristic lengths up to 250 nm can only be defined using a SAXS instrument configuration that displays a low qmin value. However, the number of available data points at low q values must be sufficient to enable accurate fitting. This feature is directly related to the angular resolution Δq of the SAXS system. In the case of nanoparticle investigation, their signature appears as oscillations in the 1D scattering curve. The minima and maxima definition is dependent on the incident beam size, and a compromise between the collimating aperture and the downstream photon flux must be defined by the operator. SAXS measurements have been performed on a SiO2 powder and demonstrate the capability of the Xeuss 2.0 SAXS/WAXS system to provide a low qmin value combined with a high angular resolution.

(XXIX) **FE-SEM (Merlin) Lab**:- The Merlin is a high performance FE-SEM with high image resolution and analytical capability. Due to the double condenser lens system of the GEMINI II column, the beam diameter is minimized to the extreme, resulting in an image resolution of down to 0.8 nanometers. A sample current of up to 300 nanoamperes is available for analytical purposes such as energy and wavelength dispersive X-ray spectroscopy (EDS and WDS), diffraction analysis of backscattered electrons (EBSD) of the generation of cathodoluminescence (CL).

(XXX) **X-ray Micro CT Lab:**-X-ray micro tomography, uses x-rays to create cross-sections of a physical object that can be used to recreate a virtual model (3D model) without destroying the original object. The prefix micro is used to indicate that the voxel sizes of the cross-sections are in the micrometer range. Micro-CT has applications both in medical imaging and in industrial computed tomography. In general, there are two types of scanner setups. In this setup, the X-ray source and detector are typically stationary during the scan while the sample rotates. The second setup, much more like a clinical CT scanner, is gantry based where the animal/specimen is stationary in space while the X-ray tube and detector rotate around. In closed systems, X-ray shielding (lead shield) is put around the scanner to avoid harmful dose of radiation. The operator usually carries a dose meter, since X-rays have a tendency to be absorbed by metal and then re-emitted like an antenna. Closed systems tend to become very heavy because lead is used to shield the X-rays. The 3D image construction process is carried out by available reconstruction software. The acquired images are reconstructed and volume rendering is done to get 3D volume. After volume rendering, image segmentation is done. This is a manual process to remove the unwanted structures from the image. The applications of x ray micro tomography can be found in biomedical applications, electronics, composite materials, metallic foams, polymers, food, wood , concrete materials.

(XXXI) **Vibrating Sample Magetometer**:- This is specific kind of a high precession machine of a "Vibrating sample magnetometer" with adequate software-controlled facilities interfaced with computer. It will be used to measure magnetic properties of different kinds of materials (Metal, Alloys, Ceramics, Organic solids, and Composites) as a function of applied magnetic field (well up to 31 kOe) as well as temperature. A high precession cryostat will be used to vary the temperature form 350 K down to 12K or even lower very accurately within ±1 K. A high temperature oven will be attached to machine and used to heat the sample progressively to collect the data very accurately at different temperatures from room temperature to well up

to 1273 K. this magnetometer in conjunction with pertinent accessories will be extended to study magnetostriction of the various kinds of the samples, from our users.

(XXXII) **Cryo-Analytical HRTEM Lab**:- The proposed cryo-analytical HRTEM will equipped with a Sehottky Field Emission Gun source comparisingZrO/W(100) with energy spread of 0.3 eV. It will be operated with acceleration voltages of 80, 120, 160 and 200 kV. The modes of operation are porposed to be available TEM (Bright field and dark field), Atomic resolution imaging (wherever applicable), Micro-probe and Nano-Probe, Annular Bright field imaging, Annular and High Angle Annular Dark field Imaging, Selected area diffraction including micro- and nano diffraction, Convergent Beam Electron Diffraction (with maximum convergence angle >100 mrad) using TEM/STEM modes, EDS using TEM/STEM modes, CRYO-TEM using cryo holder and accessories.

**New Acquisitions**

1. **Vibrating Sample Magetometer (VSM) for** *High Precision Measurements of Magnetic Properties, M/S. Lake Shore Cryotronics, Inc. USA*
2. **Small molecule Single Crystal X-Ray Diffractometer System D-10 B53 Beam stop, first source, 1.5mm, Bruker AXS Analytical Instruments.**
3. **Cryo-Analytical HRTEM-** 200KV Field Emission Transmission Electron Microscope, Model 2100F(HR) with specimen Heating-Tilting holder double tilt heating holder with temperature range of 1000 degree, Gatan make 652 Holder, Jeol India
4. **Table Top and Portable X-Ray Diffractrometer:-***Model D2 Phaser a noval Desktop X-Ray DiffractionTool enabling the analysis of Poly-crystalline Material & Cobalt Tube. It is equipped with an integrated PC and flat screen monitor, FCA Frankfurt (Germany) Bruker AXS Analytical Instruments Pvt. Ltd. Singapore*
5. **LTD Model 800 Series Nitrogen Gas Cryostream Cooler standard 1500mm x 905mm 50/60Hz, M/S. Oxford Cryosystems, United Kingdom.**
6. **X-ray Micro CT Tomography***GEVtomex LT -3875, Micro focus X-ray inspection system for 3D computed tomography (CT) and standard 2D inspection, High resolution 3D X-Ray micro-Ct system with open tube X-Ray source configuration with anti Vibration system and radiation protection cabinet. M/S. ATEGE Germany***.**
7. **Pulsed Electron Paramagnetic Resonance (P-EPR),** *X-Band Fourier Transform EPR Spectrometer ELEXSYS Series with FT- and CW Specifications with 10' magnet and 12kW bipolar power supply. Bruker Biospin AG, Switzerland*

   **One-Day Workshop on Electron Backscattered Diffraction Technique on 18 April, 2015. Guest Speaker: Dr. Stuart Right, Senior Scientist** EBSD**, EDAX, USA.**

# Central Workshop and Instruments Service Section

**Chairman : Prof. A. Roy Choudhury**

**AWS : Dr. S. Patra**

The Central Workshop & Instruments Service Section (CWISS), a unique service centre at IIT, Kharagpur was established in 1965 to cater to the fabrication of custom made Instruments, experimental set-ups and samplesfor sustenance of laboratory work and experimental research activity in the Institute for all the departments and centres.

It is one of the major service sections of the Institute having following units:
(1) Mechanical
(2) Glass Blowing
(3) Carpentry
(4) Electronic Repair Section
(5) Audio Visual

## 1. Mechanical Section

### a. Dr.S. Patra, Assistant Workshop Superintendent

Mechanical Section in CWISS comprises Mechanical fabrication and Glass Blowing Section.

### b. Mechanical Fabrication Section

It is equipped with various types of machines like CNC Lathe, table mounted CNC Lathe, CNC Engraving, CNC Milling, EDM, Milling, Conventional Lathe, Bench Lathe, Watch Maker's Lathe, Drilling, Shaping Machine, Bench Drill, Bench Shaper, Grinding Machines (Surface, Cylindrical, Pedestal, Belt and Hand operated), Jig Boring, Power Saw, Shearing Machine, Polishing, Press, Arc Welding, Brazing and Soldering, etc. CNC WEDM and Laser welding machine these has enhanced our fabrication quantity and quality as well. Recently one 5-Axis CNC Machine has been purchased which will significantly improve the capability of CWISS to serve the institute.

The Mechanical Fabrication Section caters to all the departments of the Institute for any type of precision and complicated mechanical fabrication or repair with various types of metals with the machines available in the section mostly for research and project works and regular experiment classes for B. Tech. and M. Tech. as per design.

In CNC Machines different types of software are used for drawings, like Auto CAD, Rhinoceros, 3D Studio Max, Solidworks etc. for drawing works of the components to be fabricated and also use different types of CAM software for their fabrication.

During the year 2015-16 the Mechanical Section has performed jobs of about 185workorders. Some of the notable fabrications successfully completed by CWISS include the fabriacation of: different types of nozzles, SSL Robot parts, Potato slicer, Die-Punches of different sizes, different sizes tensile, Chirpy specimens of different materials, Rack, Pinion & Gears, Shadow masks, Helix, large size of Aquarium with motor fitting, Micro- channel of various sizes, Nozzle, various types of electrodes, experimental setup, portable water purification kit, Tool for EDM, Centre of gravity apparatus, Mechanical model to study vertex induced, Rotary feed control valve, Rice Bran Collector, and Assembly of model for vortex induced vibration

## 2. Glass Blowing Section

This section is equipped with glass blowing lathe, glasscutter, glass grinder, glass annealing chamber, etc. Mainly of Borosilicate glass work is done here with the help of oxygen & LPG. The main fabrication jobs include different type of condensers, Dewars, different volume capacity F.B, R.B., Flask with neck joints, manometers, U & S Tubes, glass bubbler, glass coil for oil bath, gas collector, etc. The fabrication of Glass ware items are done as per drawing and design of the equipments.

During the year 2015-16 the this section has performed jobs of about 38 workorders

## 3. Carpentry Section

Housed in the workshop complex behind Chemical Engg. & Automobile Section, This section has Auto Planer, Joints Nature's machinery, Vertical Band Saw and Multipurpose Machine. Apart from carpentry jobs, as per requirement of the Institute it also undertakes construction of MS Frames, Hand painting, Spray painting, Polishing, Writing of name plates, display board &jobs as required by students' projects.

This section also meets the major requirements of furniture in the Institute. During the year 2015-16, this section has completed 105 Workorders of various departments of the Institute including Faculty Table, Office Table, Computer Table, Special Table (with/without Door/ Drawer/Keyboard Tray), Notice Board, Book Shelf, Stools, Wooden box, Students' models of different shape etc.

## 4. Electronics Section

Electronics section of CWISS has been revived and has facilities for repair of different types of electronic equipments. It also helps users in their design and development activities. A LPKF PCB Prototyping machine is available in this section which helps the users of different departments in fabrication of double sided PCBs.

During the year 2015-16 the Electronics Section has performed jobs of about 20workorders.

## 5. Audio Visual Section

Audio Visual Cell is primarily involved in providing audio visual support for conducting regular classes at different lecture halls (approximately 600 classes per week). It supports audiovisual facilities with Multimedia projectors, Document cameras, PCs and PA system with wireless microphones for the following class rooms: V1, V2, V3 & V4 at Vikramshila complex and F116, F127, F142, F232 & F244 at main building area. During last semester the Cell could extend support to 07 new classrooms at Nalanda classroom complex. A total 44 nos. of classrooms at Nalanda classroom complex, equipped with full AV equipments, will be available in the next Autumn semester 2016.

AV Cell used to provide support about 17,400 regular classes throughout the year in aforesaid classrooms. Besides these the Cell provides AV facilities for all seminars, symposiums, workshops, short term courses and meetings at Gargi, Moitrei, S. N. Bose Auditorium and associated programme at Netaji , Kalidas Auditorium, Senate hall, Committee room and Board room. All the T. S. G. activity programmes are also supported by the Cell. AV Cell also provides support to various student activities like Quiz, Plays, Spring festival, Kshitij, Inter Hall competitions and T&P activities.

It also helps in various other academic activities like Convocation, Senate Meeting, National & International seminars, Conferences and Workshops and alsoincluding JEE & GATE units. AVCell also given technical support for pre-placement talk during office hours & beyond office hours and sometime till midnight for special cases.

The Audio Visual Cell has a good number of sophisticated equipments like Multimedia Projectors, Document Cameras, High quality Amplifiers and Mixtures, Wireless Microphones & Conference Systems and other peripheral supporting systems. Primary maintenance of these equipments are also maintained by AVCell staff itself.

## 6. Outreach

CWISS has conducted a number of Short Term Courses on CAD-CAM applications & advanced CNC programming at IIT Kharagpur. These courses have disseminated knowledge among Teaching Faculty, Staff & Students of TEQIP colleges under the TEQIP-II programme.

The Short Term Course Principal Coordinators were Professor A. Roy Choudhury (Chairman, CWISS) and Co-Ordinators Dr. Suprakash Patra (AWS, CWISS) and Mr. Santanu Das/ Jr. Tech. Supdt., CWISS.

CWISS has also carried out work for sponsored projects and for other institutions in consultancy mode through SRIC.

# Centre for Theoretical studies

**Chairman: Director, IIT Kharagpur**
**Convenor: Prof. Sayan Kar**

**RESEARCH AND DEVELOMPENT**
**Brief Descriptions on-going activities :-**

Research is carried out in CTS on the following areas:

I. Astrophysics, Cosmology and Relativity
II. Dynamics and control (including nonlinear science)
III. Mathematics, Mathematical physics and Theoretical Computer Science
IV. Theoretical Condensed Matter Physics, theoretical high energy physics
V. Theoretical Chemistry

**ACTIVITIES**

**Courses and Graduate Programme:**
CTS is offering new advanced post-graduate courses which are relevant across departments through involvement of faculty from various departments. These courses are:

1. Methods in molecular simulations (TS70001)
2. Advanced dynamics (TS70002)
3. Wave propagation in continuous media (TS70003)
4. Advanced Mathematical techniques (TS70004)
5. Advanced quantum theory (TS70005)
6. Quantum mechanics and quantum computing (TS70006)

CTS is also admitting PhD students through institute fellowships, CSIR fellowships. Currently seven such students are enrolled.

**CTS courses taught (2015-16):**
- Quantum mechanics and quantum computing (TS70006) (Autumn)
- Advanced mathematical techniques (TS70007) (Autumn)
- Methods in molecular simulations (TS70001) (Spring)
- Wave Propagation in continuous media (TS70003) (Spring)

**Lecture Series**
- Topic: Lecture Course on Fluid Instabilities (Dr. Chirag Kalelkar)
  Date: Jan. 19-Feb. 2, 2016
  Number of Students registered: 28

**SPONSORED RESEARCH**

| Sl No | List of Project | Sponsoring Agency | Duration | |
|---|---|---|---|---|
| | | | From | To |
| 1. | Semiclassical strings in Ads/CFT (SSB) | SERB, New Delhi | 12-04-2013 | 12-04-2016 |
| 2. | Quantum Mechanical/Molecular Mechanical Insights into Enzymatic Reaction Mechanisms | DAAD, Germany | 2015 | 2016 |

**FACILITIES**

- HP DL585 G7 BC NIC AMD Opteron CTO Server
- HP DL380 G9 8SFF Intel Xeon CTO Server
- A Computer Lab with 11 Pentiums, 2 AMD Opteron Server, HP color Laserjet duplex network printer, HP Laserjet duplex network printer, Scanner, Multimedia Projector, Canon copier
- Software (Mathematica, Matlab, Maple, Scilab, IFort, IDL, Aips, Comsol etc.)
- CTS library

**Visitors Programme**

To provide facilities to faculty members, postdoctoral fellows and students from academic and research institutions in India and abroad to conduct research on theoretical problems in science and engineering in collaboration with faculty members of IIT Kharagpur.

21 visitors from different institutes have visited during 2015 – 2016 under CTS Visitors Programme.

17 different lectures have been given by the visiting experts. Additionally, S.Datta Majumdar Memorial Lecture on Gravity and the Cosmos was given by Professor Thanu Padmanabhan, Distinguished Professor, IUCAA, Pune on November 16, 2015.

**COLLABORATIVE EFFORTS**

The Centre for Theoretical Studies has very active collaborative research programmes in the board areas of Astrophysics and Cosmology. The research carried out under this collaboration is focused mainly on Cosmology. The collaboration with NCRA, TIFR, Pune. This focuses on the possibility of using low-frequency radio wave observations to study a variety of astrophysical processes through the 21 cm neutral hydrogen radiation, including turbulence in the interstellar medium and the early universe.

# Computer & Informatics Centre

1. The centre has extended the Institute networking facility to the new buildings like the J C Ghosh and P C Roy Science block, two new blocks of Nivedita hall of residence and two blocks of new faculty accommodation. In addition to these the networking has also been provided extensively to the various new laboratories and research facilities within the academic campus.The new building of Centre for Railway Research (CRR) has been networked as per their requirement.

2. The first floor of the newly constructed Integrated Information Services (ISS) building has been fully networked and the ground floor which will house ERP servers and all other facilities will be networked shortly.

3. To improve the Internet response and to facilitate various Information and Communication Technologies (ICT) based services, the NKN connectivity to the Institute has been upgraded from 2 Gbps to 11 Gbps

4. To facilitate faster internet access, CIC has hosted three Google cash servers in coordination with NKN.

5. In addition to the above, CIC has revamped the internet gateway infrastructure by installing high power internet routers with integrated firewalls, Intrusion Detection System (IDS), Intrusion Protection System (IPS) and Proxy Server Load Balancer.CIC is also in continuous process of maintaining and upgrading its infrastructure to enhance the scalability & reliability of IT operations.

6. CIC has upgraded the Institute mail messaging system and has taken adequate security measures to protect the Institute network from spyware, malware and has also initiated proactive steps to prevent the latest threat ransomware.

7. The laboratories in CIC (5 Nos) have been utilized for the Institute academics purposes for conducting Institute laboratory classes along with organizing GATE 2016 online examinations as a test centre.

# Continuing Education Center

**Name of the Centre/Unit : Continuing Education Centre.**
**Full name of the Dean : Prof. Om Prakash Sha**

**Short Term Courses Organized by the Unit :**

**a)**

| Sl. No. | Short term courses organized under | No. of Courses | No. of participants | Duration |
|---|---|---|---|---|
| 1. | QIP (AICTE) Short Term Courses | 09 | 265 | 12 Weeks |
| 2. | Sponsored/Self finance Short term courses | 77 | 2500 (approx.) | 1 week for each course (approx.) |
| 3. | Workshop/ National & International Conference | 17 | 515 (approx.) | 3-4 days for each conf. |
| | Total = | 103 | 3280 | |

**b) 3-Year Executive MBA Programmeorganised by the Unit :**

| Sl. No. | Name of the Campus | No. of Students | Duration |
|---|---|---|---|
| 1. | Kolkata campus | 30 | 3 Years |
| 2. | Bhubaneswar campus | 11 | 3 Years |

**c) Empowerment of Students and Teachers through Synchronous & Asynchronous Instruction (EIT) under NMEICT, MHRD**

| Sl. No. | Title of Workshop | No. of trainers/ participants | Duration |
|---|---|---|---|
| 1. | Design of Algorithms | 221 / 7163 | 1 week / 2 weeks |
| 2. | Structural Engineering | 168 / 3860 | 1 week |

**d) Knowledge Dissemination Programme (KDP)**

Continuing Education Cell introduced ***On-Line video-enabled micro-credit courses*** of 10-12 hours duration under the Knowledge Dissemination Programme (KDP). A total of 10 courses were offered in 2015-16. These modular courses were conducted from IIT Kharagpur and streamed live through video conferencing to our Kolkata and Bhubaneswar campuses using the NKN enabled classrooms during evening/weekends. A total of 354 participants which included students and faculty members from TEQIP-II institutions, IIT Kharagpur students and industry professions attended the KDP programme.

| Sl No. | Title | Participants list |
|---|---|---|
| 1 | Data Mining | 18 |
| 2 | Wireless Sensor Network and Internet of Things | 32 |
| 3 | Embedded System Design | 29 |
| 4 | Microfuidics and Nanofluidics | 62 |
| 5 | Service Operations Management | 20 |
| 6 | Selected Topics of Advanced Signal Processing | 24 |
| 7 | Effective Speaking and Making Presentations | 41 |
| 8 | Hydraulic Transients in Water Conveyance Systems | 33 |
| 9 | Gradient Based Numerical Optimization Algorithms | 95 |
| | | **354** |

**e) International Summer and Winter Term (ISWT)/Global Initiative for Academic Networks (GIAN)**

Indian Institute of Technology Kharagpur conducted its second International Summer and Winter Term (ISWT) by offering nine courses in the summer of 2015 and one in winter of 2015. Additionally, twelve courses were offered under the Govt. of India new programme titled ***Global Initiative for Academic Networks (GIAN)*** in the winter of 2015. These courses of 2 weeks or 10 working days duration were designed around current and multidisciplinary themes of Science, Engineering, Management and Law with a judicious blend of lectures and tutorials per day. A total of 360 national and international participants from the academia and industry participated in the summer courses whereas a total of 520 participants attended the winter courses. GIAN/ISWT courses provided an excellent platform to our students, faculty and industry professionals to seek knowledge and experience from international faculty. It also provided them an opportunity to interact and learn subjects in niche areas through collaborative learning process. High quality course material, both through print and video, was developed under the GIAN/ISWT programme so as to be used by a larger body of students and teachers.

| **International Summer Winter Term (ISWT)<br>1st April 2015 to 31st March 2016** | | | | |
|---|---|---|---|---|
| ***ISWT Summer courses - 2015*** | | | | |
| ***Sl. No.*** | ***Subject Code*** | ***Name of the Subject*** | ***No. of Days*** | ***No. of Students*** |
| 1 | 15IST01 | Enabling Internet of Things with Cloud and Big-Data Networking | 14 | 43 |
| 2 | 15IST03 | Vibration & Flutter | 10 | 27 |
| 3 | 15IST04 | Introduction to Nano Sturctured Polymeric Materials | 12 | 31 |
| 4 | 15IST05 | Supply chain-Network-Modelling and Analysis | 12 | 41 |
| 5 | 15IST06 | Deep Foundations including Seismic and Offshore applications | 12 | 41 |
| 6 | 15IST07 | Microfluidics & Nanotechnology for Health-care engineering | 12 | 91 |
| 7 | 15IST08 | Corporate Governance | 14 | 31 |
| 8 | 15IST09 | Mapping Creativity | 10 | 29 |
| 9 | 15IST10 | Modeling River-Catchment Interactions | 12 | 26 |
| ***ISWT Winter courses-2015*** | | | | |
| 10 | 15IWT03 | Ergonomics and Human Factors Engg. | 11 | 32 |
| | | | | **360** |

**GIAN Courses 2015-2016**

| | | | | |
|---|---|---|---|---|
| 1 | 15IWT01 | Orthopaedic Biomechanics: Implants and Biomaterials | 12 | 52 |
| 2 | 15IWT02 | Thin film technology for waste heat recovery | 10 | 33 |
| 3 | 15IWT04 | Hydrodynamics of Riverbed Erosion and Scour at Structures | 12 | 43 |
| 4 | 15IWT05 | Separation of fine and ultra-fine particulated in fluid medium: fundamentals and applications in mineral processing | 12 | 49 |
| 5 | 15IWT06 | Video Based Scene Understanding | 12 | 28 |
| 6 | 15IWT07 | Logic and Application of Logic | 12 | 40 |

| | | | | |
|---|---|---|---|---|
| 7 | 15IWT08 | Probabilistic Risk Assessment | 12 | 14 |
| 8 | 15IWT09 | Planning and Management of Cultural Heritage Sites | 12 | 42 |
| 9 | 15IWT10 | Smartgrid Operation with Renewables | 12 | 29 |
| 10 | 15IWT11 | Special Topics in Robotics | 13 | 80 |
| 11 | 15IWT12 | Rock Fragmentation Commercial Explosives , Blast Design, and Productivity: Level | 12 | 43 |
| 12 | 15IWT13 | Nano-Biotechnology A Discipline at a Crossroads | 15 | 35 |
| | | | | **520** |

**Facilities:**
Video-ConferencingStudios at Kolkata (3), Bhubaneswar (3)and Kharagpur (4)& Raipur (2)Seating Capacity (60 + 40 + 40 + 40+40)

**Collaborative Efforts** **:** -NIL-

**Seminars/Workshops/Conferences/ISWT/GIAN/KDP Organized by the Unit**

Total No. of Workshops/Conferences/Short-term courses/
Symposia/GIAN/ISWT/KDP Organize : 134

Total No. of participants attended : 4500 +

**Particulars of M.Tech and Ph.D scholars joined/completed under QIP:**

A. No. of Teachers completed Ph.D degree under QIP : 10
B. No. of Teachers completed M.Techprogramme under QIP : 06
C. No. of Teachers joined Ph.Dprogramme under QIP : 07
D. No. of Teachers taking advance admission to Ph.Dprogramme under QIP : 04

**Particulars of 3-year M.TechProgramme:**

A. No. of students completing the course under EC specialisation: 02
B. No. of students completing the course under IT specialisation: 01

**Particulars of 3-year Executive MBA programme**

A.No. of students completing the course from Kolkata campus: 30
B. No. of students completing the course from Bhubaneswar campus: 11

# Estate (e&m) Works Section
# Indian Institute of Technology, Kharagpur

1. Installation and commissioning of 1.00 MW 11kV/415V Substation at NCRC for Chiller Plant. Another 1.5 MW, 11kV/415V Substation for AHU has been tendered for for NCRC.

