JSS MAHAVIDYAPEETHA

SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING

JSS TECHNICAL INSTITUTIONS CAMPUS
MANASAGANGOTHRI P.O., MYSORE – 570 006

TECHNICAL EDUCATION QUALITY IMPROVEMENT PROGRAMME (TEQIP) PHASE-II

INSTITUTIONAL DEVELOPMENT PROPOSAL

VOLUME - I

SUB-COMPONENT 1.2

SCALING-UP POST GRADUATE EDUCATION

AND

DEMAND-DRIVEN R&D AND INNOVATION

NATIONAL PROJECT IMPLEMENTATION UNIT

EDCIL HOUSE, PLOT NO. 18 A, SECTOR 16 A,
GAUTAM BUDH NAGAR, NOIDA – 201 301
(UTTAR PRADESH)

AUGUST 2010

ABBREVIATIONS

AICTE	:	All India Council for Technical Education
AIO		Action Item Orphan
AP	:	Assistant Professor
B.E	:	Bachelor of Engineering
BOG	:	Board of Governors
BT	:	Biotechnology
CII	:	Confederation of Indian Industries
COE	:	Controller of Examinations
CPHEEO	:	Central Public Health and Environmental Engineering Organization
CS	:	Computer Science & Engineering
CSIR	:	Council for Scientific & Industrial Research
CTM	:	Construction Technology & Management
CV	:	Civil Engineering
DBT	:	Department of Biotechnology
DRDO	:	Defence Research Development Organization
DST	:	Department of Science & Technology
E&C	:	Electronics & Communication
EE	:	Electrical & Electronics
EEIC	:	Engineering Education Innovation Centre
ENV	:	Environmental Engineering
ERP		Enterprise Resource Planning
FICCI	:	Federation of Indian Chamber of Commerce and Industries
FKCCI	:	Federation of Karnataka Chamber of Commerce and Industries
GATE	:	Graduates Aptitude Test for Engineering
GOI	:	Government of India
GOK	:	Government of Karnataka
GTTC		Government Toolroom and Training Centre
I	:	International Training
i2i	:	Ideas to Innovation
IDP	:	Institutional Development Proposal
IIIT	:	Indian Institute of Information Technology
IISC	:	Indian Institute of Science
IIT	:	Indian Institute of Technology
IP	:	Industrial & Production Engineering
IRG	:	Internal Revenue Generation
IS	:	Information Science & Engineering
ISRO	:	Indian Space Research Organization
IT	:	Instrumentation Technology
ITLL	:	Integrated Teaching and Learning Laboratory
JSSMVP		Jagadguru Sri Shivarathreeshwara Mahavidyapeetha
JSSRC		Jagadguru Sri Shivarathreeshwara Research Council
KPTCL	:	Karnataka Power Transmission Corporation Limited
KSCST		Karnataka State Council for Science and Technology
KVPY		Kishore Vaigyanik Protsahan Yojana
L	:	Lecturer

M	:	Management Training
M.Tech	:	Master of Technology
MBA	:	Master of Business Administration
MCA	:	Master of Computer Application
ME	:	Mechanical Engineering
MOA		Memorandum of Agreement
MOEF	:	Ministry of Environment and Forests
MOU	:	Memorandum of Understanding
MUD	:	Ministry of Urban Development
NGO	:	Non Government Organization
NID	:	National Institute of Design
NIT	:	National Institute of Technology
NPIU	:	National Project Implementation Unit
NUS		National University of Singapore
OBC	:	Other Backward Class
P	:	Professor
PACE	:	Partners for the Advancement of Collaborative Engineering Education
PG	:	Postgraduate
Ph.D	:	Doctor of Philosophy
PIP	:	Project Implementation Plan
PST	:	Polymer Science & Technology
R	:	Research Training
R&D	:	Research & Development
S	:	Subject / Domain Knowledge Training
SAP		Systems Application and Products
SC	:	Scheduled Caste
SJCE	:	Sri Jayachamarajendra College of Engineering
SJCE-STEP	:	Sri Jayachamarajendra College of Engineering-Science and Technology Entrepreneurs Park
SPFU	:	State Project Facilitation Unit
ST	:	Scheduled Tribe
SWOT	:	Strengths Weakness Opportunities Threats
TEQIP	:	Technical Education Quality Improvement Program
TIFAC	:	Technology Information Forecasting and Assessment Council
TNA	:	Training Need Analysis
TOWS	:	Threats Opportunities Weakness Strengths
UG	:	Undergraduate
UGC	:	University Grants Commission
VTU	:	Visvesvaraya Technological University
W	:	Workshop / Conference

