

Summary Report

Project Title: Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning (Main Phase)

Project Control No: ARE04061212597

File No. 16-36/2009-DL

Website: www.ide.iitkgp.ernet.in

1. Project Summary

- This project is an experiment to systematically design and develop learner-centric curricula, suitable for outcome-based learning for 4 year degree programmes in six major engineering disciplines. This project is **NOT, yet another attempt to develop content**, although each curriculum document is expected to include around 80 pages of course notes and 120-125 self assessment problems and solutions. All development and review activities will be carried out collaboratively, using a specially designed web tool. A large number of motivated and experienced faculty members trained in pedagogy of teaching-learning, drawn from a diverse range of institutions across the nation are expected to participate in the development and the review process. The decision to involve such a wide section of faculty experts across India is deliberate, mainly to enhance acceptance and ownership.
- **With a little additional effort all the pedagogy courses under development can easily be converted / utilised as very effective and versatile MOOC material with very rich additional features.**

2. Project Objective

2.1 Implicit Objective

- UG engineering students need to take considerably more responsibility for their own learning than is the case at present.
- Learning to learn, communication skills, working in groups are to be important learning outcomes in addition to domain specific knowledge.
- Within limits, learners be allowed to follow their own pace, learning styles so that individual differences are largely taken care of.
- Allow continuous improvement in curricula, incorporation of better Open Educational Resource, more effective teaching –learning strategies as teachers, students, experts, users continue to give valuable inputs through course websites.
- Healthy online debates on course objectives, teaching-learning strategies, evaluation methods to benefit all concerned.

2.2 Explicit Objective

1. Develop outcomes based curriculum documents for 200 UG level one semester duration courses for 6 engineering disciplines (CE, EE, ME, ECE, CSE, Chem. E. --- 25x6 core + elective courses / discipline, covering 3rd to 8th semester; 15 common courses covering 1st and 2nd semesters and 35 interdisciplinary/ miscellaneous courses)
2. Each course curriculum to be collaboratively developed by a team of 2-3 faculty members drawn from 17 reasonably good institutions spread across India using a specially developed web tool. All courses are to be reviewed by domain as well as pedagogic experts before trials.
3. Each curriculum document is to be designed for a 40 unit course and is to contain:
 - Course overview; well defined course objectives; module overview; module objectives; unit objectives (expressed as specific objectives)
 - Around 100 unit level (one unit is equivalent to one hour class room instruction) original, nontrivial problems/assignments with solution(s); around 15 module level problems and solution(s) and 2-3 course level problems with solution(s). All problems must be explicitly linked to one or more instructional objectives.
 - Suggested module level learning strategies, which should include references to selected learning resources (books, journals, websites, simulations, video lectures and virtual labs – as appropriate).
 - Two page summary of all units
4. All courses are to be made available as OER under creative commons on a specially designed website (that also doubles up as the development tool)

Train 3000+ faculty members (including all development team members and as many reviewers as possible) through hands-on workshops, in the pedagogic principles (Blooms Taxonomy, writing instructional objectives, outcomes-based learning, formative evaluations, flip teaching etc.)

3 Who are the beneficiaries?

Eventually, these or modified versions of these documents, are expected to be available in the departmental websites of all engineering degree awarding institutions. These documents are primarily meant for students, telling them (long before the commencement of academic sessions) what knowledge, skills and attitudes they should be able to demonstrate on completion of each course, where to find the necessary learning resources (in addition to approximately 80 pages of in-built course notes) and also providing them with opportunities for self assessment (around 120 – 125 practice problems / assignments with solutions). Used

innovatively, these documents can promote self and group learning **just as MOOC material**; can teach students how to work in small collaborative groups and how to learn on their own. All faculty members, in particular, those who may have to teach such a course for the first time, are likely to find these documents extremely useful. Since terminal objectives and learning resources are carefully selected and explicitly stated, all stakeholders – students, teachers, (paper setters and examiners in affiliated college systems) and potential employers are likely to benefit very significantly. Evaluation of student achievement can be made more valid and reliable as the benchmark of achievements is explicitly stated. Every institution who decides to implement this innovation is likely to find compliance with NBA requirements much easier. The Developed Pedagogical framework under this project provides the sustainability of pedagogical Training of faculty member for developed their own course.