2. A proposal for 1000kWp distributed roof top power solar plant has been approved and tendered.

3. The Institute has taken an initiative of conversion of conventional sodium vapour& mercury vapour street lights into LED street lights in phases. The job is in its last phase.

4. Installation of 100 kWp solar power plant in the roof top of the Mathematics Department of the Institute. The power generated is being fed to the Grid. Total energy generated is 80,000 units in 6 months.

5 a) The website of the Section was launched on 7th March 2014. It is an interactive portal giving vivid details of our Substations, HT and LT lines interconnecting the Substations and load centers, the organization of the Section with responsibilities delegated to the supervisors.

5 b) An online Data Acquisition system has been installed by the Section which gives the Instantaneous voltage, current, power factor, Maximum Demand at 33kV and 11kV voltage levels at the main 33kV Substation. The historical data is also saved in the system for graphical and tabular demonstration.

6. Installation of occupancy sensor for automatic switching operation of light & fan loads in various classrooms V1, V2, V3, V4 , S N Bose, Bhatnagar, Raman Auditorium and F-132 at IIT Kharagpur. This has enabled the disconnection of light and fan loads in the absence of student occupancy in the classrooms.

7. Installation of Machine room less elevators in Sir J.C.Bose Lab Complex, Computer Science Dept., B.C.Roy .Technology Hospital patient elevator and LBS Dumb waiter.

8. Installation of modern advanced new generation ESE Type lighting arresters have been installed in the Institute Main Building, Old Building and also in five Halls.

This will protect the large area of the Institute residential and academic area from lightning.

# Civil Construction and Maintenance Section

As a part of the ongoing infrastructural development, various construction projects have been taken up by Civil Construction and Maintenance Section. Current status of those projects is as follows:

**A. NALANDA CLASSROOM COMPLEX :**

Remodeling and finishing of 30 class rooms (RCR-1 & CCR-1) are completed. Work in STB-1, STB-2, Administrative Block are in progress.

**B. J.C. GHOSH SCIENCE BLOCK & P.C ROY LABORATORY BLOCK :**

All works completed. 6 Floors handed over (2 floors SIDM. 2 floors CORAL, 1 floor Petroleum Dept.). Balance floors allotted to Chemistry Department . HVAC works for Chemistry Department is in progress.

**C. EXPANSION WORK IN ACADEMIC BUILDINGS :**

Work for construction of Aerospace Engineering building has already been awarded. Tendering is underway by the PMC, M/s. HSCL. The tendering for construction of new Annex Building in Mining Engineering Department is in progress.

**D. CONSTRUCTION OF B-TYPE FACULTY APARMENTS :**

RCC structural work under progress.

**E. CONSTRUCTION OF MARRIED SCHOLARS ACCOMMODATION :**

All RCC structural works completed, finishing works in progress.

**F. CONSTRUCITON OF FAUCLTY TRANSIT APARTMENTS :**

All RCC structural works completed, finishing works in progress.

**G. EXPANSION OF VIKRAM SARABHAI RESIDENTIAL ACCOMMODATION :**

164 rooms for Boys and 164 rooms for Girls – RCC structural work under progress.

**H. CONSTRUCTION OF SUPER SPECIALITY HOSPITAL :**

The work for construction of the Main Hospital Building for the Dr. B.C. Roy Institute of Medical Science & Research has been awarded to M/s. Larsen & Toubro Ltd. by our PMC, HSCC (I) Ltd. The foundation work has been completed and work is in progress at the second floor level.

**I. CONSTRUCTION OF RESEARCH PARK AT RAJARHAT KOLKATA:**

The work order for the (B+G+9) Main Building along with Auditorium, Sub Station building and services has been issued by CPWD to M/s. NCC Ltd. The super structure of the Auditorium has been completed and work for the roof dome is under progress. The super structure the Main Building has been completed upto the sixth floor level and brickwork is in progress. The piles for the Sub Station building have been completed and pile caps are in progress.

**J. CONSTRUCTION OF NIVEDITA HALL OF RESIDENCE :**

Blocks 1, 2 , 3, 4 and Dining, Kitchen & common facility Block structure completed, Block 1 & 2 finishing work almost completed. External services (lift, boundary wall, water and sewer, UGR, electric, road etc.) work under progress

**K. 66 UNITS OF NEW FACULTY ACCOMMODATION :**

66 nos. New Faculty Accommodation units in 11 (G+2) buildings are being constructed by CPWD in place of the dilapidated/demolished quarter Nos. A-32, C1 61-70, C1 77-78, C1 81-84 and C1 41-42. CPWD has placed the order to their executing agency M/s S.N. Paul & Co. Five sites have been handed over to CPWD after obtaining clearance from other service units. The demolition work is progress in the other six sites.

**L. NEW WATER SUPPLY PROJECT :**

Total pipe laying done 11.04 Km out of 12.600 km. The work is in progress in SE Rly Goods yard Area where total of 4.29 km has been laid out of 5.500 km. Pier casting & Collector well casting is in progress.

M. NANO CRF & LIFE SCIENCE BUILDING OF DIAMOND JUBILEE COMPLEX :

Excavation for Life Science Building is almost completed. PCC below foundation is in progress.

N. RENOVATION OF CHEMICAL ENGINEERING LABORATORY BUILDING :

Work order has been issued to M/s. NPCC Ltd. Architect selection under progress.

O. 100 UNITS OF POST DOCTORAL ACCOMMODATION :

Tender for selection of executing agency is in advanced stage.

P. FOREIGN VISITORS' ACCOMMODATION :

Tendering Process is completed by CPWD. LOI has been issued to the executing agency.

# Extra Academic Activities (NSS, NCC, NSO)

The extra academic activity (EAA) at IIT Kharagpur involves undergraduate students in the National Service Scheme (NSS), National Cadet Corps (NCC) and sports and fitness activities over four semesters. In each semester,each student gets involves in approximately 45 hours of field work in EAA. Specific Highlights of the EAA program in 2015-2016 academic year are as follows:

**National Service Scheme**of EAAcovers about 1000 students in 2015-2016. The students typically spend three hours per week over entire semesters working on social issues at about 25 villages and slums around Kharagpur. There, they facilitated the education of underprivileged school children by organizing scholarships, prizes, study materials, stationery, bicycles and utensils. They monitored drinking water quality at villages and provided nutritional supplements to primary school children to ameliorate endemic malnutrition among tribal population. They also organized blood donation and medical camps and awareness programs on issues such as substance abuse, health and hygiene and nutrition. They planted and maintained saplings and participated in facility and infrastructure maintenance, e.g., repair of rural roads, painting and maintaining school buildings and furniture. They also organized vocational training programs for unemployed youth and women, using internal resources as well as external funding from agencies such as Society for Self-employment of Unemployed Youth of West Bengal Government. The trainings cover a variety of trades such as basic tailoring; domestic wiring; repair and maintenance of household electrical equipment, e.g., air conditioner and fridge; two- three- wheeler servicing, repair and maintenance; and plumbing. Details on these activities can be found at nssiitkgp.blogspot.com.

1 Beng EME and 3 Tech Air **NCC**, each comprised of 200 cadets each form an essential part of the EAA mainly for the first two years of the undergraduate program of IIT Kharagpur. For the first time, 16 girl students were inducted into 3 Tech Air NCC in this academic session. They along with other IIT Kharagpur NCC cadets participated in the Republic Day parade on 26th January 2016.

The **Health and Fitness** program of EAA covers about900 UG students in 2015-2016. Ten faculty members and one program coordinator supervised the activities as program officers. Twice-a-week students in this program assemble for an early morning physical training under the guidance of qualified physical training instructors from Technology Students' Gymkhana. Additionally, students were introduced to Yoga, Karate and disaster management in special sessions. The students organized awareness rallies and published a newsletter on healthy living at regular intervals. There were cleaning drives by students to improve the health and hygiene and inculcate a sense of cleanliness. Further details on the activities of the Health and Fitness group can be found at healthandfitnessiitkgp.blogspot.in/ and www.youtube.com/user/iitkgpnso.

# Institute Information Cell

***Head:*** Prof. Soumya Kanti Ghosh

***Associate Head:*** Prof. PralayMitra

The Institute Information Cell (IIC)is the hub of academic and administrative information of the Institute. IIC maintains the Institute website and the internal website (online notice-board). The cell also maintains and hoststhe sites for conferences, seminars, workshops and short-term courses organized by IIT Kharagpur.The new version of the institute website is being developed by the Institute Information Cell.The new website is integrated with the institute ERP system for acquisition of real time authenticated information.

The cell also maintains several in-house applications. These includes on-line *Faculty Self Appraisal* system, *Departmental Report Generation* system, *Guest House Booking* system, *Staff Directory*, *Doctorates' Information System* etc. The cell has prepared a new version of *Communication Directory* with updated information (telephone numbers, addresses, emails) of the administration, sections, departments, schools, centres etc. IIC also consolidates and provides information for preparation of annual reports of the institute.

# Kalpana Chawla Space Technology Cell

- **Research and Development Activities**

Space Technology Cell, IIT Kharagpur was renamed as Kalpana Chawla Space Technology Cell and was formally inaugurated by Chairman ISRO on 17th November 2004 this Cell has been functioning under the supervision of chairman of Space Technology Cell since June 1998. The Cell is being funded by ISRO, Bangalore. Currently, the cell handles forty number of on-going research projects and in addition eight new projects are approved in 2015-2016. These collaborative research projects are carried out in the following broad areas:

1) Liquid Combustion, Propulsion and Cryogenics
2) Space Communications and EMI/EMC
3) Micro-machine Sensors
4) Control, Navigation and Guidance
5) Embedded Systems and IP-Cores
6) Cryptography and Security
7) Remote Sensing
8) Life Support Engineering
9) Smart Materials & Exotic Materials
10) Power Electronics
11) Space Education
12) Electronics Devices
13) Cryogenics

As an outcome there are approximately hundred papers published in reputed national and international journals and conferences. KCSTC offered two courses on Antenna & Radar in the academic year of 2015-2016.

- **Infrastructure Development and new Acquisitions**

A number of softwares and hardwares have been procured under KCSTC projects to enhance the research platform of KCSTC as well as different department laboratories. A few of these are as follows:

i) CST Software-Microwave studio, version-5, IE3D – version – 9, MATLAB, WIPL-D, HFSS, VCO-Model no – ZOS-1025, LNA, Filters, Mixers & TCAD software for VLSI design.

# Rajbhasha Vibhag

**Chairman**
Prof. D. K. Gupta

**Hindi Officer**
Dr. Rajeev Kumar Rawat

**On Going Activities of Vibhag**

**Translation**
All the documents, correspondence, Institute's Annual Report and Annual Accounts statement are translated by Rajbhasha Vibhag apart from the routine translation of various technical / non technical documents, administrative orders and letters from English to Hindi and vice versa. In addition to the translation of documents, the Vibhag ensures the bilingual display of different nameplates, notice boards, rubber stamps, and preparation of Degrees / Diplomas certificates awarded by the institute.

**Hindi Training**
Rajbhasha Vibhag has initiated Hindi Training to Institute employees for Praveen and Pragya course under Hindi Teaching Scheme. The classes are arranged in Institute with the help of Sri K K Pathak, Hindi Pradhyapak, Hindi Teaching Scheme. A total 204 employees have been trained up to Pragya level.
We have started a new training program of PARANGAT and 21 employees have passed and planning to open a Hindi Typing Program also.

**Hindi Workshops and Seminars**
With a view to create awareness for use of Hindi as Official Language in official work as well as to accelerate the pace of its progressive use, Rajbhasha Vibhag used to organize various training programmes, Workshops and Seminars for the employees / Officers of the Institute throughout the year. In the previous year 15-16 the following events took place:-

On 29-30 Jun 2015, 21-22 Dec 2015, Hindi workshops were organized for the employees. In these Dr. Rajeev Kumar Rawat, Hindi officer, Dr B M Bareja from Oil India Ltd, Dr S C Jha from HTS briefed the employees about the techniques for doing their day to day official work in Hindi and also hands-on training was given to them to be able to work on computer in Hindi, noting and drafting.

**Celebration of HINDI DIVAS**
During the month of September, Rajbhasha Vibhag has organized "Hindi Saptah" from 14th Sep 2015. Several programmes and competitions in Hindi were organised for employees and students of the Institute as well as for the students of nearby schools. Winners were motivated with certificates and hindi books as prizes. Sri Ashok Vajpai a noted writer and poet was the chief guest of the occasion who delivered a lecture on Knowledge and Mother Languages.

**Publication**
Rajbhasha Vibhag publishes a monthly News Magazine "Jharokha" in Hindi covering all the academic, cultural, extra-curricular activities of the institute with the rules , regulations, policy matters related to Rajbhasha.

**Resources and Achievements**

**Softwares**
Rajbhasha Vibhag has several Hindi Softwares like i-leap, ISM Publisher, ISM Office, Leap Office etc. Vibhag also uses the tools, PARIVARTAK, MANTRA, TRANSLITERATION, etc developed by Department of Official Language, MHA, Government of India, C-DAC and other agencies. Recently ISM V.6 was procured which is Unicode compatible.

**UNICODE**
The Vibhag has activated UNICODE in all the computers of departments and trained the employees to work in Hindi.

**Rajbhasha Library**
Rajbhasha Vibhag has a fully fledged Library with a collection of more than 1800 books of different writers on literature, fiction, poetry, prose, play and various subjects of translation and language.

**Bilingual web site**
The Rajbhasha Vibhag has made its website bilingual. Useful information links are available on Vibhag Website regarding training programmes, incentives schemes, different tools etc. The Rajbhasha Vibhag has also made the Institute's website bilingual and efforts are being made to make the contents of the website also bilingual.

**Committees**

**Official Language Implementation Committee and Progress Measurement Committee**
The Institute has constituted Official Language Implementation Committee (OLIC) for the implementation of Rajbhasha Policies and to monitor the progressive use of Hindi in the Institute in day-to-day work. A meeting of the OLIC is held quarterly and is chaired by the Director. This year the meetings were held on 15.07.15, 20.11.15 and 22.02.2016 to discuss various issues of Rajbhasha.

**Town Official Language Implementation Committee (TOLIC)**
In addition to this, Rajbhasha Vibhag, IIT Kharagpur plays a vital role in co-ordination for implementing the Official Language policy in the town. As the Director of the Institute is the senior most officer of Central government in Kharagpur, Rajbhasha Vibhag, Ministry of Home Affairs, Government of India has nominated him as Chairman of Town Official Language Implementation Committee (TOLIC). All the central government offices, Banks, Corporations, Autonomous bodies and enterprises are the members of TOLIC. At present there are 53 member Offices in the committee. The committee has been assigned the task of implementing the Rajbhasha policies and ensuring the orders and directives of government. The Director, Prof. Partha P Chakraborty has nominated Prof. D. K. Gupta, Chairman/Rajbhasha Vibhag as Executive Chairman and Dr. Rajeev Kumar Rawat, Hindi Officer as Member-Secretary of TOLIC to look after the routine work of committee. As per the calendar, the meetings of TOLIC Khargpur are fixed to be held in January and August. In the previous year two meetings were held on 04.09.2015 and 22.02.16. The meetings were chaired by the Chairman TOLIC and attended by Heads of the member offices with their Hindi Staff. Rajbhasha Vibhag invites the employees of TOLIC member offices to participate in the workshops, seminars and training programmes organized in IIT Kharagpur. The newly appointed Deputy Director at Implementation Office Kolkata had visited and inspected many member offices during this period. TOLIC celebrated MATRABHASHA DIVAS, KAVI SAMMELAN, PREMCHAND JAYANTI, ESSAY competition and various other programs during the period.

# Science & Technology Entrepreneurs' Park (step)

**1. NAME OF THE UNIT:**
Science & Technology Entrepreneurs' Park / Technology Business Incubators (STEP/TBI)

**2. FULL NAME OF THE CONCERNED OFFICER :**
Prof. Satyahari Dey
Professor, Department of Biotechnology, &
Prof-in-Charge of Incubation and Entrepreneurship Programme, SRIC &
Managing Director, Science and Technology Entrepreneurs' Park (STEP),
Indian Institute of Technology Kharagpur, India

**3. MAJOR ACTIVITIES:**

**a)** Infrastructure facilities created:
(1) STEP Gopali Campus has been partially renovated for water connection, electrification, improving security measures etc.

**b)** Science graduates from peripheral villages of STEP Gopali campus have been given training on "Tissue culture programme" at Department of Biotechnology during January-June, 2016.

**c)** Tata Metaliks DI Pipes Ltd. visited the "Tissue Culture Banana Plantation" site at STEP Gopali campus and STEP officials visited Tata Metaliks DI Pipes Ltd. on 15th February, 2016 and now shown their interest on the possibility of CSR project.

**d)** Procedure for entrepreneurship for UG/PG students and Research Scholars decided.

**e)** Standing calls for proposals (CFP) activated w.e.f February 2016 for
(1) PRISM Grant
(2) Seed Loan under TBI/TIDE/TDB/TIETS

**f)** **Innovation Ignition Committee (IIC)** has been formed with 10 Faculty members of IIT Kharagpur to motivate UG/PG/RS students and Faculty members to take up entrepreneurship.

**g)** **Core Committee for Performance Evaluation (CCPE)** has been formed to take action against defaulting incubatees, to review activities/performance of all the defaulting companies and others and to recommend punitive actions. The committee formed with 5 Faculty members of IIT Kharagpur will also recommend new Entrepreneurs/Incubatees based on the merit or their proposals.

**h)** **Technical cum Financial Review Committee (TRC)** has been set up with 11 Faculty members and Registrar of IIT Kharagpur to review the technical and financial progress made by various companies incubated at STEP, IIT Kharagpur and support the CCPE.

**i)** **TIETS-TIDE Screening Committee Meeting:** A TIETS-TIDE Screening Committee Meeting for disbursement of seed fund was held at STEP, IIT Kharagpur on 20th May, 2015. Three companies: M/s Polysorb Laboratories Pvt. Ltd., M/s United Technology Laboratory and M/s Perfecist Technologies Pvt. Ltd. presented their project (technical and financial) proposal during the meeting. M/s Perfecist Technologies Pvt. Ltd. has been funded Rs.5 lakh under TIDE Seed Loan Scheme.

**TIETS-TIDE Screening Committee Meeting:** A TIETS-TIDE Screening Committee Meeting for disbursement of seed fund was held at STEP, IIT Kharagpur on 12th November, 2015. Three companies: M/s Epsilon Energies, M/s Infilight and M/s Emsig Technologies Pvt. Ltd. presented their project (technical and financial) proposal during the meeting. M/s Emsig Technologies Pvt. Ltd. has been funded Rs.10 lakh under TIDE Seed Loan Scheme.

**TIETS-TIDE Screening Committee Meeting:** A TIETS-TIDE Screening Committee Meeting for disbursement of seed fund was held at STEP, IIT Kharagpur on 23rd March, 2016. Two companies: M/s Vejovis Healthcare Solutions Pvt. Ltd., M/s Unlax Consumer Solutions Pvt. Ltd. presented their project (technical and financial) proposal during the meeting. M/s Unlax Consumer Solutions Pvt. Ltd. has been funded Rs.6.5 lakh under TIDE Seed Loan Scheme.

**j) Brainstorming Meeting on Intellectual Property (IP):** A brainstorming meeting was held on 6th July, 2015 at STEP, IIT Kharagpur. Prof. Goutam Saha and Prof. Tapas K Bandhyopadhyay gave presentation and talk during the meeting. Many entrepreneurs' of STEP, IIT Kharagpur attended the meeting.

**k) Interactive session with Mr. Peter Chan:** An Interactive session was organized on 9th August, 2015 among the entrepreneurs of STEP and the students of the Institute with Mr. Peter Chan, esteemed alumnus of Department of Electrical Engineering, IIT Kharagpur who is the best BONSAI ENTREPRENEUR in the world.

**l) WORKSHOP on 'Bio-innovation':** A WORKSHOP on Bio-innovation was held on 4th September, 2015 at the Conference Room at STEP, IIT Kharagpur Campus. The workshop was attended by the STEP entrepreneurs and the students of our Institute. DR. ASIT B. MANDAL (Agri Biotech), Principal Scientist, Central Research Institute for Jute & Allied Fibers (ICAR), Barrackpore; Dr. DEBPRASAD CHATTOPADHYAY (Drug discovery), Deputy Director (Scientist 'E'), ICMR Virus Unit, I.D. & B.G. Hospital, Kolkata and DR. BHASKAR SAHA (immunodiagnostics), Scientist 'G', National Centre for Cell Science, Pune were invited to give take on Bio-innovation.

**m) Progress Report of TOCIC, IIT Kharagpur:**

(1) PRISM Project Review Committee Meeting was held at TOCIC, IIT Kharagpur on 1st April, 2015 to review 2 PRISM Projects

(2) PRISM Project Review Committee Meeting was held at TOCIC, IIT Kharagpur on 5th August, 2015 to review 1 PRISM Project.

**4. RESEARCH AND DEVELOPMENT:**

N/A.

**5. Brief descriptions of on-going entrepreneurial activities at STEP**

- Total No. of companies: 90.
  STEP IIT Kharagpur Campus: 77.
  STEP Gopali Campus: 13.

- No. of Companies incubated in 2015-16: 4.
  STEP IIT Kharagpur Campus: 3.
  STEP Gopali Campus: 1.

***New Companies inducted at STEP-IIT Kharagpur campus during 2015-16***

***New Acquisitions in STEP-IIT Campus:***

| Sl. No | Name of the companies | Major Entrepreneurial Activity |
|---|---|---|
| 1 | M/s Embedding Security and Privacy Pvt. Ltd. | Software security system. |
| 2 | M/s Unlax Consumer Solutions Pvt. Ltd. | Smart Home Management using the Internet of Things (IoT) and data analytics. |
| 3 | M/s Parthasarathi Mukhopadhyay | Advanced Manufacturing and Desigh Technology for Civil Aircraft. |

***Companies incubated at STEP-Gopali campus during 2015-16***

***New Acquisitions in STEP-Gopali Campus:***

| Sl. No. | Name of the companies | Major entrepreneurial activity |
|---|---|---|
| | M/s Vas Bros. Enterprises Pvt. Ltd. | Transfer of Laterite Based Arsenic Filtration Technology and Manufacturing of Laterite Based Arsenic Filter Media |

**Awards and Recognition to STEP Entrepreneurs**

- **M/s SG ArtHeart Pvt. Ltd.**
  Prof. Sujoy Kr. Guha (Institute faculty) got awarded with the 'Best Innovator's Pitch' in the BIRAC Innovators Meet 2014 for Prioritizing Innovation Research for Affordable Product Development.
- **M/s Amnivor Medicare Pvt. Ltd.**
  Dr. Santanu Dhara has been awarded by BIRAC SRISTI Gandhian Young Technological Innovation Award 2015 for their project titled; 'X-ray visible polymers via in situ iodination - crosslinking for non-invasive real time imaging'. The innovator's R&D team also has bagged Gold Medal in DST-Lockheed Martin India-Innovation Growth Programme 2015.
- **M/s Auro Robotics Pvt. Ltd.**
  They have been selected in Y Combinator startup incubator-cum-accelerator program in California, US for their project titled; 'Development of autonomous driving system for ground vehicle'.
- **M/s Think Innoventions Pvt. Ltd.**

The company has received a special appreciation certificate from CDAC evaluation under DIT.