CONTENTS

CONTENTS

CONTENTS

CONTENTS

1. INSTITUTIONAL BASIC INFORMATION

Sri Jayachamarajendra College of Engineering (SJCE) started in the year 1963 under the aegis of JSS Mahavidyapeetha and founded by Jagadguru Dr. Shivarathri Rajendra Mahaswamigalu, the 23rd pontiff of Sri Suttur Mutt. It is managed by the JSS Mahavidyapeetha headed now by His Holiness Jagadguru Sri Shivarathri Deshikendra Maha Swamiji, the 24th pontiff of this historic tradition. JSS Mahavidyapeetha, Mysore is a registered society running educational institutions in Karnataka, Tamilnadu and Uttar Pradesh with more than 300 institutions including Science, Management, Arts and Commerce Colleges, Medical College, Pharmacy Colleges, Dental College, Nursing Colleges, Law College, Colleges of Education, Engineering Colleges, several Polytechnics, Industrial Training Centres, High Schools, Primary Schools and Teachers Training Institutions, Institutions in its fold go beyond education to span crèches, old-age homes, cooperatives, rural development, orphanages, vocational training, publications and even cultural revival and protection of our heritage.

Sri Jayachamarajendra College of Engineering is situated in the western part of Mysore city in a sprawling campus of 47.3 hectare extensive and elevated stretch of land to the west of University of Mysore campus of Manasagangothri, less than 6 km from the central bus stand and railway station. As the institution plans towards national and international presence, SJCE promises to offer more and more exciting opportunities for students, faculty and staff. SJCE features nationally recognized faculty who teach 26 academic programs (including MCA and MBA) at undergraduate and post graduate levels in emerging disciplines, participate in vital scientific research, using modern facilities and technologies with a focus and preparing technological leaders for the future. The institutions reputation for academic excellence in professionally oriented programmes attracts students from across the country and world. The faculty of SJCE is noted for their distinguished background, research and the personal attention they offer to students.

The institution's reputation for academic excellence in professionally oriented programs attracts students from all over the country and is a most sought after institution by the aspirants of engineering courses.

SJCE is an autonomous institute approved by University Grants Commission, Government of India, affiliated to Visvesvaraya Technological University and accredited by National Board of Accreditation.

1.1 INSTITUTIONAL IDENTITY

Name of the Institution	**Sri Jayachamarajendra College of Engineering Mysore - 570 006, Karnataka**
Is the institution AICTE approved?	Yes
Furnish AICTE Approval No.	F No. 770-53-247(E)/RD/94, Dt: 02.05.2008 (Vol:2 - Annexure 1)
Type of Institution	Government Aided Autonomous
Status of Institution	Autonomous Institute as declared by, UGC and Visvesvaraya Technological University (Vol:2 - Annexure 2)

Names of Head of Institution and Project Nodal Officers:

Head and Nodal officers	Name	Phone Numbers	Mobile Numbers	Fax Numbers	E-Mail Address
Head of the Institution (Full time appointee)	Dr. B. G. Sangameshwara	0821-2548293	+919686677225	0821-2548290	bg.bgsangam@yahoo.com
TEQIP Coordinator	Dr. S.K.Prasad	0821-2548285 - 89	+919449621994	0821-2548290	prasad_s_k@hotmail.com
Project Nodal Officers:					
Academic Activities	Dr. Syed Shakeeb Ur Rahman	0821-2548285 – 89	+919448071986	0821-2548290	ssr_sjce@yahoo.co.in
Civil Works including Environment Management	Sri B.M. Sadashiva Murthy	0821-2548285 – 89	+919900504023	0821-2548290	bmsada@yahoo.com
Procurement	Dr. N. Haraprasad	0821-2548285 – 89	+919845488700	0821-2548290	nharaprasad@hotmail.com
Financial Aspects	Sri K.B. Somashekhara Murthy	0821-2548293	+919686677226	0821-2548290	kb_smurthy@yahoo.co.in
Equity Assurance Plan Implementation	Sri K.M Anilkumar	0821-2548285 – 89	+919945633380	0821-2548290	anilkmsjce@yahoo.co.in
	Dr. P. Nanjundaswamy		+919449264365		pnswamy@yahoo.com

1.2 ACADEMIC INFORMATION

1.2.1 Under Graduate Engineering Programs offered in Academic year 2009-10

Sl. No	Title of the Programme	Level	Duration (Years)	Year of Starting	AICTE Sanctioned Annual Intake	Total Student Strength (All years)
1.	Biotechnology	Under Graduate – B.E	4 Years (8 Sem.)	2002-03	30	77
2.	Civil Engineering			1963-64	60	235
3.	Computer Science & Engineering			1982-83	120	470
4.	Construction Technology & Management			2004-05	60	152
5.	Electrical & Electronics Engineering			1963-64	60	239
6.	Electronics & Communication Engineering			1971-72	120	478
7.	Environmental Engineering			1987-88	60	221
8.	Industrial & Production Engineering			1980-81	60	233
9.	Information Science & Engineering			2000-01	60	160
10.	Instrumentation Technology			1978-79	60	240
11.	Mechanical Engineering			1963-64	60	250
12.	Polymer Science & Technology			1987-88	40	153

