INDIAN INSTITUE OF TECHNOLOGY, ROORKEE

DEPARTMENTAL REVIEW TEMPLATE

1. **Name of Department/Center :** Alternate Hydro Energy Center
2. **Reviewers :** Prof NK Bansal
   Dr. Praveen Saxena
   Dr - Ajay Mathur
3. **Date of Review:** 14 March 2014

GRID FOR ASSESSMENT

NOTE:

i. Please grade in the box provided for the following parameters in the range of 1-10 with 10 being the highest.
ii. Leave 'blank' for 'No Comment'.
iii. Kindly give your opinion on the strength and weakness of the Department/ Center and your suggestions for future growth.

I. ACADEMICS

I.1	**Undergraduate** (E lectures)	**Score**
1.	Curriculum i. Curricular Structure ii. Course Syllabi iii. Flexibility	9
2.	Formal Academic Load on Students i. Teaching ii. Laboratory/Practical iii. Projects(minor/major)	
3.	Evaluation Process i. Continuing Evaluation ii. Mid-term Evaluation iii. End-term Evaluation	10

4.	Academic Ambience	8
5.	Opportunity for Peer-Based Learning	
6.	Opportunity for Further Learning(Breadth and Depth) Present i. Elective Courses Specialization ii. Minor with Major Discipline Off iii. Honors Programme in Major Discipline	4
7.	E-Assisted Learning i. Availability of Library Resources and Major Search Engines (like Scopus, Web of Science) ii. Multi-Media Assisted Teaching	10
8.	In –Curriculum Research/Exploration Opportunity to Students	8
9.	Technical Societies/ Colloquium for Students i. Departmental Society ii. Student Chapter(s) of Professional Societies	
10.	Faculty –Student Interaction	
11.	Faculty Mentoring of Students	
12.	Faculty Advisor System for Students/Class of Students	
13.	Self Study Courses for Student	8
14.	Effective Teaching Mechanism for Enhanced Number of Students in Various Classes	9
15.	Effectiveness of Assisted Learning: Tutorial System for B.Tech Students/ Seminars	9

I.2	**Graduate Programmes (Masters)**	**Score**
1.	Curriculum i. Curricular Structure Lack of field experience in curricula ii. Course Syllabi iii. Flexibility	7
2.	Formal Academic Load on Students i. Teaching Appropriate ii. Laboratory/Practical iii. Seminar/Dissertation	8
3.	Evaluation Process i. Continuing Evaluation ii. Mid-Term Evaluation iii. End-Term Evaluation	10
4.	Academic Ambience	9
5.	Opportunity for Peer-Based Learning	8
6.	Opportunity for further Learning(Breadth and Depth) Elective Courses (Specialization Electives)	8
7.	E-Assisted Learning i. Availability of Library Resources and Major Search Engines (like Scopus, Web of Science)	9

	ii. Multi-Media Assisted Teaching	
8.	In –Curriculum Research/Exploration Opportunity to Students	8
9.	Technical Societies/ Colloquium for Students i. Departmental Society ii. Student Chapter(s) of Professional Societies	
10.	Faculty –Student Interaction	9
11.	Faculty Mentoring/Supervising of Students	9
12.	Faculty Advisor System for Students/Class of Students	9
13.	Effectiveness of Assisted Learning: Home Assignments/Seminars/Presentations	10

I.3	**Doctoral (Ph.D) Programmes**	**Score**
1.	Pre-Ph.D Courses and Evaluation Process	10
2.	Comprehensive Courses Examination	10
3.	Breadth and Depth of Knowledge of Students	9
4.	Seminar/ Presentations and Technical Communication	9
5.	Average No. of Research Students/Faculty	10
6.	Average No. of Research Papers of Ph.D Students	9
7.	Average Duration to Complete Ph.D (years)	9