## 6. SEMINARS/WORKSHOPS/CONFERENCES:

| Sl. No. | Name of the Seminars / Workshops / Conferences / Symposia | Date |
|---|---|---|
| 1 | PRISM Workshop / Symposium | 1st April, 2015, 5th August, 2015 |
| 2 | STEP GBM & AGM | 7th October, 2015 |
| 3 | STEP Quarterly GBM | 13th January, 2016 |
| 4 | TIDE Screening Commiitee | 20th May, 2015; 12th November, 2015 & 23rd March, 2016 |

# Sponsored Research & Industrial Consultancy (SRIC)

The IITs are increasingly being regarded as the primary drivers for indigenous technology development targeting the needs of the nation. Research sponsored by Government as well as the industry is expected to grow in the years to come, spearheaded by the faculty and research students of the premier academic institutes. At IIT Kharagpur, the Sponsored Research and Industrial Consultancy (SRIC) cell of the institute acts as the conduit for industrial interaction and faculty participation in sponsored research. The wide variety of engineering sciences at IIT Kharagpur provides a unique environment that fosters inter-disciplinary research in cutting edge technology areas, such as energy, nanotechnology, semiconductors, bioengineering, and computational sciences. The diversity of in-house expertise at IIT Kharagpur has also catalyzed the development of a healthy ecosystem for large scale industrial collaborations in multi-disciplinary areas, such as automotive control software, railways research, steel technology, petroleum and biofuels research, industrial robotics, and many more.

The year 2015-16 has witnessed a significant evolution in the models for research funding from the government. The Ministry of Human Resource Development has taken a leadership role through the newly introduced schemes of Uchchatar Avishkar Yojana (UAY) and Imprint, by streamlining the partnership of various ministries and industry in areas of advanced high-end research at the academic institutions. SRIC IIT Kharagpur played a key role in catalyzing the submission of a large number of proposals from IIT Kharagpur, and worked with the other IITs in carrying out the selection process. In UAY alone, the institute has received funding commitment to the tune of 66 crores spread over the following exciting new projects.

1. *Development of Metallocene Grade Linear Low Density Polyethylene (LLDPE): Catalyst, Process and Polymer* under Ministry of Chemicals and Fertilizerswith partial financial assistance from TCG Lifesciences Pvt. Ltd.,Kolkata.
2. *Development of indigenous blast vibration monitoring seismograph for mining industry* under Ministry of Coalwith partial financial assistance from Uttam Blastech Pvt. Ltd., Hyderabad.
3. *Development of Rapid Prototyping and Dual-Type Filament Making Machines for Rapid Laser Direct Structuring for molded Interconnect Devices and Thermoplastics* under Ministry of Communications and Information Technologywith partial financial assistance from Alfatek Systems, Kolkata.
4. *Effective Drug Repurposing through literature and patent mining, data integration and development of systems pharmacology platform* under Ministry of Communications and Information Technologywith partial financial assistance from GVK BIO, Hyderabad.
5. *Oligosaccharide Nutraceuticals from Grain Crops: New Molecules, Scale Up of Production, Formulation and Pilot Scale Product Development* under Ministry of Food Processing Industrieswith partial financial assistance from Ultra-Seedtech India Pvt. Ltd., Hyderabad.
6. *Development of High Performance Rubber Composites using New Generation Materials for Application in Tyre* under Ministry of Heavy Industries and Public Enterprises with partial financial assistance from TATA Steel, Aditya Birla, HSS Elastomer & Tyre Research Institute, Balkrishna Industries Ltd., IRMRA, Techno Waxchem Pvt. Ltd., and Acmechem Ltd.
7. *Open and Intelligent Plug-in Hybrid Electric Vehicle (PHEV) Technologies for Smart Indian Cities* under Ministry of Heavy Industries and Public Enterpriseswith partial financial assistance from TATA Motors Limited.
8. *Pilot Scale Production of Ethanol from Lignocellulosic Feedstock* under Ministry of Petroleum and Natural Gaswith partial financial assistance from Devleela Lifesciences Pvt. Ltd. Raipur, India.
9. *Development of Rotary Hearth Furnace Technology for treating off grade iron ore* under Ministry of Steelwith partial financial assistance from SAIL.
10. *Safety Analytics: Save People at Work from Accidents and Injuries* under Ministry of Steel with partial financial assistance from Tata Steel, Jamshedpur.

11. *Ramie cultivation, fiber processing and textile manufacture* under Ministry of Textiles with partial financial assistance from Advance Automation, Kolkata.
12. *Bogie Design, Vehicle Dynamics, and Rail-Wheel Traction Control Towards Improved Safety and Comfort and Reduction in Running Costs for Metro Coaches* under Ministry of Urban Development with partial financial assistance from BEML Ltd., Bangalore.
13. *Smart & Integrated Pedestrian* under Ministry of Urban Development with partial financial assistance from NSRI, Tokyo, GMR Airport Developers Ltd.

A very significant highlight of the year 2015-16 was the launch of the Global Initiative of Academic Networks (GIAN) program coordinated nationwide by IIT Kharagpur. Aimed at tapping the talent pool of scientists and entrepreneurs worldwide and garnering the best international experience into our systems of education, the GIAN initiative has in one year attracted an astonishing 618 advanced courses involving international experts. These courses have been made available online for attendees all across the nation.

Additional educational initiatives under the leadership of IIT Kharagpur include the National Digital Library initiative, the National Initiative for Design Innovation, the Teaching Learning Center for Pedagogy Design & Research, and the MOOC compliant e-content creation initiative. Major MHRD supported initiatives include the E-Business Centre of Excellence, Virtual Labs, and Real Time Virtual Labs.

Another important leadership role for IIT Kharagpur has been the nationwide coordination of the PAN-IIT collaborations with ONGC. This institute alone has received funding to the tune of 9.50 crores for 5 new projects. Important collaboration initiatives were also started with Hindustan Aeronautics Limited and Indian Railways.

The second round of Institute Challenge Grants projects was approved in 2015-16. This includes the following exciting projects:

1. Development Of Infrastructure For Germ-Free/Gnotobiotic Mice For Screening of Psychobiotics Strains
2. Setting up high-end testing facilities of materials for Biomaterials, Aerospace and Automotive applications
3. Understanding Vocalization Development Deficits in Mouse Models of Autism Spectrum Disorders – Role of Sub plate Neurons
4. Electric field control of hybrid magnetic interfaces at atomic scale for spintronic applications
5. Probing the Earth's interior: Minerals at extreme high pressure and temperature conditions using high-pressure apparatus
6. Geomicrobiology of arsenic contaminated aquifer of Bengal basin: deciphering subsurface microbial communities and their functional role in As mobilization
7. Development of Nano Patterned Perovskite Solar Cells

During the year 2015-2016 the Institute received 203 research projects from the Government, private and international funding agencies/enterprises for a total value of 102.82 crore and 153consultancy projects worth 22.68 crore. This includes a number of high-value and flagship projects from the government and the industry, such as:

1. Study of High Speed Deep Grinding of Burn Resistant Titanium Alloy & Ceramics Using Monolayer Electroplated Super-Abrasive Wheel
2. Petrogenesis & Rare Earth Element Potential Of Kamthai & Amba Dongar Carbonatities
3. Effect of Pore Structure of Indian Gas Shales on Its Methane and Co2 Adsorption Behavior
4. Water Management During Hydrofracking Operations Of Shale Gas Field
5. Effect of Interfacial Gaps In FRP Strengthened Structural Components: An Experimental/Numerical Study
6. Study of GCV Profiling And Stack Yard Coal GCV Change Analysis

7. GCV Profile Study At NTPC Kahalgaon
8. Pollution Load Carrying Capacity in Janjgir - Champa Region
9. Pollution Load Carrying Capacity in Raigarh Region
10. Morphological Studies of Rivers Mahanadi, Mahananda and Hooghly
11. Information Security Education And Awareness (ISEA) Project Phase-II
12. Setting Up of Teaching Learning Centre For Pedagogy Design & Research
13. Special Manpower Development Programme for Chips to System Design
14. National Initiative For Design Innovation
15. Central Laboratory Facility for Eastern Region for Water Hyperspectral Remote Sensing

The Intellectual Property Rights and Industrial Relations (IPR & IR) Cell under SRIC is responsible for the licensing and the transfer of technologies developed by researchers at IIT Kharagpur to the commercial sector.

The IPR & IR Cell of the institute has made the institute proud in the year in 2015-16 by winning the prestigious National Intellectual Property Award in the category of "Top Indian Academic Institution for Patents". The award, which is given by the Indian Patent Office & Confederation of Indian Industries, was formally handed over to the Director, IIT Kharagpur on 26th April, 2016, World IP Day by the Hon'ble Minister of Commerce and Industry, Smt. Nirmala Sitharaman, at a function jointly organized by the Indian Intellectual Property Office and Confederation of Indian Chamber of Commerce & Industry (CII). This success may be largely attributed to the proactive role played by the IPR Cell of SRIC. In the year 2015-16, through its web enabled IP Portal the IPR cell has received and filed more than 40 applications of this institute in the Indian Patent office.

As in previous years, in partnership with the Technology Transfer Group driven by the students, the IPR Cell organized an IPR Workshop in March 2016. This program focused on the importance of Industrial design and its protection by Dr. S.K. Mitra, Deputy Controller, Patents and Design, Patent Office, Kolkata and the awareness speech from Prof. S. Matilal of this institute towards the rights of a copyright holder in terms of publicity, distribution and legal protection.

In a new study initiative from the IPR Cell, an IPR Round Table was held in April 2016 at Kolkata. The feasibility of a new model of IP prosecution system that can fast-track enforcement of IP with reduction of time and steps was debated in this meeting in the presence of the Hon'ble Justice Prabha Sridevan, Former Judge Madras High court and many other renowned dignitaries in this field.

The Entrepreneur Cell under SRIC supports a variety of incubation programs funded by the Government.

Various student activities are encouraged and supported through SRIC. Notable activities include the following:

- **TeamKART**activity for design and implementation for single seat racing car.
- **Boeing University Relations program** under which students have designed, built and flight tested a fixed wing UAV with vertical takeoff and landing, and cruise capability with rigidly attached set of thrusters. During the period they have successfully completed the design and building process followed by flight tests to improve and fine tune the project outcome.
- **RoboSoccer** activity for design and implementation of a team of soccer playing robots: This activity is coordinated under a students' group named "Kharagpur Robosoccer Students' Group" (KRSSG). The Federation of International Robo-soccer Association (FIRA) arranges the FIRA cup. The team from IIT Kharagpur participated in this competition last year under the MiroSot category at Seol, South Korea, where participants need to devise artificial intelligence strategies, and develop sharp sensing and precise real-time control for the physical soccer-playing robots. The team have bagged **bronze** medal in the Mirosot League and performed very well in the SimuroSot league. KRSSG also organized a competition on robo-soccer ("Code-o-Soccer") during the techno-management fest "Kshitij", and about 20 teams from different parts of India participated in the event.

- **Aerial Robotics Kharagpur (ARK)** is a students' group working for building autonomous aerial vehicles. The group was formed in February 2015. They are developing a system for flight control of a drone for participating in International Aerial Robotics Competition (IARC).
- **TeamAGV** activity for design and implementation of autonomous ground vehicles. The team has designed, fabricated and operated autonomous vehicle with multiple sensors data processing and fusion incorporating sophisticated control steps to participate in various competitions in India and abroad. The Association for unmanned vehicle system international (AUVSI) organized the 24th Annual Intelligent Ground Vehicle Competition (IVGC) at Oakland University in Rochester, Michigan from June 3 - June 6, 2016. The IIT Kharagpur team participated in this competition, where participants need to devise intelligent strategies for autonomous driving, and develop accurate sensing with error-free real-time control for the physical robots to cover a given arena with defined difficulty levels.Recently the team has received one e2o vehicle from Mahindra for completing the driver-less car challenge under Mahindra Rise Prize students' competition, nationwide. The team Auro, a spin off from this AGV research group also has been selected for the same.
- **TeamAUV** activity for design and implementation of autonomous underwater vehicle. The team has designed and operated an upgraded underwater vehicle with multiple sensors and sophisticated control computers to participate in various competitions in India and abroad.

The M N Faruqui Innovations Center (MNFIC) was launched in 2014 with support from our alumni. The objective of this center is to provide tinkering facilities to students to motivate them to innovate through experimentation. An electronic design facility under the center is ready, and several heavy duty mechanical machines are expected soon. The summer project competition for the first year batch has been launched. The MNFIC will also be a nodal center to facilitate some new activities both by the institute and also with involvement of other alumni, corporate etc. For this purpose a general “Endowment for Innovation” has been created in the institute.

In addition to the above, students participation is also taking place in several areas of innovation such as the green policy initiative that aims to reduce the carbon footprint of the campus through technology advances.

****

# Technology Students' Gymkhana

**President: Prof. Somesh Kumar**
**Treasurer: Prof. KingshukBhatttacharyya**
**Vice President: ShovanPanigrahi**

**RECTOR'S NOMINEES:**

1. Prof. N. K. Goyal, Reliability Engineering, (Sports & Games)
2. Prof. A. Chandra, Physics & Meteorology, (Sports & Games)
3. Prof. Shailendra Kumar Varshney, E& EC, (Sports & Games)
4. Prof. Bhargab Maitra, Civil Engg, (Technology),
5. Prof. A. Basu, Geology & Geophysics, (Technology)
6. Prof. Jitendra Kumar, Mathematics, (Technology)
7. Prof. Priyadarsini Patnaik, Humanities & Social Science (Soc. Cult.)
8. Prof. W.K. Mohanty,Geology & Geophysics, (Soc. Cult.)
9. Prof. Arnab Roy, Aerospace Engineering, (Soc. Cult.)

Likewise every year this year also the students under the auspice of TSG indulged themselves in a variety of activities not only for the utilization of their leisure time but also for fun, fitness, enjoyment, keeping themselves away from boredom, reviving their energy after academic workload and for their overall development. The highlights of the year are as follows.

**INTER IIT SPORTS MEET**

The 51$^{st}$Inter IIT Sports Meet began with the Inter IIT Aquatic Meet held at IIT Madras from 1$^{st}$October 2015 to 04$^{th}$ Oct 2015at IIT Madras. IIT Kharagpur secured over all 2$^{nd}$ position, in the process also securing the first position in Water polo. Wonderful performances were shown by the swimmers of IIT Kharagpur. SirajModiwala of Mechanical Dept. from Nehru Hall of residence showed exceptional performance by winning Gold medal in all back stroke events i.e., 50m., 100m., and 200m. He clocked a time of 32.46 sec for the 50m. backstrokesetting a new **Meet record**.

Due to severe floods, the main meet in December was cancelled. The city of Chennai faced tragic consequences due to the natural disaster.

However Students of IIT Kharagpur nurtured themselves in term of fitness and skill by participating in various other inter college and inter university competitions. Following are the competitions attended and various achievements of the students.

1. **Athletics**: The men's team got the overall Bronze medal in Athletics by securing one Gold, four Silver, three Bronze and seven 4$^{th}$ position finishes at "SANGRAM" 2016 held at IIT Roorkee. With inspiring performances by the members, the **women's team** also brought Bronze medal for IIT Kharagpur against all odds and secured a total of two Golds, one Silver, two Bronze and three4$^{th}$ place finishes.
2. **Football:** team secured Gold at an inter college competition held at XLRI , Jamshedpur.
3. **Badminton:** team won Gold at "SPARDHA" Inter College tournament held at IIT BHU and at "SANGRAM" Inter college tournament held at IIT Roorkee, IIT Kharagpur (Boys and Girls) won gold.
4. **Hockey:** team also participated in an out station tournament.
5. **Cricket:** IIT Kharagpur reached the semi-finalsat the Ajay Ghosh Inter University cricket tournament held at ViswabharatiUniversityarShantiniketan,under the banner of CAB.
6. **Basketball:** team participated in the Senior State Basketball Championship (Boys&Girls) The boys team won two matches losing their last match against Eastern railway. Thegirls lost two matches. Also at the tournament held in XLRI, Jamshedpur, on 15th August, 2015, both the boys and girls team secured 1st position.

7. **Weightlifting:**secured overall bronze medal in Weight Lifting with one gold, one silver and one bronze medal individually won by team members at "UDGHOSH" competition held at IIT Kanpur. In Power lifting IIT Kharagpur Team secured overall silver by winning four silvers and securing two fourth place finishes.
8. **Weightlifting:**team also participated in "SANGRAM" tournament held at IIT Roorkee and won overall Silver medal in Weight Lifting with one gold, three silver and one fourth position individually won by team members. Further in Power lifting IIT Kharagpur became the champion with four golds, one silver and one bronze in the same tournament.

**TSG AWARDS**

Following are the details of various Awards distributed this year during the Annual Award distribution ceremony.-

**TSG Annual Awards awarded for Sports & Games:**

1. INSTITUTE BLUE - 26
2. HONORABLE MENTION- 16
3. SPECIAL MENTION- 12
4. ALUMNI CUP - 03

For Sports & Games,**Alumni Cup**was awarded jointly to three students - SaketThavanani, roll no. 13MT10030(Badminton)SirajModiwala, roll no. 13ME10054 (Swimming) Udit Narayan, roll no. 14AG10017 (Weightlifting).

General Championship Sports & Games (Women) : SN Hall of residence
General Championship Sports & Games (Men) : LBS Hall of residence

**TECHNOLOGY INTER IIT TECH MEET**

4th Inter IIT Tech Meet was hosted by IIT Mandi. IIT Kharagpur won the General Championship**.**Following are the events in which positions were secured-

| Sr. No. | Event | Position in the Tech Meet |
|---|---|---|
| 1 | Hardware Modelling | 1st |
| 2 | Product exhibition | 1st & 2nd |
| 3 | Embedded Electronics | 1st |
| 4 | Internet Things | 1st |
| 5 | Portfolio Defender | 1st |
| 6 | Software Development | 1st |
| 7 | Social Medial Analysis | 1st |

**TSG Annual Awards awarded for Technology :-**

1. ORDER OF MERIT - 08
2. HONORABLE MENTION- 08
3. G.S. SANYAL CUP - 01

The G.S.SANYAL cup was awarded to Mr. ASHISH DAGA Roll No. 11ME32006 for his contribution and outstanding performance in Technology.

***Inter Hall G.C. results for Technology***

| CUP | Events | Hall | Gold | Hall | Silver | Hall | Bronze |
|---|---|---|---|---|---|---|---|
| Innovation Cup | Ad Design | HJB | 75 | AZAD | 45 | LLR | 30 |
| | Product Design | AZAD | 100 | LBS | 60 | RK | 40 |
| | Hardware Modelling | LBS | 100 | AZAD | 60 | NEHRU | 40 |
| | Opensoft | SN | 100 | LLR | 60 | MT | 40 |
| Application Cup | Chem Quest | LBS | 75 | RP | 45 | SN | 30 |
| | Case Study | LBS | 75 | NEHRU | 45 | RK | 30 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Maths Olympiad | LLR | 75 | RP | 45 | AZAD | 30 |
| Knowledge Cup | Tech Quiz | NEHRU | 75 | RP | 45 | PATEL | 30 |
| | Biz Quiz | RP | 75 | NEHRU | 45 | RK | 30 |
| Strategy Cup | Data Analytics | RP | 75 | NEHRU | 45 | PATEL | 30 |

| CUP WISE WINNER | Name of the Hall | Points |
|---|---|---|
| Application Cup | LBS | 150 |
| | SN/IG Hall | 130 |
| Knowledge Cup | RP | 165 |
| | Nehru | 120 |
| Innovation Cup | Azad | 205 |
| | LBS | 160 |
| Strategy Cup | RP | 75 |

General Championship Technology:-Winner – LBS Hall of residence

**TSG Annual Awards awarded for Social & Cultural**

1. ORDER OF MERIT 08
2. HONORABLE MENTION- 10
3. SPECIAL MENTION- 07
4. ALUMNI CUP- 01
5. SHRIMATI CHANDIRAMNI CUP- 01

ALUMNI CUP in Social and Cultural was awarded to Mr. RACHIT MADHUKAR Roll No. 13AG3FP05 for his outstanding performance in Soc.& Cult events.
SHRIMATI CHANDIRAMANI CUP was awarded to Mr. ABHISHEK SULTANIA Roll No. 11IM30023 for his contribution to Social and Cultural events and for his performance.
General Championship Social &Cultural: Nehru Hall of residence

**NAME OF THE T.S.G. SPORTS PERSONNEL**

1. Mr. SoumenMondal-(S.O. In-Charge T.S.G.) B.A, B.P.Ed, M.P.Ed ,NIS (Patiala) Diploma in Sports Coaching in Basketball, Ph.DPerusing, Qualified, (BFI) National Referee 'A'.
2. Dr. R Prabhakaran – (Sports Officer)Ph D, DSC (NSNIS), MSM (UK), MA (Eng).
3. Ms.Priyanka Singh – (Sports Officer) M.P. Ed, M.Phil, NIS Diploma in sports coaching (Football).
4. Mr. Sudhir Kumar- B.Sc in Physical Education, Master's in Phy.Edu.& Sports Science, M.Phil., NCC Commissioned Officer(rank Flying Officer).
5. Mr. A.K. Ghosh -B.A. B.P Ed, Sports Coaching in Footballfrom NSNIS, Kolkata.
6. Dr. GyanSwaroop-B.P.E, M.P.E, M.Phil, Ph.D,NIS (Patiala)Diploma in Sports Coaching in Hockey, Qualified National Referee.
7. Mr. AdribMitra- B.Com (H), B.P.Ed, M.P. Ed, M.Phil, Trained Life saver in water.
8. Mr. Samba Kar-B.A.Hons. in Phy. Edu., B.P.Ed, M.P. Ed.
9. Mr. Pranab Sarkar-B.A (English H) B.P.Ed, M.P. Ed.

Mr.SoumenMondal, SportsOfficer, was selected as Coach of West BengalState Basketball Girls team for theSeniorNationalBasketball Championship held at Mysore,Karnataka, from 09th -16$^{th}$January, 2016.

**DEVELOPMENTS IN SPORTS:**

1. Supply orders were issued for Gymnasium machines worth Rs. 20 Lakhs.
2. Basket Ball court resurfaced and two courts wererepainted as per International Standards.
3. One water remover roller was procured for theBasketball courts.
4. TATA Sports Complex football and cricket grounds were resurfaced and a lawn mower and a roller were purchased.
5. One water removing roller was procured for the Tennis courts.

6. Lawn mowing roller and jumping pit for Pole-vault and High Jump were purchased for the Jnan Ghosh Stadium.

**FACILITIES AVAILABLE AT TECHNOLOGY STUDENTS' GYMKHANA:**

1. Gymnasium: - A well equipped gymnasium with two floors (total five rooms) and more than 1900 members enrolled (Students & Staff).
2. Indoor games :-
   a. Badminton – 4 Indoor courts
   b. Table Tennis- 4 tables
   c. Weight Lifting – Two full size platforms, 3 complete sets of weights and 10 barbells.
   d. Billiards:- 1 table
   e. Squash:- 1 standard indoor Court
   f. Chess:- 14 Chess boards
3. Tennis Court: - 2Synthetic (with flood lights), 2 clay and 1 hard surface court.
4. Basketball:-2 Flood lit Basketball courts.
5. Volleyball:- 2flood lit courts and one additional court
6. Cricket: - Two fields with two turf pitches and 3 flood lit practice nets (including one with cement pitch for net practice with bowling machine)
7. Football :- Two fields
8. Athletics:- Standard 400 mtrack, jumping pits, enclosed throwing arena for hammer
9. Hockey :- 1 Hockey field
10. Swimming:- Standard swimming pool with facility for platform diving.

**TSG ELECTIONS**:- TSG Elections for the various office bearer's post of TSG were conducted online, as has been the practice for the past few years,using in house software designed under the supervision of Dr. Kingshook Bhattacharyya with support from Dr. D.K. Nanda and his team from CIC. Election process was a success and President TSG and Election Officer Prof. B.N. Singh (Aerospace Engineering) could declare the results within half-an- hour of the finish of casting of votes, saving manpower and energy.

**MAJOR EVENTS ORGANISED:**

1. National Youth was observed inside the campus and a "Youth Rally" was organized by TSG on 12$^{th}$ Jan 2016. The Youth rally started at 6:00am and finished by 7:00 am. A Panel discussion was also organized at KalidasAuditorium at 5:30pm with an overwhelming response from students as evidenced by the huge participation in both the events.
2. Mr. ArdhenduGhosh has organized a Celebrity Cricket match, played between TSG Team, at IIT KGP on 16 Jan 2016 and the Bengal Celebrity cricket team. He also organized Ajay Ghosh Cricket state level Tournament on 3$^{rd}$ October to 10$^{th}$ October 2015 at IIT Kharagpur. IIT Kharagpur Team entered the semi finals.
3. Basket Ball Children's training Camp was organized from 15$^{th}$ May 2016 to 31$^{st}$ May 2016 for staff wards and school children of campus.
4. Tennis Academy was started for providing Tennis skill training to students, staff wards and school children of campus.
5. Tennis Tournament:- KGP Open Tennis Tournament was conducted by TSG in the campus with huge participation by on campus as well as outstation players.