1.2.2 Post Graduate Engineering programs offered in Academic year 2009-10

Sl. No	Title of the Programme	Level	Duration (Years)	Year of Starting	AICTE Sanctioned Annual Intake	Total Student Strength (All Years)
Post Graduate Courses						
1.	M. Tech. in Industrial Electronics	Post Graduate	2 Years (4 Sem.)	1983-84	18	36
2.	M. Tech. in Industrial Structures			1984-85	18	36
3.	M. Tech. in Environmental Engineering (Jointly with CPHEEO, MUD-GOI)			1985-86	18	30
4.	M. Tech. in Maintenance Engineering			1987-88	18	22
5.	M. Tech. in Computer Engineering			1989-90	18	36
6.	M. Tech. in Bio Medical Instrumentation			1992-93	18	28
7.	M. Tech. in Software Engineering			1995-96	18	36
8.	M. Tech. in Master of Engineering Management			1986-87	18	31
9.	M. Tech. in Networking & Internet Engineering			2002-03	25	50
10.	M. Tech. in Energy Systems and Management (Jointly with KPTCL, GoK)			2002-03	18	25
11.	M. Tech. in Polymer Science & Technology			2005-06	18	26
12.	M. Tech. in Health Science & Water Engineering (Jointly with JSS Medical College, Mysore)			2005-06	18	09
13.	Master of Computer Applications (MCA)		3 Years (6 Sem.)	1986-87	60	172
14.	Master of Business Administration (MBA)		2 Years (4 Sem.)	1998-99	120	240
Research Programmes						
15.	Research Programme leading to Ph. D.	Research Program (Ph.D / M.Sc Engg)	3 Years	1980-81	Registered and working - 95	
16.	Research Programme leading to MSc. (Engg.)		2 Years		Registered and working - 12	

Note: MCA and MBA details are for information only.

1.2.3 Accreditation Status of UG Programmes

Title of UG Programmes being offered	Whether eligible for accreditation or not	Whether accredited as on 31st March. 2010	Whether Applied for as on 31st March. 2010	No. of accreditations undergone
Biotechnology	Eligible	Not Accredited	Applied for	--
Civil Engineering	Eligible	Accredited	--	3
Computer Science & Engineering	Eligible	--	Applied for	2
Construction Technology & Management	Eligible from July 2010	--	Not Applied Yet	--
Electrical & Electronics Engineering	Eligible	--	Applied for	2
Electronics & Communication Engineering	Eligible	--	Applied for	2
Environmental Engineering	Eligible	Accredited	--	2
Industrial & Production Engineering	Eligible	Accredited	--	3
Information Science & Engineering	Eligible	Accredited	--	1
Instrumentation Technology	Eligible	Accredited	--	3
Mechanical Engineering	Eligible	--	Applied for	2
Polymer Science & Technology	Eligible	--	Applied for	2

Note: Details in Vol:2 Annexure 2

1.2.4 Accreditation Status of PG Programmes

Title of PG Programmes being offered	Whether eligible for accreditation or not	Whether accredited as on 31st March. 2010	Whether Applied for as on 31st March. 2010	No. of accreditations undergone
M. Tech. in Industrial Electronics	Eligible	Accredited		1
M. Tech. in Industrial Structures	Eligible	Accredited		1
M. Tech. in Environmental Engineering	Eligible	Accredited		1
M. Tech. in Maintenance Engineering	Eligible		Applied for	-
M. Tech. in Computer Engineering	Eligible	Accredited		1
M. Tech. in Bio Medical Instrumentation	Eligible		Applied for	-
M. Tech. in Software Engineering	Eligible	Accredited		1
M. Tech. in Master of Engineering Management	Eligible		Applied for	-
M. Tech. in Networking & Internet Engineering	Eligible	--	Not applied yet	-
M. Tech. in Energy Systems and Management	Not Eligible	Not Accredited		-
M. Tech. in Polymer Science & Technology	Not Eligible	Not Accredited		-
M. Tech. in Health Science & Water Engineering	Not Eligible	Not Accredited		-
Master of Computer Applications	Eligible		Applied for	-
Master of Business Administration	Eligible		Applied for	-

Note: Details in Vol:2 Annexure 2

1.3 FACULTY STATUS (REGULAR/ON-CONTRACT FACULTY AS ON MARCH 31, 2010)

Faculty Rank	No. of sanctioned Regular post	Present Status : Number in position by Highest Qualification												Total No. of regular faculty in position	Total vacancies	Total No. of contract faculty in position
		Doctoral Degree				Masters Degree				Bachelors Degree						
		Engineering Discipline		Other Discipline		Engineering Discipline		Other Discipline		Engineering Discipline		Other Discipline				
		R	C	R	C	R	C	R	C	R	C	R	C			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Professor	31	34	--	06	--	02	--	--	--	--	--	--	--	42	07	--
Associate Professor	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Assistant Professor	61	12	--	01	--	52	--	03	--	01	--	--	--	69	13	--
Lecturer	143	07	--	03	--	32	15	02	11	07	34	--	03	51	53	63
Total	235	53	--	10	--	86	15	05	11	08	34	--	03	162	73	63