4 Executive Summary of Project

1	Project Title	Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning (Main Phase)
2	MHRD File Number	16-36/2009-DL
3	Project Control No. & Date	ARE04061212597
4	Name of Partner Institute (s)	Centre for Educational Technology, IIT Kharagpur (Anchor) IIT Delhi, IIT Bombay, IIT Guwahati, IIT Roorkee, NIT Trichi, BIT Mesra, NIT Warangal, NIT Durgapur, NIT Rourkela, SVNIT Surat, Amrita University, SASTRA University, IIIT Hyderabad, IIIT Bangalore
5	P.I & Co- P.I Name	P.I Name: Dr. Bani Bhattacharya Co-P.I. Prof. Anup Kumar Ray Prof. Khanindra Pathak Dr. Shyamal Kumar Das Mandal
6	P.I Contact Info	Centre for Educational Technology, Indian institute of Technology Kharagpur Kharagpur-721302, India Phone: 91-3222-282259, 282260, 282118 Mobile No - 919434054023 Email: banib@cet.iitkgp.ernet.in
7	Deliverables of the project	Main Phase: Target – <u>First Year</u> i. Identify all institutions / experts, expected to participate in the Main Phase. ii. Identify all new courses (100+), organize training programme for fresh experts. iii. Complete development of all partially completed pilot

		<p>phase courses. (around 80 courses)</p> <ul style="list-style-type: none"> iv. Design a separate user friendly interactive website for end users v. Make all pilot phase courses available to the user community. vi. Conduct pilot field trial and take appropriate steps. vii. Complete 20% development of 100+ new courses viii. Conduct 2 National Seminars + 2 National Training Workshops ix. 3 Regional Seminars + 4 Regional Training Workshops x. 1 National/ International Conference <p><u>Second Year</u></p> <ul style="list-style-type: none"> i. Complete additional 60% development of 100+ new courses ii. Conduct second pilot field trial and take appropriate steps. iii. Conduct 2 National Seminars + 2 National Training Workshops iv. 4 Regional Seminars + 4 Regional Training Workshops v. 1 International / National Conference <p><u>Third Year</u></p> <ul style="list-style-type: none"> i. Complete additional 20% development of 100+ courses ii. Make all 180 + courses available to the user community. iii. Conduct third field trial and take appropriate steps. iv. Conduct 2 National Seminars + 2 National Training Workshops
8	Project start Date	1 st April 2013
9	Project Cost	Rs. 1600 Lakhs
10	Project Duration	3 Years
11	Project Sanction no & Date	F.16-36/2009-DL dated 19th February,2013
12	Funds released so far	Main: Rs.463.8 Lakhs
13	Utilization Certificate Submitted	Submitted on 1 st April 2014 (2013-2014) Submitted on 16 th Jan. 2015 (2014-2015) Audited UC of 2013-14, 2014-15 and 2015 till Nov. 2015 submitted on 14 th Dec. 2015 as per the MHRD request.
14	Amount spent (31 st Dec. 2014)	Rs.298.00 Lakhs
15	PRSG Meeting	1st PRSG Meeting: 1 st March 2014 (Minutes of PRSG Meeting Uploaded in Sakhsat website) 2nd PRSG Meeting: 16 th January, 2015 (Minutes of PRSG Meeting Uploaded in Sakhsat website)

		Audited UC for 2013-14, 2014-15 and 2015 to Nov. 2015 has been submitted to MHRD as per the received request letter.		
16	Standing committee Meeting, Held on 25 th August 2014 at New Delhi	<p>“The PI briefed that the Pedagogy project in Pilot form started in the year 2009 and Phase-I development of the project started from 1st April 2013. The PI informed that the PAB approved this project with the budget of Rs. 16.00 Crores, out of which Rs.4.638 Crores have been released till date.</p> <p>The Members were informed that implementation of teaching pedagogy in Universities in the new form are more important while following the NBA requirements and India since has signed the Washington Accord.</p> <p>The members deliberated and recommended release of funds for the project i.e., the 2nd installment of 30% of Rs.1600/- Lakhs budget of Main Phase of the project already approved by the PAB.”</p>		
17	Domain experts committee meeting Held on 14.07.2015 at New Delhi	<p>PI presents the progress of the project including the immediate requirement of the 2nd Installment fund.</p> <p>“DEC recommended release of next installment of 30% of the Rs.1600/-Lakhs for the remaining part of the project already approved by the PAB.”</p>		
18	URL of website where the content/deliverables are located	<p>www.ide.iitkgp.ernet.in (Main Phase) [Note: all Pilot Phase courses has been transfer to Main Phase]</p>		
19	Deliverable achieved so far	First Year		
			Target	Status as on 31st Dec. 2014
		i	Identify all institutions / experts, expected to participate in the Main Phase	Completed
		ii	Identify all new courses (100+), organize training programme for fresh experts.	Completed
		iii	Complete development of all partially completed pilot phase courses. (around 80 courses)	Completed
iv	Design a separate user friendly interactive website for end users	Course Development web based tools → completed www.ide.iitkgp.ernet.in		
		User web based interactive course delivery		