**OUTSTATION PARTICIPATION SOCIAL AND CULTURAL (2015-16)**

1. Technology Dance Society showed its caliber with a silver at Rendezvous, IIT Delhi in the street dance competition, which enabled them to qualify for the final rounds of the regional's of MTV's Colours of Youth contest.
2. Technology Dance Society followed it up again with a bronze at Shuffle, the street dance competition of Spring Fest 2016.

3. Technology Dramatics Society: Encore won bronze at Spring Fest 2016 in Rangmanch, the stage play competition.Encore also represented IIT Kharagpur at Rendezvous, IIT Delhi.Pravah represented IIT Kharagpur at Antaragni, IIT Kanpur. Druheen represented IIT Kharagpur at IIEST Shibpur. Prasthanam invited Tanikella Bharani, a versatile actor and writer from the Telugu film industry for an interactive session and guest lecture during their annual production at IIT Kharagpur.
4. Debating Society, IIT Kharagpur won major plaudits this year, with teams finishing as winners and runners-up at the NIT Rourkela Parliamentary Debate, winners, semifinalists and best adjudicator at the Kalinga School of Law Parliamentary Debate and semifinalists at IIT Bombay Parliamentary Debate, as well as representing the institute at the Heritage PD and NUJS PD. They were also instrumental in starting the first-ever IIT Kharagpur Parliamentary Debate at Spring Fest 2016.
5. Technology Literary Society conducted Kavya Sandhya as well as events like Poetry Slam and Creative Writing at Spring Fest.
6. WTMS had 2 productions, apart from active participation from the talented musicians from the institute in events like Lake Side Dreams and Sargam in Spring Fest.

**SPRING FEST2016**was organized from 29th January 2016 to 1st February 2016. A plethora of more than 65 events ranging from varied genres provided a platform to the students where they proved their mettle and caliber.

**KSHITIJ 2016**the Annual Techno-Management fest of IIT Kharagpur, held from21st Jan 2016 to 24th Jan 2016, provided a platform for a confluence of students, academia and the industry. The fest was been graced by the presence of such luminaries who are looked up to for their distinguished contribution in their respective fields. Further Kshitij provided an opportunity for students and campus residents to interact with leaders from the corporate sector, research scientists and celebrities. More than 65 events were scheduled and were conducted successfully.

## ACHIEVEMENTS OF IIT KHARAGPUR IN VARIOUS EVENTS/ PROGRAMMES CONDUCTED AT KSHITIJ 2016:

| Sr. No. | Event | Position of IIT Kharagpur |
|---|---|---|
| 1 | **C-Monopoly** | 1st |
| 2 | **Relic Hunter** | 1st |
| 3 | **Maths Challenge** | 1st |
| 4 | **Cryptex** | 1st |
| 5 | **Excalibur** | 1st |
| 6 | **Biz Quiz** | 1st |
| 7 | **Tech Quiz** | 1st |
| 8 | **SOE** | 1st |
| 9 | **Block Chain Hackathon** | 1st |
| 10 | **B Plan** | 2nd |
| 11 | **Environ** | 2nd |
| 12 | **ASME SDE** | 1st |
| 13 | **Anadigix** | 1st |
| 14 | **Source Code** | 1st |
| 15 | **Overnite** | 1st |
| 16 | **The Great Depression** | 1st |
| 17 | **Sherlockology** | 2nd |
| 18 | **Snappit** | 1st |
| 19 | **Mastermind** | 2nd |
| 20 | **Echelon** | 1st |

**INTERNATIONAL YOGA DAY**

On 21st June 2015 International Yoga Day wasobserved at the campus. A morning yoga session was conducted withmore than 900 people participating followed by alecture on yoga in the evening**.**

**NATIONAL YOUTH DAY** was celebrated on 12th Jan 2016.A Youth Rally was organized. More than 800 students, staff & faculty participated in the run.Through the good offices of *Prof. Manish Bhattacharjee* (Dean, S.A.), books on Swami Vivekananda were distributed for free to students who had participated in the Rally. In evening a debating session was organized at the Kalidas Auditorium where IIT students and faculty participated in the debate.

**ILLUMINATION AND RANGOLI EVENT**

IIT Kharagpur was yet again enlightened by the light of diyas, fragrant with the essence of culture and upbeat with the spirit of illumination. All the halls were drenched in the flavor of this unique way of celebrating the festival of lights, Diwali. Students worked for this festival for a month to get their hostels illuminated on the day of Diwali along with the signature Rangolis,beautiful masterpiecesrendered meticulously by controlled and patient spraying of powder paint on the floor of the common rooms of the hostels

All the spirit, enthusiasm, and laborstudents put into the festival were structured to present a theme. These magnificent artworks were a great medium to display a theme or send out a message.

The celebrations ended with tempo shouts, and a few moments of silent gazing at the illuminated art, sharing smiles with everyone, with moist eyes carrying the brimming culture in them. Illumination and Rangoli at IIT Kharagpur are deep seated in the very spirit of the student community.

The year 2015-16 was yet another success added to the Chapter of KGP history. Students of IIT Khargpur not only participated in all the events at Inter-hall and Inter IIT Aquatic meet, they also participated in various out of campus tournament and had secured positions in almost all the events, showing an enhancement in the performance of IIT Kharagpur sportspersons.

# Technology Telecom Centre

Technology Telecom Centre (TTC) provides voice communication services to subscribers in the academic as well as in the residential campuses. During the financial year (2015-16) TTC laid underground telephone cables for the newly constructed building of Centre for Railway Research and transferred telephone lines from the old SMST Dept to its relocated place at old NCC building. TTC also laid necessary cables to the Central Research Facility (CRF) building in an exercise to restructure the existing telephone cables.

Laying of underground telephone cables from the telephone exchange to J C Ghosh and P C Roy Chemical block is under process.

# Career Development Centre

The Career Development Centre is responsible for arranging practical training for 3rd year B. Tech/Dual Degree and 4th year of Five year Integrated M.Sc degree students and job placement of final year students graduating from the Institute that includes PhDs. The Centre is actively engaged in forging synergistic relationships between the Institute and various industries and user systems of technical and scientific manpower. Based on these interactions, the CDC gives feedback to the Institute on the academic programmes.

**Summer Training Details**

Eight weeks of summer practical training at the end of 3rd year B. Tech/Dual Degree and 4th year of Five year IntegratedM.Scdegree is a compulsory part of the curriculum at IIT Kharagpur, carrying 2 credits. All efforts are made to place the concerned students in the best of organizations in India and abroad for summer training through Training and Placement section and various departmental supports. An emergent trend is that more and more students are seeking summer training abroad.

A total of 1350 companies/ organizations in India are contacted for training facilities for the current summer internships of our students during May- July 2016. Out of which 77 companies either visited the campus or conducted interviews through telephonic interviews and 15companies allotted seats after seeking nominations. The details of internship are as follows.

| Period of Internship | Number. of students enlisted for Internship | Number of students attending Internship in India | | | Internship at foreign Univ./Org. | Highest Stipend offered | |
|---|---|---|---|---|---|---|---|
| | | selected by the company | Nominated by the Dept. | Self-arranged | | India | Abroad |
| May-July 2016 | 1178 | 335 | 51 | 725 | 67 | Rs.1,20,000/- p.m. | US $ 2500 p.m. |

**Placement Details**

480companies / organizations registered for hiring students for final placement out of which 240 companies offered our students for employment during 2015-2016. The details of number of students who had registered for placement and those actually placed through campus interviews including those who have opted either for higher studies or arranged job through off campus as on 01.06.2016 are as follows:

| Degree | Student Registered | Student Placed | Percentage Placed |
|---|---|---|---|
| B.ARCH | 31 | 24 | 77% |
| B.TECH | 563 | 468 | 83% |
| DUAL DEGREE | 491 | 422 | 86% |
| LLB | 23 | 20 | 87% |
| M.SC(2YR) | 88 | 56 | 64% |
| M.SC(5YR) | 175 | 146 | 83% |
| M.TECH | 534 | 333 | 62% |
| MCP | 35 | 6 | 17% |
| MHRM | 14 | 13 | 93% |
| MS | 4 | 3 | 75% |
| PHD | 40 | 19 | 48% |
| **Grand Total** | **1998** | **1510** | **76%** |

The highest salary for overseas offerreceived in2015-16 is $200000 per annum and the highest salary received in INR is Rs. 41lakh per annum.

IIT Kharagpur attracted the highest number of PPOs among all IITs and also registered the highest placement record among all IITs.
The number of PPOs received are 185 and number of accepted offers was 129 out of which 4 offerswere from Overseas.

**Student Participation**

Career Development Centre at IIT Kharagpur has taken an initiative to harness the students' management skills through a formal system during the placement season since 2005-2006. The system has progressed extremely well and from year 2010 onwards, the CDC has immensely benefitted from Students'Placement Team. CDC also conducts 2 in-house Pre-Assessment Tests to prepare the students for the placement season. This test score is also used by the companies as one of their shortlisting criteria in many cases.

The organizational skill of team has helped CDC to conduct 20-25companies'placement interviews per day and round the clock. During the placement season students/CDC staff play an active role from contacting the companies to the final selection at campus by providing complete logistic support.

**New Initiatives**

In addition to the existing roles, Career Development Centre at IIT Kharagpur has taken some initiatives to help student explore a better career. CDC is hosting the following novel events with the help of Vice Chairmen

1. Faculty/ Corporate and Alumni interactions on various career options.
2. Alternative career options
3. Personality Development activities including Soft Skills and Leadership Workshops
4. The feedback received from various organizations are addressed to concern departments / authorities for new programs / curriculum revisions.

**Achievements**

1. Continuously achieved more than 1000 placements for last three years in Phase I.
2. Highest number of pre- placement offers in leading organisations.
3. Highest number of internships
4. Rated the most employable institute in the country by an international survey for higher educational institutions by Quacquarelli Symonds (QS) global employability rankings.

# STATISTICS

**Table : A-1**

## ADMISSION TO UNDERGRADUATE (B.TECH./B.ARCH./M.SC./DUAL DEGREE) COURSES IN THE SESSION 2015-2016

### (A) B.TECH. 4-YEAR

| Sl. No. | Course | Sanctioned Strength | | | | | Admission Offered | | | | | Actually Registered | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GN | OB | SC | ST | TOTAL | GN | OB | SC | ST | TOTAL | GN | OB | SC | ST | TOTAL |
| 1 | Aerospace Engg. | 17(1) | 9 | 5 | 2 | 33 | 17 | 9 | 5 | 2 | 33 | 17 | 9 | 5 | 2 | 33 |
| 2 | Agril. & Food Engg. | 18(1) | 10 | 5 | 3 | 36 | 17 | 11 | 5 | 3 | 36 | 14 | 10 | 5 | 1 | 30+3* |
| 3 | Biotech. & Bioch. Engg. | 14 | 7(1) | 4 | 2 | 27 | 14 | 7 | 4 | 2 | 27 | 14 | 6 | 2 | 1 | 23+2* |
| 4 | Chemical Engg. | 26 | 14 | 8(1) | 4 | 52 | 26 | 14 | 8 | 4 | 52 | 25 | 14 | 8 | 4 | 51 |
| 5 | Civil Engg. | 31 | 17(1) | 9 | 5(1) | 62 | 31 | 17 | 9 | 5 | 62 | 30 | 16 | 9 | 5 | 60+1* |
| 6 | Computer Sc. & Engg. | 28(1) | 15 | 8(1) | 4 | 55 | 29 | 15 | 8 | 4 | 56 | 29 | 15 | 8 | 4 | 56 |
| 7 | Electrical Engg. | 28 | 15(1) | 8 | 4(1) | 55 | 28 | 15 | 8 | 4 | 55 | 28 | 15 | 8 | 4 | 55 |
| 8 | Electronics & ECE | 31(1) | 17 | 9(1) | 5 | 62 | 31 | 17 | 9 | 5 | 62 | 30 | 17 | 9 | 5 | 61 |
| 9 | Industrial & Systems Engg. | 15(1) | 7 | 5 | 2 | 29 | 15 | 7 | 5 | 2 | 29 | 14 | 7 | 5 | 2 | 28+1* |
| 10 | Instrumentation Engg. | 16(1) | 9 | 5 | 2 | 32 | 16 | 9 | 5 | 2 | 32 | 16 | 9 | 5 | 2 | 32 |
| 11 | Manuf. Sc. & Engg. | 15(1) | 8 | 4 | 2 | 29 | 15 | 8 | 4 | 2 | 29 | 14 | 8 | 4 | 2 | 28 |
| 12 | Mechanical Engg. | 34(1) | 18 | 10(1) | 5 | 67 | 34 | 18 | 10 | 5 | 67 | 34 | 18 | 10 | 5 | 67 |
| 13 | Met. & Mat. Engg. | 22(1) | 12 | 7 | 3 | 44 | 22 | 12 | 7 | 3 | 44 | 21 | 12 | 6 | 3 | 42 |
| 14 | Mining Engg. | 20 | 11 | 6 | 3 | 40 | 20 | 11 | 6 | 3 | 40 | 19 | 11 | 6 | 3 | 39+1* |
| 15 | Ocean Engg. & N.A. | 17 | 9(1) | 5 | 2 | 33 | 17 | 9 | 5 | 2 | 33 | 16 | 8 | 5 | 1 | 30+2* |
| | **Total (A)** | **332** | **178** | **98** | **48** | **656** | **332** | **179** | **98** | **48** | **657** | **321** | **175** | **95** | **44** | **635** |

**(B) B. Arch. 5-Year**

| Sl. No. | Course | Sanctioned Strength | | | | | Admission Offered | | | | | Actually Registered | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GN | OB | SC | ST | TOTAL | GN | OB | SC | ST | TOTAL | GN | OB | SC | ST | TOTAL |
| 1 | Architecturec | 20(1) | 11 | 6 | 3 | 40 | 20 | 11 | 6 | 3 | 40 | 19 | 10 | 6 | 0 | 35+3* |
| | **Total (B)** | 20(1) | 11 | 6 | 3 | 40 | 20 | 11 | 6 | 3 | 40 | 19 | 10 | 6 | 0 | 35 |

**(C) M.sc. Integrated 5-Year**

| Sl. No. | Course | Sanctioned Strength | | | | | Admission Offered | | | | | Actually Registered | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GN | OB | SC | ST | TOTAL | GN | OB | SC | ST | TOTAL | GN | OB | SC | ST | TOTAL |
| 1 | Applied Geology | 18 | 10 | 5 | 3 | 36 | 18 | 10 | 4 | 3 | 35 | 17 | 10 | 4 | 0 | 31+3* |
| 2 | Chemistry | 17(1) | 9 | 5 | 3 | 34 | 17 | 9 | 5 | 3 | 34 | 15 | 9 | 5 | 0 | 29+2* |
| 3 | Economics | 23(1) | 12 | 7 | 3 | 45 | 23 | 12 | 7 | 3 | 45 | 23 | 12 | 7 | 2 | 44+1* |
| 4 | Maths. & Computing | 25 | 13(1) | 8(1) | 4 | 50 | 25 | 13 | 8 | 4 | 50 | 24 | 13 | 8 | 3 | 48+1* |
| 5 | Physics | 18(1) | 10 | 6 | 3 | 37 | 17 | 11 | 6 | 3 | 37 | 16 | 10 | 5 | 3 | 34+1* |
| 6 | Expl Geophysics | 17 | 9 | 5 | 3 | 34 | 17 | 9 | 5 | 3 | 34 | 17 | 9 | 5 | 0 | 31+3* |
| | **Total (C)** | 118 | 63 | 36 | 19 | 236 | 117 | 64 | 35 | 19 | 235 | 112 | 63 | 34 | 8 | 217 |

**(D) Dual Degree 5- Year**

| Sl. No. | Course | Sanctioned Strength | | | | | Admission Offered | | | | | Actually Registered | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GN | OB | SC | ST | TOTAL | GN | OB | SC | ST | TOTAL | GN | OB | SC | ST | TOTAL |
| 1 | Aerospace Engg. | 10(1) | 5 | 3 | 1 | 19 | 10 | 5 | 3 | 1 | 19 | 10 | 4 | 3 | 1 | 18 |
| 2 | Agricultural and Food Engg. with M.Tech. Specialisations | 17 | 9(1) | 5 | 3 | 34 | 17 | 9 | 5 | 3 | 34 | 15 | 9 | 5 | 0 | 29+3* |
| 3 | Biotech. & Biochem. Engg. | 13(1) | 7 | 4 | 2 | 26 | 14 | 7 | 4 | 2 | 27 | 13 | 7 | 4 | 0 | 24+2* |
| 4 | Chemical Engg. | 14 | 7(1) | 4 | 2 | 27 | 14 | 7 | 4 | 2 | 27 | 13 | 7 | 4 | 2 | 26 |
| 27 | Civil engg./Struct. Engg. | 11(1) | 6 | 3 | 2 | 22 | 11 | 6 | 3 | 2 | 22 | 10 | 6 | 3 | 2 | 21 |
| 6 | Computer Sc. & Engg. | 20 | 11(1) | 6 | 3 | 40 | 20 | 11 | 6 | 3 | 40 | 20 | 11 | 6 | 3 | 40 |
| 7 | Elect. Engg./Instru. Engg. | 11(1) | 6 | 3 | 2 | 22 | 11 | 6 | 3 | 2 | 22 | 11 | 6 | 3 | 2 | 22 |
| 8 | E&ECE with M.Tech Sepecialisation | 20 | 11(1) | 6 | 3 | 40 | 20 | 11 | 6 | 3 | 40 | 20 | 11 | 6 | 3 | 40 |
| 9 | Industrial& Systems Engg. /IEM | 11 | 6 | 3(1) | 2 | 22 | 11 | 6 | 3 | 2 | 22 | 11 | 6 | 2 | 2 | 21 |
| 10 | Manuf. Sc. & Engg./ IEM | 8(1) | 4 | 2 | 1 | 15 | 8 | 4 | 2 | 1 | 15 | 8 | 4 | 2 | 1 | 15 |
| 11 | Mechenical Engg with M.Tech. specialisation | 24 | 13(1) | 7 | 4(1) | 48 | 24 | 13 | 7 | 4 | 48 | 24 | 13 | 7 | 4 | 48 |
| 12 | Met. & Mat. Engg. | 10 | 5(1) | 3 | 1 | 19 | 10 | 5 | 3 | 1 | 19 | 9 | 5 | 3 | 1 | 18 |
| 13 | Mining Engg. | 10 | 5 | 3 | 1 | 19 | 10 | 5 | 3 | 1 | 19 | 10 | 5 | 3 | 1 | 19 |
| 14 | Mining Safety Engg. & Disaster Mgt. in Mines | 9 | 5 | 3 | 1 | 18 | 9 | 5 | 3 | 1 | 18 | 8 | 5 | 3 | 0 | 16 |
| 15 | Ocean Engg. & naval Arch. | 12(1) | 6 | 4 | 2 | 24 | 11 | 7 | 4 | 2 | 24 | 11 | 6 | 3 | 0 | 20+2* |
| 16 | QED&M | 7(1) | 4 | 2 | 1 | 14 | 6 | 4 | 2 | 1 | 13 | 6 | 4 | 2 | 0 | 12+1* |
| | **Total (D)** | 207 | 110 | 61 | 31 | 409 | 206 | 111 | 61 | 31 | 409 | 199 | 109 | 59 | 22 | 389 |
| | **Total (A + B + C + D)** | **677(20)** | **362(11)** | **201(6)** | 101(3) | **1341(40)** | **675** | **365** | **200** | **101** | **1341** | **651** | **357** | **194** | **74** | **1276(32)*** |

**(1)-Figures in () indicates PD candidate. * Preparatory. student**
**Source :JEE**

**Table : A-2**

**ADMISSION TO 2-YEAR M.SC. COURSES, 2015-2016**

| Sl. No. | Course | SANCTIONED STRENGTH | | | | | ADMISSION OFFERED | | | | | ACTUALLY REGISTERED | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GN | OB | SC | ST | TOTAL | GN | OB | SC | ST | TOTAL | GN | OB | SC | ST | TOTAL |
| 1 | Chemistry | 23 | 12 | 7 | 4 | 46 | 22 | 12 | 7 | 3 | 44 | 1 | - | - | 1 | 2 |
| 2 | Geophysics | 12 | 6 | 4 | 2 | 24 | 9 | 6 | 2 | 2 | 19 | 3 | - | 2 | - | 5 |
| 3 | Geological Sciences | 15 | 8 | 5 | 2 | 30 | 15 | 8 | 5 | 2 | 30 | - | - | - | - | - |
| 4 | Mathematics | 13 | 9 | 6 | 2 | 30 | 11 | 8 | 6 | 2 | 27 | 2 | 1 | - | - | 3 |
| 5 | Physics | 23 | 12 | 8 | 4 | 47 | 22 | 11 | 8 | 4 | 45 | 1 | 1 | | | 2 |
| | **TOTAL** | 86 | 47 | 30 | 14 | 177 | 79 | 45 | 28 | 13 | 165 | 7 | 2 | 2 | 1 | 12 |

Source : ERP

**Table : A-3**

**DISCIPLINE-WISE BREAK-UP OF STUDENTS AWARDED M.C.M. SCHOLARSHIP 2015-16**
**Rate of Scholarship : Rs.1000/- p.m. plus Free-tuitionship**

| S.N. | Course | 1st yr. | 2nd yr. | 3rd yr. | 4th yr. | 5th yr. | Total |
|---|---|---|---|---|---|---|---|
| **(A) B.Tech. 4-Year** | | | | | | | |
| 1 | Aerospace Engg. | 7 | 5 | 8 | 3 | 0 | 23 |
| 2 | Agri. & Food Engg. | 14 | 3 | 4 | 5 | 0 | 26 |
| 3 | Biotech. & Bioch. Engg. | 4 | 3 | 0 | 1 | 0 | 8 |
| 4 | Chemical Engg. | 10 | 5 | 11 | 8 | 0 | 34 |
| 5 | Civil Engg. | 15 | 17 | 13 | 11 | 0 | 56 |
| 6 | Computer Sc. & Engg. | 14 | 14 | 12 | 13 | 0 | 53 |
| 7 | Electrical Engg/ Instrumentation Engg. | 21 | 19 | 15 | 20 | 0 | 75 |
| 8 | Electronics & ECE | 15 | 12 | 19 | 11 | 0 | 57 |
| 9 | Industrial Engg. | 6 | 3 | 3 | 7 | 0 | 19 |
| 10 | Mechanical Engg. / Manuf. Sc. & Engg. | 17 | 18 | 21 | 17 | 0 | 73 |
| 11 | Met. & Mat. Engg. | 9 | 6 | 12 | 7 | 0 | 34 |
| 12 | Mining Engg. | 9 | 4 | 10 | 5 | 0 | 28 |
| 13 | Ocean Engg. & N.A. | 5 | 2 | 1 | 3 | 0 | 11 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **(B) B.Arch. 5-Year** | | | | | | | |
| | Architwecture | 13 | 9 | 6 | 6 | 3 | 37 |
| **(C) M.Sc. Integrated 5-Year** | | | | | | | |
| 1 | Applied Geology/ Expl. Geophysics | 11 | 7 | 9 | 3 | 1 | 31 |
| 2 | Economics | 15 | 6 | 8 | 9 | 7 | 45 |
| 3 | Chemistry | 7 | 3 | 2 | 0 | 0 | 12 |
| 4 | Maths. & Computing | 6 | 7 | 5 | 0 | 2 | 20 |
| 5 | Physics | 3 | 5 | 2 | 0 | 1 | 11 |
| | **TOTAL** | 201 | 148 | 161 | 129 | 14 | 653 |
| | **B.F.** | 201 | 148 | 161 | 129 | 14 | 653 |
| **(D) M.Sc. 2-Year** | | | | | | | |
| 1 | Geological Sciences/Geophysics | | | | | | |
| 2 | Chemistry | | | | | | |
| 3 | Mathematics/Statistics & Information | | | | | | |
| 4 | Physics | | | | | | |
| **(E) Dual Degree 5-Year** | | | | | | | |
| 1 | Aerospace Engg. | 4 | 3 | 4 | 15 | 0 | 26 |
| 2 | Agricultural and Food Engg. with M.Tech. specialisations | 7 | 4 | 3 | 7 | 0 | 21 |
| 3 | Biotech. & Bioch. Engg. | 6 | 5 | 3 | 7 | 0 | 21 |
| 4 | Chemical Engg. | 6 | 5 | 6 | 5 | 0 | 22 |
| 5 | Civil Engg. with M.Tech. specialisations | 4 | 5 | 1 | 11 | 0 | 21 |
| 6 | Computer Sc. & Engg. | 9 | 6 | 9 | 6 | 0 | 30 |
| 7 | Electrical Engg./Instrumentation Engg. | 5 | 2 | 5 | 6 | 0 | 18 |
| 8 | E & ECE with M.Tech. specialiasations | 6 | 8 | 8 | 9 | 0 | 31 |
| 9 | Industrial Engg./IEM. | 6 | 4 | 4 | 2 | 0 | 16 |
| 10 | Mech. Engg./Manuf. Sc. & Engg. | 19 | 7 | 5 | 19 | 0 | 50 |
| 11 | Met. & Mat. Engg. | 5 | 4 | 2 | 2 | 0 | 13 |
| 12 | Mining Engineering | 12 | 4 | 4 | 7 | 0 | 27 |
| 13 | Ocean Engg. & N.A. | 5 | 3 | 5 | 6 | 0 | 19 |
| 14 | QEDM | 0 | 0 | 0 | 0 | 0 | 0 |
| | **TOTAL** | 295 | 208 | 220 | 231 | 14 | 968 |