Note:

1) R = Regular, C=Contract
2) Advertised for filling up 27 Non-grant-in-aid posts (5 P, 6 AP & 16L) and process will be completed by November 2010
3) Submitted to Govt. of Karnataka for filling up 29 Grant-in-aid posts (2P, 7AP, 20L)
4) Details are in (Vol:2 Annexure 3)

1.4 BASELINE DATA

Sl. No.	Parameters	Data
1.	Total strength of students in all programmes and all years of study in the year 2009-10 (Details in Vol:2 Annexure 4)	3350
2.	Total women students in all programmes and all years of study in the year 2009-10 (Details in Vol:2 Annexure 4)	1113
3.	Total SC students in all programmes and all years of study in the year 2009-10 (Details in Vol:2 Annexure 4)	440
4.	Total ST students in all programmes and all years of study in the year 2009-10 (Details in Vol:2 Annexure 4)	90
5.	Total OBC students in all programmes and all years of study in the year 2009-10 (Details in Vol:2 Annexure 4)	1140
6.	Number of fully functional P-4 and above level computers available for students in the year 2009-10	1170
7.	Total number of syllabus Text books and Reference books available in library for UG & PG students in the year 2009-10 (Details in Vol:2 Annexure 5)	84788
8.	Percentage of UG students placed through campus interviews in the year 2009-10 (Details in Vol:2 Annexure 6)	79.6
9.	Percentage of PG students placed through campus interviews in the year 2009-10 (Details in Vol:2 Annexure 6)	14.4
10.	Percentage of High quality undergraduates (>75% marks) in the year 2009-10 (Vol:2 Annexure 7)	87.0
11.	Percentage of High quality post graduates (>75% marks) in the year 2009-10 (Details in Vol:2 Annexure 7)	87.6
12.	Number of research publications in Indian refereed Journals in the year 2009 (Details in Vol:2 Annexure 8)	07
12a	Number of research publications in Indian Conferences in the year 2009 (Details in Vol:2 Annexure 8)	42
13.	Number of research publications in International refereed Journals in the year 2009 (Details in Vol:2 Annexure 8)	76
13a	Number of research publications in International Conferences in the year 2009 (Details in Vol:2 Annexure 8)	48
14.	Number of Patents obtained (as on date) (Details in Vol:2 Annexure 9)	03
15.	Number of Patents filed in the year 2009-10	--
16.	Number of sponsored research projects completed in the year 2009-10 (Details in Vol:2 Annexure 10)	10

Sl. No.	Parameters	Data
17.	The transition rate of students in percentage from 1st year to 2nd year in the year 2009-10 (Details in Vol:2 Annexure 7) for i. All students ii. SC iii. ST iv. OBC	 95.4 89.0 84.2 99.3
18.	IRG from students fee and other charges in the year 2009-10 (Rs. in lacs)	841.47
19.	IRG from R & D projects, consultancy & other sources in the year 2009-10 (Rs. in lacs)	123.74
20.	Total IRG in the year 2009-10 (Rs. in lacs)	965.21
21.	Total recurring expenditure in the year 2009-10 (Rs. in lacs)	2490.45
22.	Number of Joint publications with National authors in journals in the year 2009 (Details in Vol:2 Annexure 8)	65
22a	Number of joint publications with national authors in conferences in the year 2010 (Details in Vol:2 Annexure 8)	80
23.	Number of Joint publications with International authors in the year 2010	--
24.	Number of R & D products commercialized in the year 2009-10	--
25.	Number of Joint M. Tech programs with institutions undertaken in the year 2009-10 (Details in Vol:2 Annexure 11)	3
26.	Number of joint M. Tech programs with Industry undertaken in the year 2009-10 (Vol:2 Annexure 11)	5
27.	Number of joint Ph. D with institutions undertaken in the year 2009-10 (Details in Vol:2 Annexure 11)	6
28.	Number of Joint Ph. D. with Industry undertaken in the year 2009-10 (Details in Vol:2 Annexure 11)	4
29.	Number of Joint consultancies undertaken with Institutions in the year 2009-10 (Details in Vol:2 Annexure 11)	6
30.	Number of Joint consultancies undertaken with Industry in the year 2009-10 (Details in Vol:2 Annexure 11)	5