			system → development is going on.
	v	Make all pilot phase courses available to the user community.	7 courses are available
	vi	Complete 20% development of 100+ new courses	Completed
	vii	Conduct 2 National Seminars + 2 National Training Workshops	Two National Seminar at IIT KGP One National Training Workshop at NIT W
	viii	3 Regional Seminars + 4 Regional Training Workshops+	3 Regional Seminars (IITKGP, IIT R, Guwahati University) 4 Regional Training Workshops (IIT D, SVNIT, NIT D, IITG)
	ix	1 National/ International Conference	International Conference organized during Dec.18-20 ,2013
	x	Conduct pilot field trial and take appropriate steps.	This will be done as soon as courses development completed.
	Second Year		
		Target	Status
	i	Complete additional 60% development of 100+ new courses	80% development completed and. After that every course will be reviewed by domain reviewer.
	ii	Conduct second pilot field trial and take appropriate steps.	This will be done as soon as courses development completed.
	iii	Conduct 2 National Seminars + 2 National Training Workshops	2 National Seminar at IIT KGP
	iv	4 Regional Seminars + 4 Regional Training Workshops 1 International / National Conference	4 Regional Training Workshops 2 Regional Seminar
	Third Year		
	1	Complete additional 20%	1. 90 courses are

			development of 100+ courses	<p>completed in 40 units and domain review is going on.</p> <p>2. 6 courses are all completed and release for open access</p> <p>3. 80 courses 90% of the development completed</p>
20	Outcome of the project	<ol style="list-style-type: none"> 1. Outcome-based Curricula for 200 UG level Engineering Courses covering 6 Engineering Disciplines: CE; EE; ME; ECE; CSE; Chem. E and First Year Courses 2. Open Source Web-based Pedagogy Framework tool for designing, reviewing, monitoring and publishing Outcome-based Curricula 3. All Universities / Institutions are able to use the above developed web-tool to develop their own Outcome based curricula / adapt / adopt the curricula already being developed nationally. 4. Conduct Training Programmes for more than 5000 Engineering Faculty members of different institutions across the country for Instructional System Design, Pedagogy, out come based Curriculum Design. 		
21	Outcome of the project as achieved on date	Outcome of the project	Achievement so far	
		Outcome-based Curricula for 200 UG level Engineering Courses covering 6 Engineering Disciplines: CE; EE; ME; ECE; CSE; Chem. E and First Year Courses	80% development completed	
		Open Source Web-based Pedagogy Framework tool for designing, reviewing, monitoring and publishing Outcome-based Curricula	Course Development and open accesses web based tools → completed www.ide.iitkgp.ernet.in	
		All Universities / Institutions are able to use the above developed web-tool to develop their own Outcome based curricula / adapt / adopt the curricula already being developed nationally.	The developed web-tool is used for faculty development program under TEQIP-II. More than 1000 faculty members are already resistor for development of their own courses.	

		<p>Conduct Training Programmes for more than 5000 Engineering Faculty members of different institutions across the country for Instructional System Design, Pedagogy, outcome based Curriculum Design.</p>	<p>Numbers of training program is already done in different participating institute to train the faculty members. Around 4000 faculty members of various institutions have been trained in Pedagogy by the Project team of IIT Kgp with active support of TEQUIP.</p> <p>One of the most encouraging development of this unique project is the very rapid (many folds) growth in the demand for training in Pedagogy by all Institutions and TEQUIP's insistence for such training for every faculty.</p> <p>Many Institutions that received training under this project have succeeded in getting NBA accreditations at first attempt.</p>
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