**Table : A-4**

**STUDENTS AWARDED ONLY FREE TUTIONSHIP 2014-15**

| S.N. | Course | 1st yr. | 2nd yr. | 3rd yr. | 4th yr. | 5th yr. | Total |
|---|---|---|---|---|---|---|---|
| **(A) B.Tech. 4-Year** | | | | | | | |
| 1 | Aerospace Engg. | 0 | 0 | 0 | 2 | 0 | 2 |
| 2 | Agri. & Food Engg. | 0 | 3 | 1 | 1 | 0 | 5 |
| 3 | Biotech. & Bioch. Engg. | 0 | 4 | 0 | 0 | 0 | 4 |
| 4 | Chemical Engg. | 0 | 4 | 3 | 1 | 0 | 8 |
| 5 | Civil Engg. | 0 | 4 | 6 | 0 | 0 | 10 |
| 6 | Computer Sc. & Engg. | 0 | 0 | 1 | 3 | 0 | 4 |
| 7 | Electrical Engg/Instrumentation Engg. | 0 | 5 | 4 | 3 | 0 | 12 |
| 8 | Electronics & ECE | 0 | 1 | 2 | 1 | 0 | 4 |
| 9 | Industrial Engg. | 0 | 5 | 0 | 2 | 0 | 7 |
| 10 | Mechanical Engg./Manuf. Sc. & Engg. | 0 | 8 | 4 | 5 | 0 | 17 |
| 11 | Met. & Mat. Engg. | 0 | 2 | 1 | 0 | 0 | 3 |
| 12 | Mining Engg. | 0 | 3 | 6 | 1 | 0 | 10 |
| 13 | Ocean Engg. & N.A. | 0 | 2 | 2 | 0 | 0 | 4 |
| **(B) B.Arch. 5-Year** | | | | | | | |
| 1 | Architecture | 0 | 2 | 1 | 2 | 0 | 5 |
| **(C) M.Sc. Integrated 5-Year** | | | | | | | |
| 1 | Applied Geology/ Expl. Geophysics | 0 | 6 | 1 | 0 | 0 | 7 |
| 2 | Economics | 0 | 3 | 5 | 1 | 0 | 9 |
| 3 | Chemistry | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | Maths. & Computing | 0 | 3 | 1 | 0 | 0 | 4 |
| 5 | Physics | 0 | 1 | 1 | 0 | 0 | 2 |
| | **Total** | 0 | 56 | 39 | 22 | 0 | 117 |
| | **B.F.** | 0 | 56 | 39 | 22 | 0 | 117 |
| **(D) M.Sc. 2-Year** | | | | | | | |
| 1 | Chemistry | | | | | | |
| 2 | Geological Scienc/ Geophysics | | | | | | |
| 3 | Mathematics | | | | | | |
| 4 | Physics | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **(E) Dual Degree 5-Year** | | | | | | | |
| 1 | Aerospace Engg. | 0 | 1 | 1 | 0 | 0 | 2 |
| 2 | Agricultural and Food Engg. With M.Tech. Specialisations | 0 | 4 | 2 | 1 | 0 | 7 |
| 3 | Biotech. & Bioch. Engg. | 0 | 2 | 1 | 3 | 0 | 6 |
| 4 | Chemical Engg. | 0 | 2 | 0 | 2 | 0 | 4 |
| 5 | Civil Engg. With M.Tech. Specialisations | 0 | 2 | 1 | 0 | 0 | 3 |
| 6 | Computer Sc. & Engg. | 0 | 1 | 1 | 3 | 0 | 5 |
| 7 | Electrical Engg./ Instrumentation Engg. | 0 | 3 | 2 | 1 | 0 | 6 |
| 8 | E & ECE with M.Tech. specialisation | 0 | 1 | 2 | 3 | 0 | 6 |
| 9 | Industrial Engg./IEM. | 0 | 4 | 1 | 1 | 0 | 6 |
| 10 | Mech,.Engg./ Manuf. Sc. & Engg. | 0 | 1 | 5 | 1 | 0 | 7 |
| 11 | Met. & Mat. Engg. | 0 | 2 | 1 | 0 | 0 | 3 |
| 12 | Mining Engineering | 0 | 5 | 7 | 1 | 0 | 13 |
| 13 | Ocean Engg. & N.A. | 0 | 2 | 0 | 0 | 0 | 2 |
| 14 | QEDM | 0 | 0 | 0 | 0 | 0 | 0 |
| | **TOTAL** | 0 | 86 | 63 | 38 | 0 | 187 |
| | MCM Summery | | | | | | |
| Table A-3 | MCM Scholarship & Free Studentship / M.Sc. & Dual Degree | 295 | 208 | 220 | 231 | 14 | 968 |
| Table A-4 | Students Awarded only Free Studentship / M.Sc. & Dual Degree | 0 | 86 | 63 | 38 | 0 | 187 |
| | **Grand Total** | 295 | 294 | 283 | 269 | 14 | 1155 |

**Table : A-5**

**STUDENTS (SC & ST) AWARDED FINANCIAL ASSISTANCE 2015-2016**
**Rate: Pocket Allowance Rs.250/- p.m. plus Free Messing**

| Sl.No. | Course | 1st yr. | | 2nd yr. | | 3rd yr. | | 4th yr. | | 5th yr. | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SC | ST | SC | ST | SC | ST | SC | ST | SC | ST | |
| **(A) B.Tech. 4-Year** | | | | | | | | | | | | |
| 1 | Aerospace Engg. | | | | | | | 1 | 1 | | | 2 |
| 2 | Agri. & Food Engg. | 4 | | 2 | | | | 3 | 4 | | | 13 |
| 3 | Biotech. & Bioch. Engg. | | | | | 1 | | | | | | 1 |
| 4 | Chemical Engg. | 1 | | | 2 | | | | | | | 3 |
| 5 | Civil Engg. | 1 | 1 | | 1 | | | | | | | 3 |
| 6 | Computer Sc. & Engg. | 1 | | | | 1 | | | | | | 2 |
| 7 | Electrical Engg. | | 1 | | 1 | | 1 | 1 | 1 | | | 5 |
| 8 | Electronics & ECE | | | | | | 1 | | 1 | | | 2 |
| 9 | Energy Engg. | | | | | | | | | | | |
| 10 | Industrial Engg. | | | | | | | | 1 | | | 1 |
| 11 | Instrumentation Engg. | | | | | | | | | | | |
| 12 | Manuf. Sc. & Engg. | | | 1 | | | | | | | | 1 |
| 13 | Mechanical Engg. | 1 | 1 | | | | | 2 | | | | 4 |
| 14 | Met. & Mat. Engg. | 1 | | | | 1 | 1 | | | | | 3 |
| 15 | Mining Engg. | | 1 | | 1 | | | 2 | | | | 4 |
| 16 | Ocean Engg. & N.A. | | | 1 | | | | 2 | | | | 3 |
| **(B) B.Arch. 5-Year** | | | | | | | | | | | | |
| | Architecture | | | | | | | 1 | 2 | | | 3 |
| **(C) M.Sc. Integrated 5-Year** | | | | | | | | | | | | |
| 1 | Applied Geology | | | | | | | | | | | |
| 2 | Economics | | | | 1 | | | | | | 2 | 3 |
| 3 | Expl. Geophysics | | | | | | | | | | | |
| 4 | Industrial Chemistry | | | | 1 | | | | | | | 1 |
| 5 | Maths. & Computing | | | | | | | | | | | |
| 6 | Physics | | | | | | | | | | | |
| 7 | Statistics & Informatics | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **(D) M.Sc. 2-Year** | | | | | | | | | | | | |
| 1 | Chemistry | 3 | 1 | 1 | 2 | | | | | | | 7 |
| 2 | Geophysics | | | 1 | 2 | | | | | | | 3 |
| 3 | Geological Sciences | 3 | | | | | | | | | | 3 |
| 4 | Mathematics | 4 | 2 | 2 | | | | | | | | 8 |
| 5 | Physics | 2 | | | | | | | | | | 2 |
| **(E) Dual Degree 5-Year** | | | | | | | | | | | | |
| 1 | Aerospace Engg. | | | | | | | | | | | |
| 2 | Agricultural & Food Engineering with M.Tech. specialisations. | | | | | | | | | | | |
| 3 | Biotech. & Bioch. Engg. | | | | | | | | | | | |
| 4 | Chemical Engg. | | | | | | | | | | | |
| 5 | Civil Engg.with M.Tech. Specialisations. | | | | | | | | | | | |
| 6 | Computer Sc. & Engg | | | | | | | | | | | |
| 7 | Electrical Engg./ Instrumentation Engg. | | | | | | | | | | | |
| 8 | E & ECE with M.Tech. specialisations | | | | | | | | | | | |
| **(E) Dual Degree 5-Year** | | | | | | | | | | | | |
| 9 | Industrial Engg./IEM. | | | | | | | | | | | |
| 10 | Manuf. Sc.& Engg./IEM | | | | | | | 1 | | | | 1 |
| 12 | Mechanical Engg. with M.Tech Specialsiation | | | | | | | | | | | |
| 13 | Met. & Mat. Engg. | | | | | | | | 1 | | | 1 |
| 14 | Mining Engineering | | | | | | | | | | | |
| 15 | Mining Engg with M.Tech. specialiations | | | | | | | | | | | |
| 16 | Ocean Engg. & N.A. | | | | | | | | 1 | | | 1 |
| 17 | QEDAM | | | | | | | | | | | |
| | **Total:** | 21 | 7 | 8 | 11 | 3 | 3 | 13 | 12 | 0 | 2 | 80 |

**Table : 6**

**MEDALS AND PRIZES : 2015 – 2016 : UNDER-GRADUATE**

| **1. INSTITUTE GOLD MEDALS:** | | | | |
|---|---|---|---|---|
| **Sl. No.** | **Name of Medal/Prize** | **Name of the winner** | **Instt.Roll No.** | **CGPA** |
| 1. | PRESIDENT OF INDIA GOLD MEDAL | Prithwish Mukherjee<br>Soham Dan (Jointly) | 12CS10058<br>12CS10059 | 9.75<br>9.75 |
| 2. | DR. BIDHAN CHANDRA ROY MEMORIAL GOLD MEDAL | Rajorshi Paul | 12ME10074 | 9.47 |
| 3. | PRIME MINISTER OF INDIA GOLD MEDAL | Sachin Kumar | 11CS30043 | 9.73 |
| 4. | DR. JNAN CHANDRA GHOSH MEMORIAL GOLD MEDAL | Aditya Banerji | 11CH30003 | 9.26 |
| 5. | PROF. J. C. BOSE MEMORIAL GOLD MEDAL | Asim Maity | 14CY40024 | 9.77 |
| **2. ENDOWMENT GOLD MEDALS:** | | | | |
| 1. | ANUKUL CHANDRA SARKAR MEMORIAL GOLD MEDAL | Arya Prakash Padhi | 12CE10008 | 9.23 |
| 2. | PROF. R. G. CHATTERJEE MEMORIAL GOLD MEDAL | Sandipan Haldar | 11PH20020 | 9.17 |
| **3. SILVER MEDALS :** | | | | |
| **A. 4-YEAR B. TECH.(HONS.) COURSES :** | | | | |
| 1 | Aerospace Engineering | Vemula Yashwanth | 12AE10033 | 8.72 |
| 2 | Biotechnology & Biochemical Engg. | Kritarth Jha | 12BT10015 | 8.54 |
| 3 | Chemical Engineering | Pujari Srinivasa Rao | 12CH10036 | 9.56 |
| 4 | Civil Engineering | Arya Prakash Padhi | 12CE10008 | 9.23 |
| 5 | Computer Science & Engineering | Prithwish Mukherjee | 12CS10058 | 9.75 |
| 6 | Electrical Engineering | Shivang | 12EE10041 | 9.51 |
| 7 | Instrumentation Engineering | Bodepu Lakshmi Lavanya | 12IE10008 | 9.07 |
| 8 | Electronics & Electrical Communication Engineering | Vardaan Pahuja | 12EC10067 | 9.61 |
| 9 | Mechanical Engineering | Deshmukh Arjun Ravindra | 12ME10019 | 9.54 |
| 10 | Manufacturing Science & Engineering | Apurv Shukla | 12MF10003 | 9.15 |
| 11 | Metallurgical & Materials Engineering | Anusheela Das | 12MT10007 | 9.25 |
| 12 | Mining Engineering | Biswaranjan Jena | 12MI10016 | 8.71 |
| **B. 5-YEAR DUAL DEGREE COURSES :** | | | | |
| 1 | Aerospace Engineering | Rishita Das | 11AE30024 | 9.49 |
| 2 | Agricultural & Food Engineering | Nayan Mallick | 11AG32008 | 8.95 |

| | | | | |
|---|---|---|---|---|
| 3 | Biotechnology & Biochemical Engineering | Srinivasan S | 11BT30023 | 9.29 |
| 4 | Chemical Engineering | Aditya Banerji | 11CH30003 | 9.26 |
| 5 | Civil Engineering | Rajeev Choudhary | 11CE31013 | 9.22 |
| 6 | Computer Science & Engineering | Sachin Kumar | 11CS30043 | 9.73 |
| 7 | Electrical Engineering | Harit Bansal | 11EE32001 | 9.61 |
| 8 | Electronics & Electrical & Comm. Engineering | Sudipta Biswas | 11EC34005 | 9.66 |
| 9 | Industrial & Systems Engineering | Reddivari Himadeep Reddy | 11IM30014 | 9.26 |
| 10 | Mechanical Engineering | Ashish Daga | 11ME32006 | 9.47 |
| 11 | Manufacturing Sc.& Engg | Arpit Kumar Agrawal | 11MF3IM03 | 8.57 |
| 12 | Metallurgical & Materials Engineering | Washim Alam | 11MT30020 | 9.43 |
| 13 | Mining Engineering | Anoop Muppalla | 11MI31006 | 8.56 |
| 14 | Ocean Engineering & Naval Architecture | G Akshay Deepak | 11NA30007 | 8.74 |
| **C. M. SC. (5-YEAR) COURSES :** | | | | |
| 1 | Chemistry | Sayak Subhra Panda | 11CY20026 | 9.35 |
| 2 | Exploration Geophysics | Pushkar Mondal | 11EX20025 | 9.28 |
| 3 | Applied Geology | Achyut Mishra | 11GG20004 | 9.07 |
| 4 | Economics | Chandra Mouli Halder | 11HS20008 | 9.17 |
| 5 | Mathematics & Computing | B Hari Sri Sai Charan Reddy | 11MA20015 | 8.90 |
| 6 | Physics | Sandipan Haldar | 11PH20020 | 9.17 |
| **D. M. SC. (2-YEAR) COURSES** | | | | |
| 1 | Chemistry | Asim Maity | 14CY40024 | 9.77 |
| 2 | Geology | Aditi Chatterjee | 14GG40012 | 9.61 |
| 3 | Mathematics | Ashok Das | 14MA40019 | 9.49 |
| 4 | Physics | Dhiman Bhowmick | 14PH40025 | 9.33 |

| **4. ENDOWMENT PRIZES - (UNDER GRADUATE)** | | | | | |
|---|---|---|---|---|---|
| **Sl. No.** | **Name of Medal/Prize** | **Name of the winner** | **Instt.Roll No.** | **CGPA** | **Amount Rs.** |
| 1 | | Megha Jhunjhunwala | 12CS10061 | 9.66 | 500.00 |
| 2 | P. K. Bhattacharya Memorial Prize | Pushkar Mondal | 11EX20025 | 9.28 | 500.00 |
| 3 | Sachinandan Basak Memorial Prize | Neha Banerjee | 14EE10061 | 9.40 | 500.00 |
| 4 | Amlan Sen Memorial Prize | Rishav Roy | 12ME10048 | 9.51 | 1,000.00 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | Swapan Kumar Saha Memorial Prize | Vardaan Pahuja | 12EC10067 | 9.61 | 1,000.00 |
| 6 | Medury Bhanumurthy Memorial Prize | Rajorshi Paul | 12ME10074 | 9.47 | 350.00 |
| 7 | H. N. Bose Memorial Prize | Sandipan Haldar | 11PH20020 | 9.17 | 3,000.00 |
| 8 | Sharmila Bose Memorial Prize | Namita Mittal | 11CY20018 | 8.80 | 3,000.00 |
| 9 | Bigyan Sinha Memorial Prize | Soham Dan | 12CS10059 | 9.75 | 1,000.00 |
| 10 | Usha Martin Award | Anusheela Das | 12MT10007 | 9.25 | 1,000.00 |
| 11 | Systems Society Award | Gagan Goel | 12EE10012 | 9.40 | 2,500.00 |
| 12 | Prof. K.L. Chopra Award | Sandipan Haldar | 11PH20020 | 9.17 | 1000.00 |
| 13 | Charubala Devi Memorial Prize | Saurav Maji | 13EC10056 | 9.94 | 1000.00 |
| 14 | Prof. Prabodh Chandra Sanyal Award | Doyel Pandey | 14MA40008 | 8.69 | 1,000.00 |
| 15 | B. L. Nagpal Memorial Prize | Karan Kumar Singh | 13CE30010 | 9.40 | 2,000.00 |
| 16 | Umesh Kumar Bhatia Sports Prize | Aman Kharb | 12CS30003 | 8.43 | 1000.00 |
| 17 | Pradeep Kumar Chakraborty Award | Bharat Khurana | 13MT10006 | 9.65 | 1,000.00 |
| 18 | G. B. Mitra Award | Sayak Subhra Panda | 11CY20026 | 9.35 | 1,000.00 |
| 19 | Bhartiya Cutler Hammer Prize | Satyaki Mukherjee | 13EE30024 | 9.55 | 3,000.00 |
| 20 | Mansara Prize | Prachi Verma | 12AR10036 | 8.67 | 1,000.00 |
| 21 | R. M. Lalwani Prize | Saurav Maji | 13EC10056 | 9.94 | 1000.00 |
| 22 | H. P. Bhadury Memorial Prize | Sougata Hazra | 13ME10055 | 9.62 | 1,500.00 |
| 23 | John Von Neuman Award | Saurav Maji | 13EC10056 | 9.94 | 2,500.00 |
| 24 | Prof. S. K. Nandi Memorial Prize | Sayantan Dutta | 13CH10043 | 9.28 | 500.00 |
| 25 | International Symposium (Microwave & Communication) 1981 Prize | Saurav Maji | 13EC10056 | 9.94 | 3,000.00 |
| 26 | Class Of 1970 Alumni (US) Association Prize | Shubham Jena | 14AE3001 | 9.79 | 2,500.00 |
| 27 | Technology Alumni Association (Delhi Chapter) Award | Nishant Baranwal Somy | 15ME30030 | 9.89 | 1,500.00 |
| 28 | IIT Kharagpur Alumni (California Chapter) Award | Shubham Jena | 14AE30017 | 9.79 | 3,000.00 |
| 29 | Prof. S. P. Sengupta Memorial Prize | Aniruddhe Pradhan | 12ME10072 | 9.41 | 2,500.00 |
| 30 | K. Rama Rao Endowment Prize | A Sahithi | 13AG10001 | 8.54 | 2,500.00 |
| 31 | Smt. Ava Sanyal Memorial Prize | Bharat Khurana | 13MT10006 | 9.65 | 2,500.00 |
| 32 | Prof. B.N. Avasthi Memorial Award For Sports | Siraj Modiwala<br>Aishwarya | 13ME10054<br>13CS10004 | 7.777.54 | 2,500.00<br>2,500.00 |
| 33 | Prof. Sunil Kanti Sen Memorial Award | Subham Rajgaria | 15CS10061 | 9.73 | 4,000.00 |
| 34 | Prof. Sudhir Ranjan Sengupta Memorial Prize | Arya Prakash Padhi | 12CE10008 | 9.23 | 2,000.00 |

| | | | | | |
|---|---|---|---|---|---|
| 35 | Best B.Tech. Project Thesis Award By Mr. Mitrajit Mukhopadhyay | 1st Pujari Srinivasa Rao 2nd –Shivam Dutta 3rd –Navneet Kumawat | 12CH10036<br>12CH100411<br>2CH30019 | 9.56<br>8.30<br>7.46 | 25,000.00<br>15,000.00<br>10,000.00 |
| 36 | A. A. Hakim Memorial Endowment Prize | Nayan Mallick | 11AG32008 | 8.95 | 2,500.00 |
| 37 | Keshab K Parhi Endowment Prize | Akshay Singh | 11EE33003 | 9.51 | 15,000.00 |
| 38 | Nilanjan Ganguly Memorial Award For E&E.C.E. Deptt. | Vardaan Pahuja | 12EC10067 | 9.61 | 10,000.00 |
| 39 | Nilanjan Ganguly Memorial Award For Physics Deptt. | Sandipan Haldar | 11PH20020 | 9.17 | 10,000.00 |
| 40 | Kedar Nath Singh Memorial Prize | Sandipan Haldar | 11PH20020 | 9.17 | 6,400.00 |
| 41 | Dwaraka Nath Singh Memorial Prize | Áshish Daga | 11ME32006 | 9.47 | 6,400.00 |
| 42 | Jugal Kishore Singh Memorial Prize | Deshmukh Arjun Ravindra | 12ME10019 | 9.54 | 6,400.00 |
| 43 | Rajender Kumar Khanna Memorial Award | Shivang | 12EE10041 | 9.51 | 10,000.00 |
| 44 | Ramneek Sodhi Memorial Award | Arghya Patra | 12MT30024 | 9.49 | 10,000.00 |
| 45 | Sushil Kumar Chowdhury Memorial Award | Vemula Yashwanth | 12AE10033 | 8.72 | 7,000.00 |
| 46 | TKT Srikrishnan Endowment Prize | Aniruddhe Pradhan | 12ME10072 | 9.41 | 20,000.00 |
| 47 | Prof. J.P. Ghose Memorial Award | Sumeet Kumar | 13NA3EP01 | 8.45 | 10,000.00 |
| 48 | Sikharini Nag Memorial Award | Deshmukh Arjun Ravindra Akhilesh Peddu | 12ME10019<br>11ME32009 | 9.54<br>9.12 | 20,000.00<br>20,000.00 |
| 49 | Prof. D.V.S. Murty Merit Award | Bodepu Lakshmi Lavanya | 12IE10008 | 9.07 | 10,000.00 |
| 50 | Prof. P.K. Muhuri Memorial Award | Srishti Gole | 14NA10027 | 7.76 | 10,000.00 |
| 51 | Prof. R.K. Brahma Memorial Prize | Ashish Daga | 11ME32006 | 9.47 | 16,000.00 |
| **5. J. C. GHOSH MEMORIAL PRIZE** | | | | | |
| 1 | Aerospace Engineering | Himanshu Prabhat | 13AE30005 | 9.17 | 2,000.00 |
| 2 | Agricultural & Food Engineering | Debmalya Ghosh | 13AG30007 | 8.83 | 2,000.00 |
| 3 | Biotechnology & Biochemical Engg | Rhushikesh Anand Phadke | 13BT30019 | 8.86 | 2,000.00 |
| 4 | Chemical Engineering | Sayantan Dutta | 13CH10043 | 9.28 | 2,000.00 |
| 5 | Civil Engineering | Karan Kumar Singh | 13CE30010 | 9.40 | 2,000.00 |
| 6 | Computer Science & Engineering | Prabhat Agarwal | 13CS10060 | 9.92 | 2,000.00 |