1.5 INSTITUTIONS TO BE ELIGIBLE FOR PARTICIPATION IN THE PROJECT UNDER THE SUB-COMPONENT 1.2

Sl. No.	Attainment Parameters	Bench Mark Values	Institutions response (Yes / No)
1.	Does the Institution agree to implement all academic and nonacademic reforms given as below • Implementation of Curricular Reforms • Exercise of autonomies (Details in Vol:2 Annexure 2) • Establishment of Corpus Fund, Faculty Development Fund, Equipment Replacement Fund and Maintenance Fund (Details in Vol:2 Annexure 12) • Generation, retention and utilization of revenue generated through variety of activities • Institutions to fill-up all existing teaching and staff vacancies • Delegation of decision making powers to senior functionaries with accountability • Improve Student Performance Evaluation • Improvement performance appraisal of faculty by students • Provide faculty incentive for continuing education (CE), consultancy and R&D • Obtain accreditation (Details in Vol:2 Annexure 2)	Yes	**YES**
2.	Availability of academic autonomy as recognized by UGC for both UG and PG programmes (Details in Vol:2 Annexure 2)	Yes	**YES**
3.	Presence of Board of Governors with an eminent academician or industrialist as the Chairperson (Details in Vol:2 Annexure 13)	Yes	**YES**
4.	Percentage of eligible UG programmes accredited or applied for (Details in Vol:2 Annexure 2)	60%	**91.66% YES**
5.	Percentage of eligible PG programmes accredited or applied for (Details in Vol:2 Annexure 2)	40%	**66.67% YES**
6.	Cumulative number of Ph.Ds produced in the last three academic years (2007-08, 2008-09, 2009-10) (Details in Vol:2 Annexure 14)	5	**34 YES**
7.	Cumulative number of M Tech. produced in the last three academic years (2007-08, 2008-09, 2009-10) (Details in Vol:2 Annexure 15)	50	**364 YES**
8.	Faculty positions filled on regular full time basis as percentage of total faculty positions sanctioned in accordance with the AICTE prescribed student to faculty ratio (Details in Vol:2 Annexure 3)	65%	**69.8% YES**
9.	Percentage of regular faculty with PhD in engineering as percentage of total faculty (excluding Basic Sciences) (Details in Vol:2 Annexure 3)	15%	**22.6% YES**
10.	Percentage of regular faculty with PhD in engineering as percentage of total faculty (including Basic Sciences) (Details in Vol:2 Annexure 3)	–	**26.8 % YES**

1.6 IMPLEMENTATION OF REFORMS

The bar chart below shows the time frame for implementation of academic and non-academic reforms. The cost estimate for implementation of the reforms is given in Vol:1 - Section 2.18.

1.6.1 Academic reforms

Sl. No	Type of Reform	Time Frame for Implementation (Months)							
		0-6	6-12	12-18	18-24	24-30	30-36	36-42	42-48
1.	Curricula revision for existing M.Tech. Program (Core courses, electives, internships, projects and evaluation system)								
2.	Curriculum design of new M.Tech. Program (Core courses, electives, internships, projects, evaluation system and annual revisions)								
3.	Quantitative and qualitative enhancement of research by faculty and students								
4.	Encourage young faculty members to take up research activity								
5.	Introducing innovations in UG programs								
6.	Introducing faculty incentive schemes of continuing education, consultancy, R&D, publications and participating in conferences, seminars, workshops in India & abroad								
7.	Finishing school support for academically weak students								

1.6.2 Non- Academic reforms

Sl. no	Type of Reform	Time Frame for Implementation (Months)							
		0-6	6-12	12-18	18-24	24-30	30-36	36-42	42-48
1	Excising institute autonomy (Academic, administrative, management and finance) within the existing frame works.								
2	Establishing corpus fund, faculty development fund, equipment replacement fund and maintenance fund								
3	IRG and utilization								
4	Filling all teaching and staff vacancies								
5	Delegation of decision making powers to HODs with accountability								

2 INSTITUTIONAL DEVELOPMENT PROPOSAL

2.1 EXECUTIVE SUMMARY

a) The SWOT Analysis has been an eye-opener to all the faculty and staff of SJCE revealing that a lot more needs to be done in the coming years towards realizing its vision. This proposal under TEQIP II is a part of the Institute's Strategic Plan derived from SWOT Analysis.

b) Qualitative and quantitative improvement of postgraduate education & research built on a solid undergraduate education needs immediate attention during the next four years. The proposal provides a roadmap towards achieving the specific objectives of increasing the enrolment in and output of M. Tech and Ph. D with measures to improve quality through innovations in undergraduate education.

c) Following Action Plans are proposed to achieve the specific objectives and outcomes.

- Scaling-up enrolment into Masters & Doctoral Programs in Engineering/ Technology at SJCE
- Improving collaboration with industry
- Quantitative increase & qualitative improvement in research by faculty individually, jointly/ collaboratively
- Developing research interest among undergraduate students
- Improving the academic performance of weak students through a Finishing School
- Improving institutional governance

d) The project targets are as follows.