II. RESEARCH

		Score
1.	Research Ambience in the Department	10
2.	Research Awareness among Doctoral Students	8
3.	Competence Level of Doctoral Students for Research	7
4.	Quality of Research	7
5.	Quality of Publications	9
6.	Impact of Publications	8
7.	Relevance of Research to Knowledge Generation	8
8.	Societal Relevance of Research	10
9.	Exposure of Researchers to the International State of Art	9
10.	Student Exposure to Attending Quality Conferences/Symposia	8
11.	Growth in Ph.D Programme	9
12.	Quality of Research Infrastructure	10
13.	Utilization of Existing Research Infrastructure	9
14.	Department Initiative on Faculty Hiring	7
15.	Breadth and Depth of Research in the Department	9
16.	Research Intensity of Faculty Members	9

Futuristic Areas For Hiring Faculty Members

- Solar photovoltaic systems & technologies
- Environmental pollution modeling in aquatic ecosystems
- Environmental impact assessment in aquatic ecosystems
- Renewable energy grid integration ;

Research Areas for Improvement

- Sediment erosion of turbines in hydropower
- Biodie Quality improvent of biodiesel ; • Cumulative environmental impact assessment

Comments (not more than 100 words for each given below)

Strength:

- Quality of research labs and other infrastructure
- Close relationship with industry & practice
- Unique expertise in small hydro resource assessment, performance evaluation, design, and standardization
- Excellent training of operational staff

Weakness:

- Lack of field exposure/immersion/slots in MTech programme
- Limitation in access to courses from other Departments
- Lack of bridge courses for people from diverse backgrounds

Suggestions for improvement:

- Greater flexibility in MTech programme for including bridge courses & courses from cognate departments
- Institutionalization of 1-4 week long industry-oriented field experience for MTech students
- Name of MTech course may be changed to reflect curricula and student suggestions
- Try to recruit faculty with appropriate eligibility from industry ~~non-academic~~

III. Departmental Infrastructure

		Score
1.	Adequacy of Class Rooms and Multi-Media Facility	10
2.	Availability of Laboratories	10
3.	Availability of Conference/Seminar Room, etc.	10
4.	Availability of Seating Space for Research Students	8
5.	Availability of Internet Services in Research Labs and Class Rooms	10
6.	Departmental Library and E-Resources	10
7.	Computing Facilities and Software	9
8.	Adequacy of Offices and Furnishing for Faculty	9
9.	Faculty- Student Ratio Too few faculty; more required	5
10.	Support Staff (Technical/Administrative) Adequacy	5

Comments (not more than 100 words for each given below)

Strength: Strong infrastructure

Weakness: Inadequate faculty strength

Suggestions for improvement: * Urgent need to enhance faculty strength, including people from industry background.

* Need to enhance & strengthen "brand name" of AHEC nationally & globally so as to make stakeholders aware of the research & training of AHEC. This will enhance placement & sponsored research.

IV. Admissions of Ph.D Students

		Score
1.	Intake of Ph.D Students	8
2.	Admission Process	8

Suggestions:

Adequate; no specific suggestions.

V. Outcomes

		Score
1.	Placements i. Placement of B.Tech/IDD Students ii. Placement of Masters Student iii. Placement of Ph.D Students	6
2.	Average No. of Ph.D.s Awarded per Year	9
3.	Publications per Faculty in ISI Indexed Journals/Year	9
4.	Average Citations per Faculty/Year (Last-Three Years) (Web of Science/Scopus)	8
5.	Recognitions; Awards(National/International) to Faculty/Students	7
6.	Consultancy and Projects	10
7.	No. of Ph.D. graduates who took Academics as Career (Based on Data of Last 5 Years)	10

Comments and Suggestions for improvement:

Strengthen interaction with industry so as to promote placement of MTech & PhD students.

OVERALL ASSESSMENT: AHEC has built itself into one of the pre eminent centres for training & research in small hydro in the world. This is creditable, & needs to be supported institutionally, e.g. convey to Department.