| | | | | | |
|---|---|---|---|---|---|
| 7 | Electrical Engineering | Satyaki Mukherjee | 13EE30024 | 9.55 | 2,000.00 |
| 8 | Instrumentation Engineering | Hardik Sheth | 13IE10014 | 8.95 | 2,000.00 |
| 9 | Electronics & Elect. Comm. Engineering | Saurav Maji | 13EC10056 | 9.94 | 2,000.00 |
| 10 | Industrial And Systems Engineering | Kunal Kulbhushan Jain | 13IM10013 | 9.04 | 2,000.00 |
| 11 | Mechanical Engineering | Sougata Hazra | 13ME10005 | 9.62 | 2,000.00 |
| 12 | Manufacturing Science & Engineering | Anubhav Singh | 13MF10007 | 8.86 | 2,000.00 |
| 13 | Metallurgical & Materials Engineering | Bharat Khurana | 13MT10006 | 9.65 | 2,000.00 |
| 14 | Mining Engineering | Prithvi Chandak K | 13MI10025 | 8.76 | 2,000.00 |
| 15 | Ocean Engineering & Naval Architecture | Gautam Kumar Jha | 13NA3FP08 | 8.88 | 2,000.00 |
| 16 | Architecture & Regional Planning | Kaartikey Dwivedi | 13AR10020 | 9.26 | 2,000.00 |
| 17 | Chemistry | Ipsita Mohanty | 12CY20019 | 8.78 | 2,000.00 |
| 18 | Applied Geology | Syed Aaquib Hussain | 12GG20037 | 8.67 | 2,000.00 |
| 19 | Exploration Geophysics | Kartik Pal | 12EX20013 | 8.76 | 2,000.00 |
| 20 | Mathematics & Computing | Keshav Agarwal | 12MA20020 | 9.53 | 2,000.00 |
| 21 | Physics | Souvik Biswas | 12PH20032 | 9.47 | 2,000.00 |
| 22 | Economics (HS) | Umang Manish Mavani | 12HS20044 | 9.01 | 2,000.00 |
| **6. BEST PROJECT AWARD :** | | | | | |
| **A. 4-YEAR B. TECH.(HONS.) COURSES :** | | | | | |
| 1 | Aerospace Engineering | Jishnu M | 12AE30021 | 9.02 | 1,000.00 |
| 2 | Agricultural & Food Engineering | Rahul Verma | 12AG10029 | 8.91 | 1,000.00 |
| 3 | Chemical Engineering | Abhishek Bose | 12CH30032 | 8.94 | 1,000.00 |
| 4 | Civil Engineering | Noel Mathew Paul | 12CE10029 | 8.46 | 1,000.00 |
| 5 | Computer Science & Engineering | Prithwish Mukherjee | 12CS10058 | 9.75 | 1,000.00 |
| 6 | Electrical Engineering | Mausamjeet Khatua | 12EE10027 | 9.21 | 1,000.00 |
| 7 | Instrumentation Engineering | Ayush Pandey | 12IE32001 | 8.12 | 1,000.00 |
| 8 | Industrial And Systems Engineering | Goyal Anubhav Vijay | 12IM30007 | 8.93 | 1,000.00 |
| 9 | Electronics & Elect. Comm. Engineering | Abhishek Paul | 12EC10004 | 9.04 | 1,000.00 |
| 10 | Mechanical Engineering | Aniruddhe Pradhan | 12ME10072 | 9.41 | 1,000.00 |
| 11 | Metallurgical & Materials Engineering | Arghya Patra | 12MT30024 | 9.49 | 1,000.00 |
| 12 | Mining Engineering | Amit Kumar Patel | 12MI10007 | 7.51 | 1,000.00 |
| 13 | Ocean Engineering & Naval Architecture | Pratyush Devliyal | 12NA10026 | 8.16 | 1,000.00 |

| | | | | | |
|---|---|---|---|---|---|
| **B. 5-YEAR DUAL DEGREE COURSES :** | | | | | |
| 1 | Aerospace Engineering | Rishita Das | 11AE30024 | 9.49 | 1,000.00 |
| 2 | Agricultural & Food Engineering | K.H.Anand | 11AG32001 | 8.39 | 1,000.00 |
| 3 | Biotechnology & Biochemical Engineering | Srinivasan S | 11BT30023 | 9.29 | 1,000.00 |
| 4 | Chemical Engineering | Jain Parshva Hemant | 11CH30028 | 8.54 | 1,000.00 |
| 5 | Civil Engineering | Rahul Sharma | 11CE31003 | 8.87 | 1,000.00 |
| 6 | Computer Science & Engineering | Bhat Shrihari Amarendra | 11CS30008 | 9.44 | 1,000.00 |
| 7 | Electrical Engineering | Akshay Singh | 11EE33003 | 9.51 | 1,000.00 |
| 8 | Electronics & Elect. Commu. Engg | Nuthakki Srinivasa Shashank | 11EC32002 | 9.42 | 1,000.00 |
| 9 | Industrial & Systems Engineering | Reddivari Himadeep Reddy | 11IM30014 | 9.26 | 1,000.00 |
| 10 | Industrial & Systems Engg. (IMQE) | Vommi Siva Sylesh | 11QE30006 | 8.19 | 1,000.00 |
| 11 | Industrial & Systems Engg. (IMQM) | Arunesh Nandan | 11QM30003 | 8.27 | 1,000.00 |
| 12 | Mechanical Engineering | Agrawal Sanket Dilip | 11ME31012 | 7.90 | 1,000.00 |
| 13 | Manufacturing Science & Engg. | Gourabathuni Venkata Harish | 11MF3IM07 | 8.29 | 1,000.00 |
| 14 | Metallurgical & Materials Engineering | Washim Alam | 11MT30020 | 9.43 | 1,000.00 |
| 15 | Mining Engineering | Anoop Muppalla | 11MI31006 | 8.56 | 1,000.00 |
| 16 | Ocean Engineering & Naval Architecture | G.Akshay Deepak | 11NA30007 | 8.74 | 1,000.00 |
| **C. 5-YEAR M. SC. COURSES :** | | | | | |
| 1 | Chemistry | Sayak Subhra Panda | 11CY20026 | 9.35 | 1,000.00 |
| 2 | Exploration Geophysics | Pushkar Mondal | 11EX20025 | 9.28 | 1,000.00 |
| 3 | Applied Geology | Achyut Mishra | 11GG20004 | 9.07 | 1,000.00 |
| 4 | Economics | Purvi Bhanushali | 11HS20028 | 8.65 | 1,000.00 |
| 5 | Physics | Koushik Chatterjee | 11PH20013 | 9.01 | 1,000.00 |
| **D. 2-YEAR M. SC. COURSES :** | | | | | |
| 1 | Chemistry | Md Raja Sk | 14CY40030 | 9.33 | 1,000.00 |
| 2 | Geology | Torsa Sengupta | 14GG40015 | 9.12 | 1,000.00 |
| 3 | Mathematics | Doyel Pandey | 14MA40008 | 8.69 | 1,000.00 |
| 4 | Physics | Agniva Ghosh | 14PH40037 | 8.87 | 1000.00 |

**Table : A-7**

**UG STUDENTS AWARDED SCHOLARSHIP BY EXTERNAL AGENCIEIS**
**During the Year 2015-16**
**(Government or Private)**

| Sl. No. | Awarding Organization | No. of Recipients |
|---|---|---|
| 1 | National Council of Educational Research & Training, Sri Aurobinda Marg, New Delhi-16 | 2 |
| 2 | INSPIRE Scholarship awarded by Department of Science & Technology, Govt. of India, New Delhi to the students of 5-Yr. Int. M.Sc.Course(Science stream only) | 468 |
| 3 | Rajarshee Shahu Maharah Merit Scholarship, Director of Social Welfare, Mahararashtra State, Pune. | 5 |
| 4 | SAIL Scholarship being awarded by Steel Authority of India Ltd. through Vishakhapatnam Steel Plant | 2 |
| 5 | Pandit Jawharlal Nehru Science & Technology Scholarship Scheme | |
| 6 | Aditya Birla Scholarship, Aaditya Birla Group, Aditya Birla Management Corporation, Mumbai | 5 |
| 7 | Jagadish Chandra Bose National Talent Search, Calcutta (JBNSTS) | |
| 8 | OPJEM Scholarship being awarded by Zindal Trust , New Delhi | |
| 9 | Indian Oil Corporation Ltd., Delhi | |
| 10 | BOEING Scholarship to the students of Aero Space Engg. Department from the ongoing Research Project “Boeing University Relations”(BUR) sponsored by Boeing Company, U.S.A | |
| 11 | Scholarship under Scheme (Trust Fund) for Differently Abled Students being awarded by National Handicapped Finance & Development Corporation, (NHFDC), Faridabad. | 1 |
| 12 | KVPY Scholarship, IISc, Bangalore | 10 |
| 13 | FAEA Scholarship to BPL Cat. SC/ST students being awarded by Foundation for Academic Excellence & Access, New Delhi. | 19 |
| 14 | Post Matric Scholarship to SC/ST students , awarded through different District Welfare Officers in A.P. State Govt. of Anhdra Pradesh | 1 |
| 15 | Directorate of Technical Education, Chattisgarh | 1 |
| 16 | ST Scholarship awarded by Singapore Technologies Eng. Ltd., to students of Computer Science Engg. and O.E. & Naval. Arch. | 9 |
| 17 | NTPC Scholarship | 5 |
| 18 | Schoarship from CALSOFT Pft. Ltd. | 1 |
| 19 | ONGC Scholarship | 1 |
| 20 | EIL Scholarship, Engineers India Ltd., HRD, New Delhi | 3 |
| 21 | STEEL Scholarship | 10 |
| 22 | IAF Benevolent Asso Scholarship | 1 |
| 23 | Post-Matric Scholarship, Bihar | 1 |
| 24 | CSS Scholarship for College & University students through Govt. of AP, Hyderabad | 1 |
| | **Total** | **546** |

**Table : A-8**

**STUDENTS FROM FOREIGN COUNTRIES ON ROLL OF UNDERGRADUATE COURSES, CLASS WISE, 2015 – 2016**

| S.N. | Course | 1st yr. | 2nd yr. | 3rd yr. | 4th yr. | 5th yr. | Total |
|---|---|---|---|---|---|---|---|
| **(A) B.Tech. 4-Year** | | | | | | | |
| 1 | Aerospace Engg. | _ | - | - | - | - | - |
| 2 | Agri. & Food Engg. | - | - | - | - | - | - |
| 3 | Biotech. & Bioch. Engg. | - | - | - | - | - | - |
| 4 | Chemical Engg. | - | - | - | - | - | - |
| 5 | Civil Engg. | - | - | - | - | - | - |
| 6 | Computer Sc. & Engg. | 1 | - | | 1 | - | 2 |
| 7 | Electrical Engg. | - | - | - | - | - | - |
| 8 | Electronics & ECE | - | - | - | - | - | - |
| 9 | Energy Engg. | - | - | - | - | - | - |
| 10 | Industrial Engg. | - | - | - | - | - | - |
| 11 | Instrumentation Engg. | - | - | - | - | - | - |
| 12 | Manuf. Sc. & Engg. | - | 1 | - | - | - | 1 |
| 13 | Mechanical Engg. | -- | - | - | - | - | - |
| 14 | Met. & Mat. Engg. | - | - | - | - | - | - |
| 15 | Mining Engg. | - | - | - | - | - | - |
| 16 | Ocean Engg. & N.A. | - | - | - | - | - | - |
| **(B) B.Arch. 5-Year** | | | | | | | |
| | Architecture | - | - | - | - | - | - |
| **(C) M.Sc. Integrated 5-Year** | | | | | | | |
| 1 | Applied Geology | - | - | - | - | - | - |
| 2 | Economics | - | - | - | 1 | - | 1 |
| 3 | Expl. Geophysics | - | - | - | - | - | - |
| 4 | Industrial Chemistry | - | - | - | - | - | - |
| 5 | Maths. & Computing | - | - | - | - | - | - |
| 6 | Physics | - | - | - | - | - | - |
| 7 | Statistics & Informatics | - | - | - | - | - | - |

| S.N. | Course | 1st yr. | 2nd yr. | 3rd yr. | 4th yr. | 5th yr. | Total |
|---|---|---|---|---|---|---|---|
| **(D) M.Sc. 2-Year** | | | | | | | |
| 1 | Chemistry | - | - | - | - | - | - |
| 2 | Geophysics | - | - | - | - | - | - |
| 3 | Geological Sciences | - | - | - | - | - | - |
| 4 | Mathematics | - | - | - | - | - | - |
| 5 | Physics | - | | - | - | - | - |
| 6 | Statistics & Informatics | - | - | - | - | - | - |
| **(E) Dual Degree 5-Year** | | | | | | | |
| 1 | Aerospace Engg. | - | - | - | - | - | - |
| 2 | Ag. & F. E../Water Res. Dev. & Manag. | - | 1 | - | - | - | 1 |
| 3 | Biotech. & Bioch. Engg. | 1 | - | - | - | - | 1 |
| 4 | Chemical Engg. | - | - | - | - | - | - |
| 5 | Civil Engg./Struct. Engg. | - | - | - | - | - | - |
| 6 | Computer Sc. & Engg. | - | - | - | - | 2 | 2 |
| 7 | Electrical Engg./Instrumentation | - | - | - | -- | - | - |
| 8 | E & ECE/Automation & Comp. Vision | - | -- | - | - | - | - |
| 9 | Industrial Engg./IEM | - | -- | - | - | - | - |
| 10 | Manuf. Sc.& Engg./IEM | - | - | - | - | - | - |
| 11 | M.E./M.S. Engg. | -- | - | - | - | - | - |
| 12 | M.E./Thermal, Energy & Environ. Engg. | - | - | - | - | - | - |
| 13 | Met. & Mat. Engg./ Metallurgical Engg. | - | -- | - | - | - | - |
| 14 | Mining Engineering | - | - | - | - | - | - |
| 15 | Mining Engg./Safety Engg. & Disaster Mgt in Mines | - | - | -- | - | - | - |
| 16 | Ocean Engg. & N.A. | - | - | - | - | - | - |
| | **Total** | 2 | 2 | - | 2 | 2 | 8 |

Source : ERP

**Table : A-9**

**STATEMENT OF RESULTS (UNDERGRADUATE) FOR THE SESSION 2015-2016**

| Sl. No | Course | 1st Year | | 2nd Year | | 3rd Year | | 4th Year | | 5th Year | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | P | I | P | I | P | I | P | I | P | I | |
| **(A) B.Tech** | | | | | | | | | | | | |
| 1 | Aerospace Engineering | 31 | 2 | 19 | 14 | 23 | 5 | 16 | 6 | 0 | 0 | 116 |
| 2 | Agricultural And Food Engineering | 22 | 11 | 13 | 15 | 19 | 8 | 23 | 10 | 0 | 0 | 121 |
| 3 | Biotechnology | 20 | 5 | 15 | 10 | 12 | 6 | 7 | 2 | 0 | 0 | 77 |
| 4 | Chemical Engineering | 45 | 5 | 42 | 11 | 41 | 12 | 42 | 8 | 0 | 0 | 206 |
| 5 | Civil Engineering | 47 | 13 | 44 | 15 | 41 | 16 | 33 | 13 | 0 | 0 | 222 |
| 6 | Computer Science & Engineering | 52 | 3 | 53 | 12 | 48 | 15 | 59 | 10 | 0 | 0 | 252 |
| 7 | Electrical Engineering | 48 | 8 | 52 | 11 | 41 | 22 | 48 | 19 | 0 | 0 | 249 |
| 8 | Electronics & Electrical Communication Engg. | 56 | 6 | 53 | 16 | 56 | 13 | 58 | 16 | 0 | 0 | 274 |
| 9 | Industrial And Systems Engineering | 21 | 8 | 21 | 9 | 19 | 3 | 24 | 3 | 0 | 0 | 108 |
| 10 | Instrumentation Engineering | 28 | 4 | 24 | 10 | 22 | 12 | 22 | 12 | 0 | 0 | 134 |
| 11 | Manufacturing Engineering | 20 | 8 | 19 | 8 | 18 | 6 | 14 | 13 | 0 | 0 | 106 |
| 12 | Mechanical Engineering | 64 | 3 | 61 | 16 | 61 | 16 | 48 | 23 | 0 | 0 | 292 |
| 13 | Metallurgical & Materials Engineering | 35 | 7 | 29 | 10 | 32 | 5 | 27 | 8 | 0 | 0 | 153 |
| 14 | Mining Engineering | 28 | 11 | 20 | 13 | 30 | 12 | 31 | 4 | 0 | 0 | 149 |
| 15 | Ocean Engg. And Naval Architecture | 22 | 8 | 15 | 10 | 17 | 10 | 15 | 7 | 0 | 0 | 104 |
| | **Total (A)** | 539 | 102 | 480 | 180 | 480 | 161 | 467 | 154 | 0 | 0 | 2563 |
| **(B) B.Arch** | | | | | | | | | | | | |
| 1 | Architecture And Regional Planning | 23 | 12 | 30 | 8 | 20 | 21 | 3 | 49 | 28 | 8 | 202 |
| | **TOTAL (B)** | 23 | 12 | 30 | 8 | 20 | 21 | 3 | 49 | 28 | 8 | 202 |
| **(C) M.Sc (2yr)** | | | | | | | | | | | | |
| 1 | Chemistry | 39 | 4 | 44 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 88 |
| 2 | Exploration Geophysics | 9 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| 3 | Geology & Geophysics | 29 | 1 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 |
| 4 | Mathematics | 27 | 0 | 27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 56 |
| 5 | Physics | 29 | 10 | 37 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 79 |
| | **TOTAL (C)** | 133 | 21 | 136 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 296 |
| **(D) M.Sc (5yr)** | | | | | | | | | | | | |
| 1 | Chemistry | 23 | 6 | 9 | 7 | 11 | 8 | 16 | 6 | 21 | 0 | 107 |
| 2 | Exploration Geophysics | 25 | 7 | 23 | 6 | 24 | 1 | 21 | 12 | 27 | 2 | 148 |
| 3 | Geology & Geophysics | 23 | 10 | 12 | 8 | 15 | 13 | 23 | 4 | 29 | 2 | 139 |
| 4 | Humanities & Social Sciences | 32 | 14 | 28 | 12 | 26 | 14 | 39 | 6 | 34 | 0 | 205 |
| 5 | Mathematics | 39 | 9 | 43 | 13 | 46 | 9 | 36 | 20 | 49 | 3 | 267 |
| 6 | Physics | 26 | 8 | 18 | 11 | 17 | 11 | 21 | 11 | 18 | 5 | 146 |
| 7 | Statistics And Informatics | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | **Total (D)** | 168 | 54 | 133 | 57 | 139 | 56 | 156 | 59 | 178 | 13 | 1013 |

| Sl. No | Course | 1st Year | | 2nd Year | | 3rd Year | | 4th Year | | 5th Year | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | P | I | P | I | P | I | P | I | P | I | |
| **(E) Dual Degree** | | | | | | | | | | | | |
| 1 | Aerospace Engineering | 12 | 6 | 14 | 6 | 12 | 9 | 26 | 4 | 29 | 2 | 120 |
| 2 | Agricultural And Food Engineering | 22 | 7 | 20 | 6 | 20 | 12 | 19 | 13 | 27 | 13 | 159 |
| 3 | Biotechnology | 17 | 8 | 17 | 4 | 12 | 13 | 30 | 3 | 25 | 0 | 129 |
| 4 | Chemical Engineering | 20 | 6 | 21 | 12 | 25 | 6 | 23 | 7 | 27 | 10 | 157 |
| 5 | Civil Engineering | 18 | 3 | 14 | 10 | 15 | 5 | 26 | 6 | 26 | 10 | 133 |
| 6 | Computer Science & Engineering | 36 | 5 | 39 | 10 | 30 | 16 | 34 | 12 | 44 | 4 | 230 |
| 7 | Electrical Engineering | 22 | 0 | 15 | 9 | 23 | 5 | 20 | 5 | 23 | 10 | 132 |
| 8 | Electronics & Electrical Communication Engg. | 33 | 7 | 33 | 11 | 39 | 4 | 40 | 15 | 40 | 9 | 231 |
| 9 | Industrial And Systems Engineering | 15 | 6 | 17 | 9 | 18 | 3 | 19 | 3 | 22 | 3 | 115 |
| 10 | Instrumentation Engineering | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 |
| 11 | Manufacturing Engineering | 11 | 4 | 11 | 2 | 11 | 5 | 12 | 4 | 11 | 1 | 72 |
| 12 | Mechanical Engineering | 38 | 10 | 40 | 14 | 42 | 11 | 50 | 15 | 57 | 13 | 290 |
| 13 | Metallurgical & Materials Engineering | 12 | 6 | 17 | 8 | 14 | 4 | 20 | 9 | 22 | 3 | 115 |
| 14 | Mining Engineering | 26 | 10 | 20 | 15 | 29 | 7 | 31 | 5 | 39 | 3 | 185 |
| 15 | Ocean Engg. And Naval Architecture | 20 | 1 | 12 | 12 | 17 | 5 | 25 | 9 | 23 | 8 | 132 |
| 16 | Quality Engineering Design And Manufacturing | 10 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 17 | Quality Engineering Design And Manufacturing - Industrial Electronics Vertical | 0 | 0 | 1 | 4 | 3 | 3 | 0 | 8 | 4 | 0 | 23 |
| 18 | Quality Engineering Design And Manufacturing - Mechanical Engineering Vertical | 0 | 0 | 6 | 0 | 5 | 4 | 0 | 4 | 6 | 0 | 25 |
| | **Total (E)** | 312 | 81 | 297 | 132 | 315 | 112 | 376 | 124 | 425 | 89 | 2263 |
| | **Total (A+B+C+D+E)** | 1175 | 270 | 1076 | 383 | 954 | 350 | 1002 | 386 | 631 | 110 | 6337 |