- 60 % increase in M. Tech enrolment and output by the end of project
- 50 % increase in PhD enrolment & output
- 90 % increase in the number of research publications by Faculty
- 100% increase in MoUs with industry; 200% increase in MoUs with other institutions
- 100% increase in patenting & commercialization of research
- 2% increase in IRG
- All academically weak students take Finishing School Training
- Faculty and staff undergo training in domain area, pedagogy, research area and soft skills
- Undergraduate placement rate increased from 80% to 90%
- Publication of SJCE Technical Journal annually
- Climate for innovation & research created in the institute
  Proposed to establish
  - Engineering Education Innovation Center
  - Center for Vehicle Safety, Urban Eco System and Transportation Engineering
- Two Centers of Excellence under sub-component 1.2.1:
  - Tele Medicine and Remote Monitoring of Rural Health Care
  - Mitigation against Natural Disaster

e) The fund requirement proposed is as follows:

Sl no	Project Item Description	Fund Requirement in Lakh Rs.
1.	Infrastructure Improvements	
	a. New laboratories for existing PG programs	393.05
	b. Laboratories for new PG programs	56.50
	c. Updating of learning resources	45.00
	d. Furniture	30.25
	e. Modernization & strengthening of libraries	63.90
	f. Refurbishments	42.83
	g. Minor items	15.00
	h. Consultancy services	30.00
2.	Teaching/Research Assistantships	299.60
3.	Enhancement of R & D and Consultancy	99.00
4.	Faculty & Staff Development	197.23
5.	Enhanced interaction with industry	75.00
6.	Institutional management capacity enhancement	45.00
7.	Implementation of institutional reforms	44.00
8.	Academic support for weak students	38.00
9.	Incremental operating cost	150.00
Total		**1624.36**

2.2 SWOT ANALYSIS

2.2.1 Methodology, Analysis of Data and Inferences

At SJCE a combination of SWOT Analysis and TOWS Strategic Alternatives Matrix were put to use. The entire Institution was divided into homogeneous groups representing their respective departments and line functions. There were totally 19 groups that were taken through the day-long SWOT and TOWS facilitated workshop and we had 3 groups on each day – two Engineering departments and one Basic Science department. One day was exclusively for non-Teaching and Support staff. The following were the groups:

Civil Engineering	Mechanical Engineering	Industrial Production Engineering
Electrical Engineering	Electronics & Communication Engineering	Instrumentation Engineering
Computer Science Engineering	Environmental Engineering	Polymer Science & Technology Engineering
Information Science & Engineering	Bio-Technology Engineering	Construction Technology Engineering
Physics	Chemistry	Mathematics
Admin & Accounts	Library	Technical Staff
Students	Alumni	

Every day the aim of each departmental group was to identify the key internal factors (Strength & Weakness) and external factors (Opportunity & Threats) that are important to achieve objectives of Sub-Component 1.2 in the TEQIP document. The following approach was followed:

First, the groups were assembled in an audio-visual room and briefed about TEQIP-II in general and sub-component 1.2 in particular, its associated deliverables and the Scoring methodology that would ensure SJCE getting funding under TEQIP-II.

The group then was told about Institutional SWOT analysis being one of the eligibility criteria task for TEQIP-II. The broad focus areas that they had to deliberate on in the SWOT workshop were as below:

- Scaling up research and innovation
- Scaling up Ph.D. enrolment
- Scaling up enrolment into Master programs
- Research collaborative activities with institution at National and international level
- Improving interaction with industry
- Improving faculty qualifications

The group then discussed, distilled their thoughts and the group coordinators collected SWOT inputs on each focus area from every member of the group.

Once the Departmental SWOT was prepared, the groups were introduced to TOWS Alternatives Matrix. This was done to ensure a “Matching and Converting” strategy is used.

"Matching" was used to find competitive advantages by pairing the Strengths to Opportunities. "Converting" is to apply conversion strategies to convert Weaknesses or Threats into Strengths or Opportunities. In this way the groups were asked to pair and arrive at Strength-Opportunity, Strength-Threat, Weakness-Opportunity and Weakness-Threat matrices for their respective departments.

All this departmental SWOT inputs were then collated into one master SWOT sheet for SJCE and all the departmental TOWS inputs were collated into one master TOWS at the Institutional level.

During the collation process, care was taken not to eliminate any input too quickly. The importance of individual SWOT/TOWS input will be revealed by the value of the strategies it generates. A SWOT/TOWS item that produces valuable strategies got grouped as important. Those SWOT/TOWS inputs that generated mediocre strategies were parked.

Once this task was completed, the core-group team chaired by the Principal, consisting of senior faculty and external SWOT experts further cleaned the SWOT and TOWS inputs, normalized them and readied the Action Items for Institutional Development Proposal.

To prioritize the action items into short-term, mid-term and long-term goals, two indices – Business Value and Implementation Complexity were used. A score of 1 to 5, where 1 represented low Business Value and 5 meant highest business value was used. Similarly a score of 1 represented low Implementation Complexity and a score of 5 would mean that the action item in question had a very high Implementation Complexity.

After all action items were scored in this manner, the list was sorted on High Business Value and Low Implementation Complexity and the ones that were in this category were assigned to Short-Term Goals and progressively lower business value and higher implementation complexity were assigned into Mid and Long-term goals.