Date: 14.03.2014

(Signature of the Reviewer)

Praveen Saxena

NK BANSAL; AJAY MATHUR; P. SAXENA

(Name and Address of the Reviewer)

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AHEC

Institutional Grid for Assessment

	Academics & Pedagogy	Governance & Management	Stakeholder Engagement	
			Internal	External
Infrastructure (Hardware/ Software)	I	IV	VII	X
Processes	II	V	VIII	XI
Outcomes	III	VI	IX	XII

The Analytical Grid will take help the institute understand the relation between different parameters, identify the deficit areas, measure outcomes (as function of infrastructure and processes) and strategize suitably to achieve excellence. A tentative list of measurable indicators is given below.

I.	Infrastructure -Academics & Pedagogy	Information	Remarks
a.	Classrooms per student/ Average number of students	1 / 25	
b.	Student Faculty Ratio/ Total Number of Teachers	18 :1 / 7	
c.	Number of Technical Assistants per student	1 : 15	
d.	Average size of group per project/ lab work	1 / 5	
e.	Number of E-Classrooms	All rooms AC with data projector	
f.	Range of degrees and disciplines	• M.Tech & Ph.D. (AHES & EMRL) • Courses to B.Tech	
g.	Library – Number of books, journals, magazines	4000 / 8 / 10	
h.	Work space for Ph. D Scholars	Separate Cabin for 27 scholars	
II.	**Processes -Academics & Pedagogy**		
a.	Average number of theory credits/ courses per semester	52 / 13	
b.	Average number of lab courses/ credits per semester	1 / 2	
c.	Average number of minor/ major projects per semester	5	
d.	Average number of presentations by student per semester	5	
e.	Average number of assessments per semester	3	
f.	Average number of lectures by industry persons per semester	5	
g.	Average number of HSS courses per semester	NA	
h.	Periodicity of curriculum review	3-5 Year	
i.	Mechanism for program review at the under-graduate and Post –Graduate levels.	As per Institute Policy (both at Institute and Departmental level)	
j.	Course work mandated for PhD students and the average courses done per PhD student	2.5	
III	**Outcomes – Academics &Pedagogy**		
a.	Publications per Faculty /Masters/ PhD student	50/1/5	

b.	Publications per Faculty /Masters/ PhD student in a list of top 10 papers research field publications identified by the Institution.	Applicable at Institute level	
c.	Major research contributions	Patent – 02 Books-40 Reports-800 Research Papers-350 Ph.D. awarded- 17	
d.	Citations	4000	
e.	Student placements	70-120 %	
f.	Ph.D. placements	100%	
g.	Recognitions, Awards (National /International) by faculty	As per list (Annex-I)	
h.	Average time that it takes a new faculty to set up lab	3 years	
i.	Retention rate for young faculty.	100%	
j.	No. of international conferences attended by a Ph.D student (for exposure/ paper presentation)	2	
k.	Consultancy and project money	Rs. 7400 lacs (10 yrs)	
l.	Research grants/ seed money from internal savings of the Institute to young faculty/ Post graduate students	Applicable as per Institute Policy	
m.	No. of students who were motivated to opt for careers in engineering/ science sectors (based on available data, for at least last five years)	75 % of M.Tech Students	
n.	How many M.Tech students were motivated into PhDs	About 20%	
o.	No. of Ph D graduates who were motivated towards a career in academics, (abroad or IIT/ IISC/ TIFR/ CISR/ BARC/ etc, based on available data, for at least last five years)	6	
p.	Number of students failed	3 in 10 years	
q.	Average time between conduct of examination and announcement of results	One week after end of examination	
r.	Extent of electronic accessibility to library resources	100%	