**STUDENTS ONROLL FOR 2015-2016 (Table : A-10)**

| Sl. No | Course | 1st Year | | 2nd Year | | 3rd Year | | 4th Year | | 5th Year | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | M | F | M | F | M | F | M | F | M | F | |
| **(A) B.Tech. 4- Year** | | | | | | | | | | | | |
| 1 | Aerospace Engg. | 32 | 1 | 32 | 1 | 26 | 3 | 23 | 0 | 0 | 0 | 118 |
| 2 | Agri. & Food Engg. | 32 | 1 | 26 | 2 | 22 | 6 | 29 | 4 | 0 | 0 | 122 |
| 3 | Biotech. & Bioch. Engg | 21 | 4 | 16 | 9 | 16 | 2 | 8 | 1 | 0 | 0 | 77 |
| 4 | Civil Engg. | 57 | 4 | 58 | 1 | 50 | 8 | 43 | 3 | 0 | 0 | 224 |
| 5 | Chemical Engg. | 45 | 5 | 49 | 4 | 48 | 5 | 44 | 7 | 0 | 0 | 207 |
| 6 | Computer Sc. & Engg. | 53 | 3 | 62 | 3 | 58 | 5 | 64 | 5 | 0 | 0 | 253 |
| 7 | Electronics & ECE | 52 | 10 | 62 | 7 | 64 | 5 | 66 | 8 | 0 | 0 | 274 |
| 8 | Electrical Engg. | 79 | 9 | 86 | 11 | 86 | 12 | 92 | 9 | 0 | 0 | 384 |
| 9 | Industrial Engg. | 26 | 3 | 27 | 3 | 21 | 1 | 26 | 1 | 0 | 0 | 108 |
| 10 | Mechanical Engg. | 93 | 2 | 100 | 4 | 98 | 3 | 94 | 4 | 0 | 0 | 398 |
| 11 | Mining Engg. | 39 | 0 | 33 | 0 | 41 | 1 | 35 | 0 | 0 | 0 | 149 |
| 12 | Met. & Mat Engg. | 41 | 1 | 34 | 5 | 32 | 5 | 27 | 8 | 0 | 0 | 153 |
| 13 | Ocean Engg. & N.A. | 27 | 3 | 24 | 1 | 26 | 1 | 20 | 2 | 0 | 0 | 104 |
| | **Total (A)** | 597 | 46 | 609 | 51 | 588 | 57 | 571 | 52 | 0 | 0 | 2571 |
| **(B) B.Arch. 5- Year** | | | | | | | | | | | | |
| 1 | Architecture | 26 | 9 | 33 | 5 | 27 | 14 | 44 | 8 | 30 | 6 | 202 |
| | **Total (B)** | 26 | 9 | 33 | 5 | 27 | 14 | 44 | 8 | 30 | 6 | 202 |
| **(C) M.Sc. Integrated 5- Year** | | | | | | | | | | | | |
| 1 | Chemistry | 25 | 4 | 13 | 3 | 12 | 7 | 16 | 6 | 15 | 6 | 107 |
| 2 | Geology | 60 | 5 | 45 | 4 | 51 | 2 | 55 | 5 | 57 | 3 | 287 |
| 3 | Humanities & Social Sc | 35 | 11 | 37 | 3 | 30 | 10 | 41 | 4 | 26 | 8 | 205 |
| 4 | Maths. | 42 | 6 | 54 | 2 | 51 | 4 | 49 | 7 | 43 | 10 | 268 |
| 5 | Physics | 34 | 0 | 23 | 6 | 27 | 1 | 32 | 0 | 20 | 3 | 146 |
| | **Total (C)** | 196 | 26 | 172 | 18 | 171 | 24 | 193 | 22 | 161 | 30 | 1013 |
| **(D) M.Sc. 2- Year** | | | | | | | | | | | | |
| 1 | Chemistry | 35 | 9 | 34 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 89 |
| 2 | Geology | 41 | 8 | 16 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 77 |
| 3 | Mathematics | 20 | 7 | 19 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 56 |
| 4 | Physics | 38 | 8 | 26 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 86 |
| | **Total (D)** | 134 | 32 | 95 | 47 | 0 | 0 | 0 | 0 | 0 | 0 | 308 |

| Sl. No | Course | 1st Year | | 2nd Year | | 3rd Year | | 4th Year | | 5th Year | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | M | F | M | F | M | F | M | F | M | F | |
| **(E) Dual Degree 5- Year** | | | | | | | | | | | | |
| 1 | Aerospace Engg. | 16 | 2 | 19 | 1 | 21 | 0 | 28 | 2 | 26 | 5 | 120 |
| 2 | Agri. & Food Engg. | 24 | 5 | 22 | 4 | 27 | 5 | 29 | 3 | 34 | 6 | 159 |
| 3 | Biotech. & Bioch.Engg | 23 | 2 | 16 | 5 | 19 | 6 | 22 | 11 | 15 | 10 | 129 |
| 4 | Civil Engg. | 20 | 1 | 20 | 4 | 19 | 1 | 27 | 5 | 35 | 1 | 133 |
| 5 | Chemical Engg. | 24 | 2 | 32 | 1 | 27 | 4 | 27 | 3 | 36 | 1 | 157 |
| 6 | Computer Sc. & Engg. | 38 | 3 | 45 | 4 | 44 | 2 | 44 | 2 | 45 | 3 | 230 |
| 7 | E & ECE | 37 | 3 | 38 | 6 | 37 | 6 | 44 | 11 | 42 | 7 | 231 |
| 8 | Electrical Engg. | 19 | 3 | 21 | 3 | 26 | 2 | 25 | 3 | 32 | 1 | 135 |
| 9 | Industrial and Systems Engg./IEM | 31 | 2 | 32 | 5 | 35 | 1 | 30 | 5 | 44 | 3 | 188 |
| 10 | Mechanical Engg. | 63 | 0 | 66 | 1 | 69 | 1 | 74 | 6 | 70 | 0 | 350 |
| 11 | Mining Engg. | 35 | 1 | 35 | 0 | 36 | 0 | 35 | 1 | 42 | 0 | 185 |
| 12 | Met. & Mat Engg./Metallurgical Engg. | 16 | 2 | 22 | 3 | 16 | 2 | 26 | 3 | 24 | 1 | 115 |
| 13 | Ocean Engg. & N.A | 19 | 2 | 22 | 2 | 19 | 3 | 32 | 2 | 29 | 2 | 132 |
| | **Total (E)** | 365 | 28 | 390 | 39 | 395 | 33 | 443 | 57 | 474 | 40 | 2264 |
| | **Total (A+B+C+D+E)** | 1318 | 141 | 1299 | 160 | 1181 | 128 | 1251 | 139 | 665 | 76 | 6358 |

## Table : B-1 ADMISSION TO POSTGRADUATE COURSES IN 2015-2016

| | Dept/Centre/ School | Specialisation | Sanctioned | Admitted | Regular | Spon. | QIP | DEF | GE | OB | SC | ST | PD | Male | Female |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AE | Aerospace Engineering (Ae) | 24 | 25 | 24 | 0 | 0 | 1 | 11 | 8 | 4 | 2 | 1 | 25 | 0 |
| 2 | AG | Farm Machinery And Power (Ag1) | 19 | 18 | 18 | 0 | 0 | 0 | 5 | 8 | 4 | 1 | 0 | 17 | 1 |
| 3 | AG | Land And Water Resources Engineering (Ag2) | 18 | 17 | 17 | 0 | 0 | 0 | 7 | 5 | 3 | 2 | 0 | 12 | 5 |
| 4 | AG | Food Process Engineering (Ag3) | 30 | 30 | 30 | 0 | 0 | 0 | 12 | 11 | 5 | 2 | 0 | 22 | 8 |
| 5 | AG | Agricultural Biotechnology (Ag4) | 20 | 18 | 18 | 0 | 0 | 0 | 6 | 6 | 3 | 3 | 0 | 10 | 8 |
| 6 | AG | Aquacultural Engineering (Ag5) | 18 | 5 | 5 | 0 | 0 | 0 | 2 | 1 | 2 | 0 | 0 | 4 | 1 |
| 7 | AG | Agricultural Systems And Management (Ag6) | 19 | 15 | 15 | 0 | 0 | 0 | 10 | 3 | 2 | 0 | 0 | 9 | 6 |
| 8 | AR | City Planning (Ar) | 42 | 42 | 40 | 0 | 1 | 1 | 21 | 12 | 6 | 3 | 1 | 19 | 23 |
| 9 | AT | Embedded Controls And Software (At1) | 12 | 6 | 6 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 4 | 2 |
| 10 | BM | Business Management (Bm) | 160 | 86 | 0 | 0 | 0 | 0 | 72 | 12 | 2 | 0 | 0 | 78 | 8 |
| 11 | BM | Executive Mba (Bm1) | 100 | 29 | 0 | 0 | 0 | 0 | 30 | 0 | 1 | 0 | 0 | 26 | 5 |
| 12 | BM | Business Analytics (Bm2) | | 51 | 0 | 0 | 0 | 0 | 27 | 15 | 6 | 3 | 0 | 44 | 7 |
| 13 | BT | Biotechnology And Biochemical Engineering (Bt) | 24 | 21 | 21 | 0 | 0 | 0 | 10 | 8 | 3 | 0 | 0 | 10 | 11 |
| 14 | CE | Hydraulic And Water Resources Engineering (Ce1) | 20 | 14 | 14 | 0 | 0 | 0 | 9 | 2 | 2 | 1 | 0 | 12 | 2 |
| 15 | CE | Transportation Engineering (Ce2) | 20 | 17 | 17 | 0 | 0 | 0 | 7 | 5 | 2 | 3 | 1 | 15 | 2 |
| 16 | CE | Environmental Engineering & Management (Ce3) | 18 | 12 | 12 | 0 | 0 | 0 | 7 | 3 | 2 | 0 | 0 | 8 | 4 |
| 17 | CE | Geotechnical Engineering (Ce4) | 18 | 10 | 10 | 0 | 0 | 0 | 5 | 0 | 4 | 1 | 0 | 8 | 2 |
| 18 | CE | Structural Engineering (Ce5) | 20 | 18 | 16 | 1 | 0 | 1 | 8 | 5 | 3 | 2 | 1 | 18 | 0 |
| 19 | CE | Railway Engineering (Rr) | 10 | 14 | 9 | 5 | 0 | 0 | 7 | 5 | 2 | 0 | 0 | 13 | 1 |

| | Dept/Centre/ School | Specialisation | Sanctioned | Admitted | Regular | Spon. | QIP | DEF | GE | OB | SC | ST | PD | Male | Female |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | CH | Chemical Engineering (Ch) | 75 | 65 | 65 | 0 | 0 | 0 | 32 | 19 | 10 | 4 | 1 | 52 | 13 |
| 21 | CL | Earth System Science And Technology (Cl) | 31 | 21 | 21 | 0 | 0 | 0 | 10 | 8 | 2 | 1 | 0 | 18 | 3 |
| 22 | CR | Cryogenic Engineering (Cr) | 21 | 17 | 17 | 0 | 0 | 0 | 9 | 5 | 1 | 2 | 1 | 15 | 2 |
| 23 | CS | Computer Science And Engineering (Cs) | 37 | 38 | 33 | 1 | 0 | 4 | 16 | 11 | 7 | 4 | 1 | 27 | 11 |
| 24 | CS | Information Technology (It) | 30 | 31 | 26 | 0 | 1 | 4 | 18 | 7 | 4 | 2 | 1 | 23 | 8 |
| 25 | EC | Microelectronics & V L S I Design (Ec2) | 29 | 30 | 29 | 0 | 0 | 1 | 15 | 8 | 5 | 2 | 0 | 24 | 6 |
| 26 | EC | Rf And Microwave Engineering (Ec3) | 28 | 24 | 20 | 0 | 0 | 4 | 10 | 6 | 5 | 3 | 0 | 21 | 3 |
| 27 | EC | Telecommunication Systems Engineering (Ec4) | 28 | 30 | 25 | 1 | 0 | 4 | 11 | 10 | 6 | 3 | 1 | 25 | 5 |
| 28 | EC | Visual Information And Embedded Systems Engg. (Ec5) | 28 | 28 | 27 | 1 | 0 | 0 | 11 | 11 | 4 | 2 | 1 | 23 | 5 |
| 29 | EE | Machine Drives And Power Electronics (Ee1) | 18 | 11 | 11 | 0 | 0 | 0 | 4 | 3 | 3 | 1 | 1 | 11 | 0 |
| 30 | EE | Control System Engineering (Ee2) | 18 | 14 | 14 | 0 | 0 | 0 | 5 | 6 | 2 | 1 | 1 | 13 | 1 |
| 31 | EE | Power And Energy Systems (Ee3) | 18 | 17 | 17 | 0 | 0 | 0 | 6 | 6 | 3 | 2 | 0 | 15 | 2 |
| 32 | EE | Instrumentation And Signal Processing (Ee4) | 18 | 17 | 11 | 0 | 0 | 6 | 10 | 3 | 3 | 1 | 1 | 14 | 3 |
| 33 | ES | Energy Science And Engineering (Es) | 15 | 11 | 11 | 0 | 0 | 0 | 5 | 4 | 2 | 0 | 1 | 10 | 1 |
| 34 | ET | Multimedia Information Processing (Et1) | 15 | 12 | 12 | 0 | 0 | 0 | 6 | 4 | 2 | 0 | 0 | 8 | 4 |
| 35 | GG | Exploration Geosciences (Gg1) | 24 | 20 | 20 | 0 | 0 | 0 | 10 | 4 | 4 | 2 | 0 | 11 | 9 |
| 36 | HS | Human Resources Management (Hs1) | 30 | 17 | 0 | 0 | 0 | 0 | 13 | 3 | 1 | 0 | 0 | 13 | 4 |
| 37 | ID | Infrastructure Design And Management (Id) | 31 | 24 | 24 | 0 | 0 | 0 | 9 | 11 | 4 | 0 | 1 | 19 | 5 |

| | Dept/Centre/ School | Specialisation | Sanctioned | Admitted | Regular | Spon. | QIP | DEF | GE | OB | SC | ST | PD | Male | Female |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | IM | Industrial Engineering And Management (Im) | 25 | 25 | 20 | 4 | 0 | 1 | 13 | 8 | 3 | 1 | 1 | 24 | 1 |
| 39 | IP | Intellectual Property Law (Ip1) | 80 | 31 | 0 | 0 | 0 | 0 | 19 | 8 | 4 | 0 | 0 | 13 | 18 |
| 40 | IP | Masters Of Laws (Ip2) | | 14 | 0 | 0 | 0 | 0 | 13 | 1 | 0 | 0 | 0 | 4 | 10 |
| 41 | MA | Computer Science And Data Processing (Ma) | 34 | 28 | 28 | 0 | 0 | 0 | 14 | 7 | 6 | 1 | 0 | 24 | 4 |
| 42 | ME | Manufacturing Science And Engineering (Me1) | 26 | 22 | 20 | 1 | 1 | 0 | 10 | 6 | 5 | 1 | 1 | 21 | 1 |
| 43 | ME | Thermal Science And Engineering (Me2) | 33 | 28 | 26 | 0 | 1 | 1 | 13 | 8 | 5 | 2 | 3 | 26 | 2 |
| 44 | ME | Mechanical Systems Design (Me3) | 44 | 42 | 39 | 1 | 0 | 2 | 21 | 12 | 6 | 3 | 1 | 42 | 0 |
| 45 | MI | Mining Engineering (Mi) | 22 | 15 | 15 | 0 | 0 | 0 | 8 | 5 | 1 | 1 | 0 | 15 | 0 |
| 46 | MM | Medical Science And Technology (Mm) | 15 | 12 | 0 | 1 | 0 | 0 | 8 | 4 | 0 | 0 | 0 | 9 | 3 |
| 47 | MM | Medical Imaging And Informatics (Mm1) | 15 | 8 | 8 | 0 | 0 | 0 | 4 | 2 | 1 | 1 | 0 | 3 | 5 |
| 48 | MS | Materials Science And Engineering (Ms) | 29 | 30 | 27 | 0 | 0 | 3 | 15 | 8 | 5 | 2 | 0 | 25 | 5 |
| 49 | MT | Metallurgical And Materials Engineering (Mt1) | 54 | 45 | 45 | 0 | 0 | 0 | 21 | 13 | 7 | 4 | 1 | 39 | 6 |
| 50 | NA | Ocean Engineering And Naval Architecture (Na) | 20 | 22 | 17 | 3 | 0 | 2 | 12 | 5 | 4 | 1 | 0 | 20 | 2 |
| 51 | PH | Solid State Technology (Ph2) | 25 | 15 | 15 | 0 | 0 | 0 | 10 | 4 | 1 | 0 | 0 | 10 | 6 |
| 52 | RE | Reliability Engineering (Re) | 20 | 22 | 15 | 0 | 0 | 7 | 15 | 4 | 2 | 1 | 0 | 19 | 3 |
| 53 | RT | Rubber Technology (Rt) | 24 | 19 | 18 | 1 | 0 | 0 | 12 | 6 | 1 | 0 | 0 | 19 | 0 |
| 54 | WM | Water Engineering And Management (Wm) | 12 | 10 | 10 | 0 | 0 | 0 | 4 | 2 | 2 | 2 | 0 | 8 | 2 |

**Table : B-2 POSTGRADUATE STUDENTS ON ROLL 2015-2016**

| Dept/Center/ School | Specialisation | Code | 1st Year | | 2nd Year | | 3rd Year | |
|---|---|---|---|---|---|---|---|---|
| | | | M | F | M | F | M | F |
| AE | Aerospace Engineering (Ae) | AE | 25 | 0 | 22 | 3 | 0 | 0 |
| AG | Agricultural Biotechnology (Ag4) | AG4 | 10 | 8 | 6 | 6 | 0 | 0 |
| AG | Agricultural Systems And Management (Ag6) | AG6 | 9 | 6 | 9 | 4 | 0 | 0 |
| AG | Aquacultural Engineering (Ag5) | AG5 | 4 | 1 | 7 | 1 | 0 | 0 |
| AG | Farm Machinery And Power (Ag1) | AG1 | 17 | 1 | 19 | 0 | 0 | 0 |
| AG | Food Process Engineering (Ag3) | AG3 | 22 | 8 | 18 | 10 | 0 | 0 |
| AG | Land And Water Resources Engineering (Ag2) | AG2 | 12 | 5 | 12 | 5 | 0 | 0 |
| AR | City Planning (Ar) | AR | 19 | 23 | 25 | 15 | 0 | 0 |
| AT | Embedded Controls And Software (At1) | AT1 | 4 | 2 | 0 | 0 | 0 | 0 |
| BM | Business Analytics (Bm2) | BM2 | 44 | 7 | 0 | 0 | 0 | 0 |
| BM | Business Management (Bm) | BM | 78 | 8 | 88 | 16 | 0 | 0 |
| BM | Executive Mba (Bm1) | BM1 | 26 | 5 | 43 | 3 | 0 | 0 |
| BT | Biotechnology And Biochemical Engineering (Bt) | BT | 10 | 11 | 9 | 6 | 0 | 0 |
| CE | Environmental Engineering & Management (Ce3) | CE3 | 8 | 4 | 11 | 1 | 0 | 0 |
| CE | Geotechnical Engineering (Ce4) | CE4 | 8 | 2 | 6 | 2 | 0 | 0 |
| CE | Hydraulic And Water Resources Engineering (Ce1) | CE1 | 12 | 2 | 7 | 0 | 0 | 0 |
| CE | Railway Engineering (Rr) | RR | 13 | 1 | 0 | 0 | 0 | 0 |
| CE | Structural Engineering (Ce5) | CE5 | 18 | 0 | 19 | 1 | 0 | 0 |
| CE | Transportation Engineering (Ce2) | CE2 | 15 | 2 | 16 | 4 | 0 | 0 |
| CH | Chemical Engineering (Ch) | CH | 52 | 13 | 49 | 7 | 0 | 0 |
| CL | Earth System Science And Technology (Cl) | CL | 18 | 3 | 10 | 4 | 0 | 0 |
| CR | Cryogenic Engineering (Cr) | CR | 15 | 2 | 8 | 0 | 0 | 0 |
| CS | Computer Science And Engineering (Cs) | CS | 27 | 11 | 33 | 9 | 0 | 0 |
| CS | Information And Communication Technology(It8) | IT8 | 0 | 0 | 0 | 0 | 1 | 0 |
| CS | Information Technology(It) | IT | 23 | 8 | 20 | 2 | 0 | 0 |
| EC | Electronics And Communication Engineering (Ec8) | EC8 | 0 | 1 | 0 | 0 | 1 | 1 |
| EC | Microelectronics & V L S I Design (Ec2) | EC2 | 24 | 6 | 28 | 2 | 0 | 0 |
| EC | Rf And Microwave Engineering (Ec3) | EC3 | 21 | 3 | 15 | 2 | 0 | 0 |
| EC | Telecommunication Systems Engineering (Ec4) | EC4 | 25 | 5 | 29 | 4 | 0 | 0 |
| EC | Visual Information And Embedded Systems Engg. (Ec5) | EC5 | 23 | 5 | 23 | 3 | 0 | 0 |
| EE | Control System Engineering (Ee2) | EE2 | 13 | 1 | 13 | 1 | 0 | 0 |

| DEPT/CENTER/ SCHOOL | Specialisation | CODE | 1st Year | | 2nd Year | | 3rd Year | |
|---|---|---|---|---|---|---|---|---|
| | | | M | F | M | F | M | F |
| EE | Electrical Engineering (Ee8) | EE8 | 0 | 0 | 0 | 0 | 4 | 0 |
| EE | Instrumentation And Signal Processing (Ee4) | EE4 | 14 | 3 | 12 | 1 | 0 | 0 |
| EE | Machine Drives And Power Electronics (Ee1) | EE1 | 11 | 0 | 12 | 2 | 0 | 0 |
| EE | Power And Energy Systems (Ee3) | EE3 | 15 | 2 | 10 | 0 | 0 | 0 |
| ES | Energy Science And Engineering (Es) | ES | 10 | 1 | 0 | 0 | 0 | 0 |
| ET | Multimedia Information Processing (Et1) | ET1 | 8 | 4 | 0 | 0 | 0 | 0 |
| GG | Exploration Geosciences (Gg1) | GG1 | 11 | 9 | 11 | 0 | 0 | 0 |
| HS | Human Resources Management (Hs) | HS | 0 | 0 | 8 | 7 | 0 | 0 |
| HS | Human Resources Management(Hs1) | HS1 | 13 | 4 | 8 | 7 | 0 | 0 |
| ID | Infrastructure Design And Management (Id) | ID | 19 | 5 | 9 | 2 | 0 | 0 |
| IM | Industrial Engineering And Management (Im) | IM | 24 | 1 | 9 | 2 | 0 | 0 |
| IP | Intellectual Property Law (Ip) | IP | 0 | 0 | 0 | 0 | 16 | 13 |
| IP | Intellectual Property Law (Ip1) | IP1 | 13 | 18 | 29 | 11 | 0 | 0 |
| IP | Masters Of Laws (Ip2) | IP2 | 4 | 10 | 0 | 0 | 0 | 0 |
| MA | Computer Science And Data Processing (Ma) | MA | 24 | 4 | 11 | 1 | 0 | 0 |
| ME | Manufacturing Science And Engineering (Me1) | ME1 | 21 | 1 | 22 | 1 | 0 | 0 |
| ME | Mechanical Systems Design (Me3) | ME3 | 42 | 0 | 45 | 1 | 0 | 0 |
| ME | Thermal Science And Engineering (Me2) | ME2 | 26 | 2 | 29 | 0 | 0 | 0 |
| MI | Mining Engineering (Mi) | MI | 15 | 0 | 14 | 0 | 0 | 0 |
| MM | Medical Imaging And Informatics (Mm1) | MM1 | 3 | 5 | 6 | 5 | 0 | 0 |
| MM | Medical Science And Technology (Mm) | MM | 9 | 3 | 11 | 0 | 2 | 0 |
| MS | Materials Science And Engineering (Ms) | MS | 25 | 5 | 11 | 3 | 0 | 0 |
| MT | Metallurgical And Materials Engineering (Mt1) | MT1 | 39 | 6 | 30 | 4 | 0 | 0 |
| NA | Ocean Engineering And Naval Architecture (Na) | NA | 20 | 2 | 19 | 1 | 0 | 0 |
| PH | Solid State Technology (Ph2) | PH2 | 9 | 6 | 11 | 1 | 0 | 0 |
| RE | Reliability Engineering (Re) | RE | 19 | 3 | 13 | 1 | 0 | 0 |
| RT | Rubber Technology (Rt) | RT | 19 | 0 | 17 | 0 | 0 | 0 |
| WM | Water Engineering And Management (Wm) | WM | 8 | 2 | 0 | 0 | 0 | 0 |