Documentation was done and traceability sheets that could trace the action item to the TOWS inputs and then to the individual departmental SWOT analysis input were prepared & the core-team took the next steps to plan for budgets, Action plan etc. (Details in Vol: 3)

2.2.2 Strategic Plan for Institutional Development based on SWOT Analysis

A strong base of postgraduate engineering education and doctoral standard research outputs which in turn are dependent on sound undergraduate programs in engineering/technology are essential to produce engineers of tomorrow who is going to deal with entities ranging from mega scale to nano scale operating in a global context. SJCE has planned following strategies to bring about changes in its programs based on a mid-2010 SWOT Analysis. This IDP under TEQIP-II is an attempt to implement this plan partly.

Strengthening and expanding postgraduate and doctoral engineering education of quality & relevance by increasing enrolment; offering new & demand-driven programs; introducing innovative multidisciplinary courses and research-based projects/problems; integrated BE-MTech programs; improving quality of teaching learning and evaluation processes; increased partnership with industry; offering more scholarships/ assistantships/fellowships/travel grant/contingency for books & equipment/hostel facilities to PG & research students; sponsoring MTech & PhD students to participate and present papers in national & international conferences; faculty development and expansion in new & emerging areas; creating improved and new laboratory, computer & library facilities.

Strengthening and expanding opportunities, networking and partnerships for engineering research of quality & relevance by strengthening existing partnerships and building new partnerships with industry for sponsored research, collaborative research and establishment of state-of-the-art research facilities; creating improved and new laboratory, computer & library facilities; offering integrated MTech-PhD programs, translating research

findings into practical actions like patenting, start-ups, certification etc.; faculty development in India & abroad through post-doctoral fellowships, exchange programs, participation in conferences/seminars/symposia/courses and mentoring; exploring research opportunities with central and state governments in their development plans; strengthening and expanding networking & partnerships with national institutes of technological education & research (IISc, IITs, NID, IIITs), national laboratories(CSIR, ICAR) for collaborative research; strengthening SJCE-Alumni relations for mutual advantage.

Introducing innovations in UG education in engineering/technology to enhance relevance & quality of currently offered UG programs by gradually switching over from current teaching-centric, syllabus/subject-centric & examination-centric education to learning-centric, competence-centric, learning outcomes-based education; designing curricula and evaluation scheme based on learning outcomes approach; introducing problem-based innovative courses & electives that require collaborative & discovery learning in teams and iterative engineering skills of design-build-test; using learning-centric teaching learning processes in courses offered by all departments in SJCE gradually increasing the proportion of active learning methods like problem solving, team building, discovery learning & collaborative learning; assessing performance of students based on their learning attainments; providing laboratory & workshop facilities for designing, fabricating and testing student projects/products; faculty development for introducing innovations; collaborating with institutions in India & abroad engaged in similar activities.

Strengthening and Developing Institutional Management Capacity to effectively implement the strategies described above by establishing the following new offices.

a. Dean, Academic Affairs & Innovations (UG, PG & PhD programs)

Responsible for:

- Planning, coordination and monitoring of curriculum design, teaching learning processes, performance evaluation of students in UG & PG programs and coursework of PhD programs
- Overseeing/monitoring faculty guide-student meetings/seminars related to PG & PhD programs
- Introducing & evaluating innovations in engineering education
- Strengthening & improving networking & partnership between SJCE, industry & other institutions in India & abroad required for UG, PG & PhD programs
- Creating facilities to support UG, PG & PhD programs

b. Controller of Examination

Responsible for:

- Planning, scheduling, coordination, conduction of all examination activities of UG and PG
- Coordinate central valuation activities, tabulation and announcement of results
- Coordinate Redressal/Grievance forum
- Preparation and Issue of transcripts to students
- Reporting of all examination activities to fulfill all needs of affiliated universities
- Maintenance of all examination records
- Coordination and conducting the Graduation Ceremony

c. Dean, IRG (Research, Consultancy, Community Outreach Programs)

Responsible for:

- Planning, coordination and monitoring of research by SJCE faculty
- Organizing interdisciplinary & multidisciplinary research teams comprising SJCE faculty and external researchers

- Motivating faculty to undertake industrial consultancy work and creating additional facilities for the purpose
- Planning, coordination and monitoring community outreach programs like continuing education, alumni relations and community relations and creating additional facilities required for the purpose
- Strengthening and improving partnership between SJCE and industry for obtaining sponsored research projects & industrial consultancy
- Strengthening and improving networking & partnership between SJCE and other institutions in India and abroad for collaborative research

d. Dean, Human Resources Management

Responsible for:

- Managing computerized database of students, faculty & staff
- Managing faculty & staff development programs based on TNA.
- Managing student services (orientation, counseling, training & placement, health care)
- Administering incentive schemes for faculty & students
- Coordinate Redressal/Grievance forum
- Extending institutional support to the students in their all-round personality development

Offices of Dean (Academic affairs and Innovations) and Controller of Examinations are already established. Offices of Dean (IRG) and Dean (Human resource management) will be established in future.