IV	**Infrastructure - Governance &Management**	**Information**	**Remarks**
a.	Non-Faculty Administrative Staff Student Ratio	1/18	
b.	Computers per administrative staff	1 each	
c.	Range of services offered	As required	
d.	ERP system/ Software	Available	
e.	Systems for RTI	Available	
V	**Processes - Governance &Management**		
a.	Number of non-core activities outsourced	Available at Institute	
b.	Number of processes automated		
c.	Number of Finance Committee and BoG meeting		
d.	Average attendance in Finance Committee and BoG meeting		
e.	Number of RTI addressed at PIO/ Appellate/ CIC level	Through Institute	
f.	Average time taken to provide information under RTI	within week	
g.	Website hits, average time spent,	Available at Institute	
h.	Feedback from student, faculty and non-faculty		
i.	Procurement Norms (E-tendering/ procurement)		
VI	**Outcomes – Governance &Management**		
	May be found out through Internal/ External stakeholders survey	Applicable at Institute level	

VII	**Infrastructure – Internal Stakeholders (Faculty, Non-faculty, Students, Families)**	**Information**	**Remarks**
a.	Infrastructure related to hostels, sports facilities, wellness centre, campus, cultural events and personality development	Available at Institute level	
VIII	**Processes – Internal Stakeholders**		
a.	Number of sports events (Intra/ inter-IITs)	Available at Institute level	
b.	Number of cultural events (Intra/ inter-IITs)		
IX	**Outcome – Internal Stakeholders**		
a.	Through Internal stakeholders' survey	Available at Institute level	

X	**Infrastructure – External Stakeholders (Industry, Alumni, Community, Government/Parliament)**	**Information**	**Remarks**
a.	Industry- Research Park, Lab Equipment, Industry Cell	• Water mills • SHP Simulator • Instrumentation Lab Hydraulic Turbine R& D Lab	
b.	Alumni - Access to Library, Sports and other Institute infrastructure	Available (Records not maintained)	
c.	Community-Green Office, Student Engagement, Community relevant technology	• Standard design and drawings for MHP Development • Standard guideline for SHP Development	
d.	Government/Parliament - Annual Reports, Audit Reports, Budgetary Allocation	• MNRE • MoEF, • Other Central and State Agencies	
XI	**Processes – External Stakeholders**		
	Industry-industry-academia workshops, Number of lectures by industry, Industry visits by students, Number of Ph.D. by industry personnel, Number of faculty working with industry	02 04 15 Nil 07	
	Alumni - Career Management, Cultural Shows, Road Shows	Nil	
	Community - Courses/ projects by students on community relevant issues, NSS work	• Training Courses • Testing of Equipment for Hydropower Development	
	Government/Parliament – Annual Development Plan, Internal Consultation for Budgetary allocation	Membership of various committees	
XII	**Outcomes – External Stakeholders**		
	- Survey of External Stakeholder	20	
	- Number of Industry Sponsored Projects	800	
	- Income from Industry Sponsored Projects	Rs. 7400 lacs	
	- Number of Industry-Academia engagement workshops	4	

	- Contributions from Alumni	Data not maintained	
	- Outcomes of community relevant issues	1. Development of 15 MHP projects in Uttarakhand through community participation 2. Development of 150 water mills in Himalayan region through community participation 3. Involved in the development of Hydropower projects with aggregate capacity of 450 MW	
	- Delays in submission of Annual Reports/ Audit Reports	Nil	

ANNEXURE-I

AWARDS RECEIVED BY AHEC/ FACULTY

S. N	Year	Award	By
1.	2012	Dr. R.P.Saini - Best Teacher Award	IIT Roorkee
2.	2004	Business Leadership – Hydropower – 2003	Solar Energy Society of India – SESI, 2003
3.	2002	AHEC for outstanding work – Surya II Prize of Rs. 30,000/-	Indian Institute of Rural Development & Social Services
4.	2001	Arun Kumar – for outstanding work in renewable energy – Surya III Prize of Rs. 11,000/-	Indian Institute of Rural Development & Social Services
5.	1997	Citation for AHEC – For outstanding contribution towards Education in Renewable Energy	IREDA on its decade celebration
6.	1991	S.P. Singh – Khosla Research Award – 1991	University of Roorkee, Roorkee
7.	1991	Arun Kumar – Cash your ideas Award – 1991	CBIP, New Delhi