**Table : B-3 STATEMENT OF RESULTS OF POSTGRADUATE EXAMINATION**

| Dept/Center/ School | Specialisation | Code | Registered | Successful | Incomplete |
|---|---|---|---|---|---|
| AE | Aerospace Engineering (Ae) | AE | 25 | 25 | 0 |
| AG | Farm Machinery And Power (Ag1) | AG1 | 17 | 16 | 1 |
| AG | Land And Water Resources Engineering (Ag2) | AG2 | 17 | 17 | 1 |
| AG | Food Process Engineering (Ag3) | AG3 | 28 | 28 | 0 |
| AG | Agricultural Biotechnology (Ag4) | AG4 | 12 | 12 | 0 |
| AG | Aquacultural Engineering (Ag5) | AG5 | 8 | 7 | 1 |
| AG | Agricultural Systems And Management (Ag6) | AG6 | 7 | 7 | 0 |
| AR | City Planning (Ar) | AR | 40 | 40 | 0 |
| BM | Business Management (Bm) | BM | 102 | 102 | 0 |
| BT | Biotechnology And Biochemical Engineering (Bt) | BT | 15 | 15 | 0 |
| CE | Hydraulic And Water Resources Engineering (Ce1) | CE1 | 7 | 6 | 1 |
| CE | Transportation Engineering (Ce2) | CE2 | 14 | 11 | 3 |
| CE | Environmental Engineering & Management (Ce3) | CE3 | 12 | 12 | 0 |
| CE | Geotechnical Engineering (Ce4) | CE4 | 6 | 2 | 4 |
| CE | Structural Engineering (Ce5) | CE5 | 19 | 19 | 1 |
| CH | Chemical Engineering (Ch) | CH | 51 | 51 | 3 |
| CL | Earth System Science And Technology (Cl) | CL | 11 | 11 | 0 |
| CR | Cryogenic Engineering (Cr) | CR | 5 | 5 | 0 |
| CS | Computer Science And Engineering (Cs) | CS | 39 | 39 | 0 |
| CS | Information Technology (It) | IT | 18 | 18 | 0 |
| EC | Microelectronics & V L S I Design (Ec2) | EC2 | 28 | 28 | 0 |
| EC | Rf And Microwave Engineering (Ec3) | EC3 | 16 | 16 | 1 |
| EC | Telecommunication Systems Engineering (Ec4) | EC4 | 32 | 30 | 2 |
| EC | Visual Information And Embedded Systems Engg. (Ec5) | EC5 | 25 | 24 | 1 |
| EE | Machine Drives And Power Electronics (Ee1) | EE1 | 8 | 7 | 1 |

| Dept/Center/ School | Specialisation | Code | Registered | Successful | Incomplete |
|---|---|---|---|---|---|
| EE | Control System Engineering (Ee2) | EE2 | 12 | 12 | 1 |
| EE | Power And Energy Systems (Ee3) | EE3 | 5 | 5 | 0 |
| EE | Instrumentation And Signal Processing (Ee4) | EE4 | 9 | 9 | 0 |
| GG | Exploration Geosciences (Gg1) | GG1 | 11 | 10 | 1 |
| HS | Human Resources Management (Hs) | HS | 15 | 15 | 0 |
| ID | Infrastructure Design And Management (Id) | ID | 10 | 10 | 0 |
| IM | Industrial Engineering And Management (Im) | IM | 11 | 11 | 0 |
| MA | Computer Science And Data Processing (Ma) | MA | 12 | 12 | 0 |
| ME | Manufacturing Science And Engineering (Me1) | ME1 | 22 | 22 | 0 |
| ME | Thermal Science And Engineering (Me2) | ME2 | 23 | 23 | 1 |
| ME | Mechanical Systems Design (Me3) | ME3 | 39 | 38 | 1 |
| MI | Mining Engineering (Mi) | MI | 13 | 13 | 0 |
| MM | Medical Imaging And Informatics (Mm1) | MM1 | 8 | 8 | 0 |
| MS | Materials Science And Engineering (Ms) | MS | 13 | 13 | 1 |
| MT | Metallurgical And Materials Engineering (Mt1) | MT1 | 22 | 21 | 2 |
| NA | Ocean Engineering And Naval Architecture (Na) | NA | 20 | 20 | 0 |
| PH | Solid State Technology (Ph2) | PH2 | 10 | 10 | 0 |
| RE | Reliability  Engineering (Re) | RE | 11 | 11 | 0 |
| RT | Rubber Technology (Rt) | RT | 17 | 17 | 0 |
| BM | Executive Mba (Bm1) | BM1 | 41 | 41 | 2 |
| IP | Intellectual Property Law (Ip) | IP | 29 | 29 | 0 |
| MM | Medical Science And Technology (Mm) | MM | 2 | 2 | 0 |
| EE | M.tech 3 Years | EE8 |  | 4 |  |
| EC | M.tech 3 Years | EC8 |  | 5 |  |
| IT | M.tech 3 Years | IT8 |  | 1 |  |

## Table : C-1 NUMBER OF PHD RESEARCH SCHOLARS ENROLLED IN 2015-2016

| Dept/ Centre/ School | Csir/Dbt/Ugc | | | | | | Employee | Institute | | | | | | | | Project | | | | | Qip | | | | Spon | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | GE | | OB | | SC | | GE | GE | | OB | | SC | | ST | | GE | | OB | | SC | GE | OB | SC | | GE | | OB | SC | |
| | F | M | F | M | F | M | M | F | M | F | M | F | M | F | M | F | M | F | M | M | M | M | F | M | F | M | M | F | |
| AE | | | | | | | | 1 | 10 | | 2 | | 1 | | | | 1 | | | | | | | | | | | | 15 |
| AG | 1 | | | | | | | 3 | 6 | 3 | 1 | 3 | 2 | | | 2 | 2 | 1 | 2 | | | | | | | | | 1 | 27 |
| AR | | 1 | | | | | | 5 | 2 | | 2 | | | | | | | | | | | | | | | | | | 10 |
| AT | | | | | | | | 8 | 11 | 1 | 2 | | 1 | | 1 | 2 | 7 | | | 1 | | | | | | | | | 34 |
| BM | | | | | | | | 1 | 3 | | | 1 | 4 | | | | | | | | | | | | | 3 | | | 12 |
| BS | | | | | 1 | | | 4 | 1 | 1 | | | | | | | | | | | | | | | | | | | 7 |
| BT | 1 | | 1 | | | | | 2 | | | | | | | | 5 | | | | | | | | | | | | | 9 |
| CE | | | | | | | | 4 | 5 | | 2 | | | | | 1 | | | | | | | | | | 2 | | | 14 |
| CH | | | | | | | | 4 | 6 | | 2 | 1 | 2 | | | | | | | | | | | | | | | | 15 |
| CL | | | | | | | | 1 | 2 | | 1 | | | | 1 | | | | | | | | | | | | | | 5 |
| CR | | | | | | | | | 5 | | | | | | | | | | | | | | | | | | | | 5 |
| CS | | | | | | | 1 | 5 | 8 | | 2 | 2 | 2 | | | 1 | 2 | | 1 | | | | | | | 1 | | | 25 |
| CY | 4 | 9 | | 1 | 2 | 1 | | 6 | 11 | 3 | 2 | | 1 | | | | | | | | | | | | | | | | 40 |
| EC | | | | | | | | 1 | 8 | | 3 | | | | | | 1 | | | | 1 | | | | | 2 | | | 16 |
| EE | | | | | | | | 4 | 4 | 1 | 5 | | 2 | | | | 3 | | | | 2 | 1 | | | | | 1 | | 23 |
| EF | | | | | | | | | 3 | | 1 | | | | | | | | | | | | | | | | | | 4 |
| ES | | 1 | | | | | | 1 | 4 | | 2 | | | | | | | | | | | | | | | | | | 8 |
| ET | | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | | | | | 2 |
| GG | | 3 | 1 | 1 | 1 | 3 | | 6 | 13 | 2 | 3 | 1 | 1 | | | 2 | 1 | | | 1 | | | | | | | | | 39 |
| GS | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | 1 | | 3 |
| HS | | | | | | | | 8 | 3 | 1 | 2 | | | | | | | | | | 1 | | | | | | | | 15 |

| Dept/ Centre/ School | Csir/Dbt/Ugc | | | | | | Employee | Institute | | | | | | | | Project | | | | | Qip | | | | Spon | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | GE | | OB | | SC | | GE | GE | | OB | | SC | | ST | | GE | | OB | | SC | GE | OB | SC | | GE | | OB | SC | |
| | F | M | F | M | F | M | M | F | M | F | M | F | M | F | M | F | M | F | M | M | M | M | F | M | F | M | M | F | |
| ID | 1 | | | | | | | 3 | 2 | | | | 1 | | | | | | | | | | | | | | | | 7 |
| IM | | | | | | | | 2 | 5 | | 2 | | | | | 1 | 3 | | 2 | | | | | | | 1 | | | 16 |
| IP | | | | | | | | 1 | 1 | | 2 | | | | | | | | | | | | | | | | | | 4 |
| IT | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | 1 |
| MA | 1 | 2 | | 1 | | | | 4 | 5 | | 4 | | | | | | | | | | 1 | | | | | | | | 18 |
| ME | | | | | | | | 1 | 26 | | 1 | | 1 | | | | | | | | | | | | | | | | 29 |
| MI | | | | | | | | | 6 | | 3 | | 3 | | 1 | | | | | | | | | | | | | | 13 |
| MM | | | | | | 1 | | 5 | 7 | | | | | | | | 1 | | | | | | | | | | | | 14 |
| MS | | 3 | | | | | | 2 | 1 | | 1 | | | | | 1 | 1 | | | | | | | | | | | | 9 |
| MT | | | | | | | | 4 | 9 | 2 | 4 | 1 | 7 | 1 | 2 | 1 | 2 | | 1 | | | | 1 | 1 | | 1 | | | 37 |
| NA | | | | | | | | | 5 | | 2 | | | | | | 1 | | | | | | | | | | 1 | | 9 |
| NT | | | | | | | | 2 | 3 | | | | | | | | | | | | | | | | | | | | 5 |
| PH | | | | 1 | 1 | | | 4 | 10 | 1 | 4 | | 4 | | | | | | | | | | | | | | | | 25 |
| RE | | | | | | | | 1 | 3 | | 1 | | | | | | | | | | | | | | 1 | | | | 6 |
| RJ | | | | | | | | 3 | 6 | | | | | | | | | | | | | | | | | | | | 9 |
| RT | | 1 | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | 3 |
| TS | | | | | | | | 1 | 2 | | | | 1 | | | | | | | | | | | | | | | | 4 |
| WM | | | | | | | | | 4 | | | | | | | | 1 | | | | | | | | | | | | 5 |
| **Grand Total** | 8 | 20 | 2 | 4 | 5 | 5 | 1 | 97 | 204 | 15 | 57 | 9 | 34 | 1 | 5 | 16 | 27 | 1 | 6 | 2 | 5 | 1 | 1 | 1 | 1 | 10 | 3 | 1 | 542 |

**Table : C-2 NUMBER OF MS STUDENTS ENROLLED DURING 2015-2016**

| **Department** | **GE** | **OB** | **SC** | **Grand Total** | |
|---|---|---|---|---|---|
| | **Female** | **Male** | **Male** | **Male** | |
| AG | | 1 | | | 1 |
| AT | 2 | 3 | | | 5 |
| CE | 1 | | | | 1 |
| CH | 1 | | | | 1 |
| CL | | 1 | | | 1 |
| CR | | 1 | | | 1 |
| CS | 3 | 9 | | 1 | 13 |
| EC | 1 | 1 | | | 2 |
| EE | | 3 | | | 3 |
| ET | 2 | | 1 | | 3 |
| GS | | 1 | 1 | | 2 |
| IM | | 2 | | | 2 |
| ME | | 1 | | | 1 |
| MM | | 1 | | | 1 |
| MT | | 1 | | | 1 |
| NA | | 1 | | | 1 |
| RJ | | 1 | | | 1 |
| **Grand Total** | 10 | 27 | 2 | 1 | 40 |

**Table : C-2A NUMBER OF POST DOCTORAL FELLOWS AS ON 2/6/2015**

| Department | Total | GE | OB | Male | Female |
|---|---|---|---|---|---|
| CY | 5 | 4 | 1 | 3 | 2 |
| NA | 1 | 1 | | 1 | |
| PH | 1 | 1 | | 1 | |

**Table : C-3 UGC SCHOLARS ENROLLED DURING 2014-2015 (1-7-2015 TO 30-6-2016**

| Department/Center/School | GE | | OB | | SC | | Grand Total |
|---|---|---|---|---|---|---|---|
| | F | M | F | M | F | M | |
| BM | | 3 | 1 | | | | 4 |
| BS | | | | | 1 | | 1 |
| BT | 1 | | | | | | 1 |
| CL | | 1 | | | | | 1 |
| CY | 1 | 4 | | 2 | | | 7 |
| EF | 1 | | | | | | 1 |
| GG | | | 1 | | | | 1 |
| HS | | 1 | | 1 | | 1 | 3 |
| MA | | 1 | | | | | 1 |
| MM | 1 | 1 | | | 1 | | 3 |
| MS | | 1 | | | | | 1 |
| PH | | 2 | | 1 | | | 3 |
| **Grand Total** | 4 | 14 | 2 | 4 | 2 | 1 | 27 |

# Table : C-4 NUMBER OF RESEARCH SCHOLARS ON ROLL AS ON 31.05.2015

| Dept/ Centre/ School | Csir/Dbt/Ugc | | | | | | Employee | | Institute | | | | | | | | Project | | | | | | | | Qip | | | | | | | | Self Spon | Spon | | | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | GE | | OB | | SC | | GE | OB | GE | | OB | | SC | | ST | | GE | | OB | | SC | | ST | | GE | | OB | | SC | | ST | | GE | GE | | OB | | SC | | ST | |
| | F | M | F | M | F | M | M | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | M | F | F | M | F | M | F | M | M | |
| AE | | | | | | | | | 3 | 18 | 2 | 7 | 1 | 4 | | | 1 | 1 | | | | 1 | | | | | | | | | | | | 6 | | | | 1 | | 45 |
| AG | 8 | 4 | | 3 | | 4 | | | 34 | 31 | 4 | 13 | 4 | 6 | | 1 | 9 | 12 | 2 | 9 | 1 | 1 | | 1 | | | | | | | | | 1 | 6 | | 4 | 1 | 1 | | 160 |
| AR | | 3 | | | | | | | 17 | 7 | 2 | 5 | 4 | 2 | | | | 1 | | | | | | | | | | | 1 | | | | | 2 | | | | | | | 44 |
| AT | 1 | 2 | | 1 | | 1 | | | 21 | 50 | 3 | 13 | 1 | 5 | | 1 | 8 | 12 | 2 | | 1 | 2 | 1 | | | | | | | | | | | 6 | | | | | | 131 |
| BM | | 7 | 1 | 3 | 2 | | | | 5 | 15 | | 2 | 1 | 6 | | 1 | | 2 | | | | | | | | | | | | | | 1 | 5 | 11 | 1 | | | | | 63 |
| BS | 1 | | | | 1 | | | | 4 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 |
| BT | 10 | 12 | 4 | 1 | 2 | 3 | | | 19 | 6 | | 1 | | | | | 8 | 3 | | 1 | | | | | | | | | | | | | | | | | | | | 70 |
| CE | | 1 | | | | | | | 16 | 38 | 3 | 11 | 2 | 7 | 1 | | 3 | 2 | | | | | | 1 | | 3 | | | | 2 | 1 | | | 9 | | | | | | 100 |
| CH | | 1 | | | | | | | 21 | 37 | 5 | 6 | 2 | 10 | | | | 3 | | | | | | | 1 | 1 | | | | | | | | 2 | | | | | | | 89 |
| CL | | 2 | | | | 2 | | | 5 | 7 | | 3 | 1 | | | 1 | 2 | 2 | | | | | | | | | | | | | | | | 2 | | | | | | | 27 |
| CR | | | | | | | | | 3 | 9 | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | 14 |
| CS | 1 | 2 | | 1 | | | 1 | | 16 | 30 | 1 | 5 | 2 | 3 | | | 5 | 16 | | 3 | | | | | 1 | 5 | 1 | 3 | | 1 | | | | 1 | 4 | | | | | | 102 |
| CY | 16 | 54 | | 9 | 3 | 6 | | | 20 | 28 | 5 | 14 | 5 | 5 | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | 167 |
| EC | | 1 | | | | | | | 15 | 63 | | 9 | | 1 | | 1 | | 5 | | 1 | | | | | 2 | 5 | | | | 2 | | | | 7 | | | | | | | 112 |
| EE | | | | | | | | | 16 | 44 | 2 | 16 | 1 | 5 | | 1 | 1 | 8 | | | | | | | | 4 | 1 | 1 | | | | | | 3 | | 1 | | | | | 104 |
| EF | | | | | | | | | 2 | 5 | 1 | 3 | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | 12 |
| ES | | | | | | | | | 2 | 8 | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | 13 |
| ET | | | | | | | | | 5 | 3 | | 2 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | 12 |
| GG | 6 | 11 | 3 | 3 | 3 | 3 | | | 12 | 32 | 7 | 2 | 2 | 7 | | | 1 | 2 | | 1 | | 1 | | | | | | | | | | | | | | | | | | | 96 |
| GS | | | | | | | | | 2 | 15 | | 2 | | 1 | | | | 3 | | | | | | | | 1 | | | | 1 | | | | 2 | 1 | | 2 | | | | 30 |
| HS | 4 | 6 | | 1 | 1 | 3 | | | 23 | 11 | 2 | 6 | | 1 | 1 | | | 2 | 1 | | | | | | | 1 | | | | | | | | 7 | 6 | | | 1 | | | 77 |
| ID | 1 | | | | | | | | 4 | 7 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 13 |
| IM | | | | 1 | | | | | 2 | 18 | | 5 | | | | 1 | 1 | 5 | | 3 | | | | | | 1 | | | | | | | | | 6 | | | 1 | | | 44 |
| IP | | | | 1 | | | 2 | | 5 | 3 | | 5 | | | 1 | | 2 | | | | | | | | | | | | | | | | | | | | | | | | 19 |
| MA | 4 | 11 | 1 | 3 | | 1 | | | 17 | 34 | 2 | 14 | 4 | 4 | | | | | | 1 | | 1 | | | | 2 | | | | | | | | | | | | | | | 99 |
| ME | | | | | | | | | 5 | 84 | | 12 | | 7 | | | | 2 | | 1 | | | | | | 1 | | | | 3 | | | | 1 | 4 | | | | | | 120 |
| MI | | 1 | | | | | | 1 | 4 | 16 | | 7 | | 7 | | 1 | 1 | 5 | | | | | | | | | | 1 | | | | | | 1 | 1 | | | | | | 46 |
| MM | 5 | 9 | | | 1 | 2 | | | 15 | 18 | 2 | 3 | 1 | 2 | | 1 | 3 | 4 | | 1 | | | | | | | | | | | | | | 1 | 6 | | | 1 | 2 | 77 |
| MS | 1 | 13 | | 2 | | | | | 8 | 7 | | 7 | 1 | | | | 1 | 1 | | | | 1 | | | 1 | | | 1 | | | | | | | | 1 | | | | | 45 |
| MT | 1 | 2 | | 1 | | | | | 9 | 31 | 3 | 11 | 5 | 11 | 2 | 3 | 1 | 3 | | 2 | | 1 | | | | | | | 1 | 1 | | | | 1 | 11 | | | 1 | 1 | 102 |
| NA | | | | | | | | | 4 | 9 | 1 | 6 | | | | | 1 | 2 | | | | | | | | 1 | | | | | | | | | | 2 | | | | 26 |
| NT | | | | | | | | | 5 | 6 | | 1 | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 13 |
| PH | 1 | 7 | | 4 | 1 | 3 | | | 16 | 35 | 5 | 12 | 2 | 6 | | | | | | | | | | | | | | | | | | | | 1 | | | | | | 93 |
| RE | 1 | | | | | | | | 2 | 8 | | 2 | | | | | | | | | | | | | | 3 | | | | | | | | 1 | | | 1 | | | 18 |
| RJ | | | | | | | | | 11 | 14 | | 2 | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 29 |
| RT | | 2 | | 2 | | | | | 4 | 12 | 1 | | | 1 | | | | 4 | | 1 | | 2 | | | | 1 | | | | | | | | 4 | | 1 | | | 1 | 36 |
| TS | | 1 | | | | | | | 1 | 3 | | 1 | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 8 |
| WM | | | | | | | | | 2 | 11 | 3 | 1 | | 2 | | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | 22 |
| **Grand Total** | 61 | 152 | 9 | 36 | 14 | 28 | 3 | 1 | 375 | 775 | 57 | 212 | 40 | 107 | 5 | 12 | 49 | 106 | 5 | 24 | 3 | 10 | 1 | 2 | 5 | 29 | 2 | 6 | 2 | 10 | 1 | 1 | 22 | 98 | 1 | 11 | 1 | 8 | 4 | 2288 |

**INDIAN INSTITUTE OF TECHNOL06.Y**
**KHARAGPUR**
**BALANCE SHEET AS AT FOR 31ST MARCH 2016**

| SOURCES OF FUND | Schedule | Current Year 31st March 2016 | Previous Year 31st March 2015 |
|---|---|---|---|
| CORPUS/CAPITAL FUND AND LIABILITIES | | | |
| CORPUS I CAPITAL FUND | 1 | 14915833727 | 6994910111 |
| RESERVE AND SURPLUS | 1A | 0 | 12023483693 |
| EARMARKED/ENDOWMENTFUNDS | 2 | 6025627754 | 5718247384 |
| CURRENT LIABILITIES AND PROVISIONS | 3 | 8002471484 | 2406103434 |
| | | 28943932965 | 27142744622 |
| | | | |
| **APPLICATION OF FUNDS** | | **Current Year** | **Current Year** |
| | | **31st March 2016** | **31st March 2015** |
| FIXED ASSETS | 4 | | |
| -Tangible Assets | | 10941448325 | 13713835282 |
| - Intangible Assets | | 66135673 | 557985919 |
| - Capital Work in Progress | | 2839096484 | 1399175113 |
| INVESTMENTS-FROM EARMARKED/ENDOWMENT FUNDS | 5 | 5120859089 | 5481913887 |
| -Long Term | | | |
| -Short Term | | | |
| INVESTMENTS- OTHERS | 6 | 3112947443 | 3253446951 |
| CURRENT ASSETS | 7 | 1223836397 | 854797234 |
| LOANS, ADVANCES & DEPOSITS | 8 | 5639609554 | 1881590235 |
| **TOTAL** | | 28943932965 | 27142744622 |
| SIGNIFICANT ACCOUNTING POLICIES | 23 | | |
| CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS | 24 | | |

| **(S. Nayak)** | **(CA. B. Bhattacharyya)** | **(P. Pyne)** | **(P.P. Chakrabarti)** |
|---|---|---|---|
| Asst. Registrar (A/Cs) | Asst. Registrar (A/Cs) | Registrar | Director |

**Dated: 29th July 2016**

**INDIAN INSTITUTE OF TECHNOLOGY**
**KHARAGPUR**
**INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH 2016**

| INCOME | Schedule | Current Year 31st March 2016 | Previous Year 31st March 2015 |
|---|---|---|---|
| Academic Receipts | 9 | 442936955 | 357923568 |
| Grants I Subsidies | 10 | 3522391148 | 3130458413 |
| Income from Investments | 11 | 51927277 | 92776379 |
| Interest Earned | 12 | 37740238 | 19131723 |
| Other Income | 18 | 203450495 | 133720549 |
| Prior Period Income | 14 | 20173220 | 66113214 |
| **TOTAL ( A)** | | 4278619333 | 3800123845 |
| | | | |
| EXPENDITURE | | | |
| Staff Payments & Benefits (Establishments Expenses) | 15 | 2583426629 | 2387006597 |
| Academic Expenses | 16 | 876362639 | 686829182 |
| Administrative and General Expenses | 17 | 576005999 | 498246819 |
| Transportation Charges | 18 | 3587791 | 4197716 |
| Repairs & Maintenance | 19 | 175155366 | 26396717 |
| Finance Cost | 20 | 353613 | 383710 |
| Depreciation | 4 | 1265407175 | 354292825 |
| Other Expenses | 21 | 42405560 | 44761644 |
| Prior Period Expenses | 22 | 68981655 | 115374185, |
| **TOTAL (B)** | | 5591686427 | 4117489395 |
| Balance being excess of Income over Expenditure (A-B) | | -1313067094 | -317365550 |
| Transfer to Corpus/Capital Reserve for equivalent amount of Depreciation | | 1264775313 | 353889950 |
| Transferred to Endowment | | 0 | 0 |
| Transferred to IDF | | 0 | 0 |
| BALANCE BEING SURPLUS/ (DEFICIT) CARRIED TO CAPITAL FUND | | -48291780 | 36524400 |
| SIGNIFICANT ACCOUNTING POLICIES | 23 | | |
| CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS | 24 | | |

| **(S. Nayak)** | **(CA. B. Bhattacharyya)** | **(P. Pyne)** | **(P.P. Chakrabarti)** |
|---|---|---|---|
| Asst. Registrar (A/Cs) | Asst. Registrar (A/Cs) | Registrar | Director |

**Dated: 29th July 2016**


**Indian Institute of Technology**
**Kharagpur, West Bengal 721302**