Participation in International/National / State Committees

1997	4 National Committees
2000	2 Committees
2001	2 Committees
2002	1 National Committee
2003	1 National Committee
2004	3 National Committees
2005	1 National, 1 State Committees
2006	4 National Committees
2007	2 national committee
2008	2 national committee and 2 state committees
2009	1 International, 3 national and 2 state committees
2010	1 International, 3 national and 2 state committees
2011	1 International, 2 national and 2 state committees
2012	1 International, 2 national and 2 state committees
2013	1 International, 2 national and 2 state committees

On National Committees

- Ministry of New and Renewable Energy, constituted committee Chairman on Cost estimation for Village hydro project
- Member (Alternate) of Bureau of Indian Standard (BIS) RVD Committee 15.4 on Small Hydro (1984-92).
- Member (convener) of Civil Engg. Aspects - New Technology Committee of Ministry of Non-Conventional Energy Sources, Govt. of India (1997 -1998).
- Member of `Project Executive Committee' for UNDP-GEF Hilly Hydro Project, MNES, Govt. of India (1995-1999)
- Member of High level "Project Implementation Committee" for UNDP GEF Hilly Hydro Project of Ministry of Non-conventional Energy Sources, Government of India (1998 -2000).
- Member of "Purchase Committee" for UNDP GEF Hilly Hydro Project of Ministry of Non-conventional Energy Sources, Government of India (1998 -2000).
- Member of "Renewable Energy Cell" of UP State Government since Aug. 2000
- Nominee Director of IREDA for its funded project (July, 2000- 2003).
- Member of "Rural Electrification Committee' of Uttaranchal – since Aug. 2001.
- Member of Project Evaluation Committee of Uttaranchal Jal Vidyut Nigam, since July 2002.
- Member CII – GBC Godrej Renewable Energy Committee,(2003 till date).
- Chairman of the committee constituted by MNES for village hydro cost estimation, 2004.
- Member of Uttaranchal state committee for CDM projects 2005
- Member, Advisory Committee, Uttarakhand Electricity Regulatory Commission (2006 – 2011).
- Chairman, Hydropower seminar, ASSOCHAM and Royal Norwegian Embassy, 2006
- Member of Planning Commission Sub-Committee on rivers, lakes and aquifer for 11th plan , 2006
- Member of Planning Commission Sub-Committee on R&D Research, Design and Development in renewable energy, 2006
- Member of International Scientific Committee constituted by MoEF for World Lake Congress, 2007
- Member, Expert member of committee for State S+T Intervention Projects, DST, Govt. of India, 2007
- Member, Expert member of committee for selection of site for IIT Patna from hydrology aspects.
- Member of Standing Committee for Border area Illumination, Govt. of India, MNRE 2008.
- Member of FICCI Renewable Energy Committee 2009
- Member of examination of small hydropower site offers constituted by Uttarakhand government 2008 till date

- Member of Uttarakhand state environment impact of hydropower project committee constituted by Uttarakhand government 2008 till date
- Member of Consultative committee for mid-term evaluation of MoEF constituted by Planning Commission 2009.
- Member of expert committee for examining the special issues related to Varanasi sewage on river Ganga constituted by MoEF 2010.
- Member of expert committee for examining the issues of Loharinag Pala hydro project constituted by MoEF 2010 and again in 2011.
- Member of governing body as faculty member for Technology Incubation and Entrepreneurship Activity (TIEDA) of IIT Roorkee since Dec 2010,
- Member- 12th Plan proposals preparation for small hydro sub group of Ministry of New and Renewable Energy (2011)
- Chairman Expert Committee of MoEF for Srinagar Project – April – May, 2013.

On International Committees

- Coordinating lead author on intergovernmental panel for climate change report on renewable energy – Hydro chapter (2009-2011)
- Member of Science Planning Group (SPG) in the area of Sustainable Energy by International Council for Science Regional Office for Asia and the Pacific Kuala Lumpur (Malaysia) 2008