Providing opportunities for continuous growth and development of faculty and staff by planning, organizing, implementing and evaluating faculty & staff development programs in areas of need and interest which include programs to improve teaching competence, domain knowledge competence, research competence, IRG competence, management competence and qualifications improvement; mentoring faculty in introducing innovations; encouraging/supporting faculty exchange programs with other institutions in India & abroad; planning, organizing and implementing staff development programs which include programs to enhance IT skills relevant to functional areas, technical skills relevant to operation & maintenance of laboratories/workshops and improvement of qualifications.

2.2.3 Major Challenges for Implementation of the Strategic Plan

Introducing reform measures in its governance which include changing the mindset of key players in the system, reorganization of departments, changing the mindset of faculty towards accepting research as integral to teaching and innovation as the critical input for the survival & growth of the system, attracting students to postgraduate & doctoral programs, building required partnership with industry and higher education & research institutions, management of the most valuable human resources viz., faculty, students & staff at SJCE & provision of additional resources for implementation of the plan are going to be the major challenges. TEQIP II resources will be put to best use towards implementing this plan.

2.2.4 Vision, Mission & Values of SJCE

Vision Statement: The Vision of Sri Jayachamarajendra College of Engineering is to: educate students to think critically, work creatively, communicate effectively, and become technologically competent; function as a visible, responsible and responsive student-centered institution dedicated to academic excellence; foster the cultural, ethnic, racial and gender diversities of students, faculty and staff by responding to the needs of a changing student population; promote areas with distinctive strengths for which reputation for excellence can be established; provide a supportive environment that encourages faculty and staff to continue their intellectual and professional growth; Meet educational, research, and service needs of

the region through collaboration with academic and technical institutions, businesses and government agencies, and cultural organizations.

Mission Statement: The Mission of Sri Jayachamarajendra College of Engineering is to achieve excellence in undergraduate and graduate education, research, and public service. The institute strives to: provide an educational experience that inspires students to reach for the highest levels of intellectual attainment and personal growth throughout their lives; provide a scholarly and professional environment that enables students and faculty to make lasting contributions to the advancement of knowledge and the creative practice of engineering; Engage in service that enhances the public's understanding of technology and facilitates its use for the betterment of society; Lead the nation in providing equality of opportunity for engineering education and the institute to qualify as a deemed university; contribute to the development of technical education in the country to its complete potential; Respond to the ever changing needs and aspirations of the society http://www.sjce.ac.in/instituteprofile_visionmission.htm

2.3 SPECIFIC OBJECTIVES & EXPECTED RESULTS OF THE PROPOSAL

2.3.1 Linkage between SWOT Analysis & Key Project Activities

Sl. No.	Key Project Activities	Link with SWOT Analysis Action Items (Details in Vol: 3)
1	Scaling up Post-graduate (PG) & Doctoral Education	60, 79-83, 89-94
2	Scaling up Research and Innovation	60, 75-78, 84-94
3	Increase in Industry-Institute collaboration (IRG)	37-60, 78, 88
4	Creating interest for research in UG students	1-4
5	Introducing innovations in Engineering Education	-
6	Faculty and Staff Development	5-15
7	Partnership and Networking with other Institutes and Alumni	64-74
8	Institutional Management Capacity enhancement	61-63
9	Implementation of institutional reforms	15-36
10	Academic support for Weak Students	-

Linkage between Specific objectives, expected results and SWOT Analysis

Sl. No.	Specific Objectives	Expected Results	Link to SWOT Analysis
Institutional Reforms			
1	To: a) Improve quality & student enrolment in existing PG & PhD programs & their output b) Start new PG programs	*a. Curricula of 12 existing programs revised based on Learning Outcomes Approach* *b. Enrolment in M. Tech programs to increase from223 in 2010 to 350 in 2014* *c. No. of M. Tech graduates produced to increase from 205 in 2010 to 325 in 2014* *d. Registration in Ph .D programs to increase from 10 per year in 2010 to 15 per year in 2014* *e. No. of Ph. Ds produced to increase from 10 per year in 2010 to 15 per year in 2014*	60, 75-78, 79-83
2	To increase quantity and enhancing quality of research by SJCE faculty	*Increase in numbers of the following indicators from 2010 to 2014* *a. Faculty members engaged in research from 80 to 160* *b. Individual Research Projects from 10 to 15* *c. Joint Research Projects from 5 to 10* *d. Publications in National & International Refereed Journals from 83 to 150* *e. Patents obtained from 3 till date to 7 in 2014* *f. Patents filed from 0 to 4* *g. No. of Books on Engineering from 12 to 25*	60, 75-78, 84-94
3	To develop Faculty & Staff	*a. All 235 Faculty Members to attend Faculty Development Programs* *b. All 219 Staff Members to attend Staff Development Programs* *c. Institutional budget allocation for Faculty &Staff Development from the present 4% to 5% 2014 onwards* *d. By 2014 annually 10 person-days of training by each faculty member achieved. Training Needs Analysis in vol: 1 section 2.7Faculty & Staff Development Plan*	5-15
4	To provide academic support to weak students	*a. A Finishing School Unit established at SJCE* *b. Academically weak students from present 10% will be reduced by at least 2% through Finishing School Programs*	-

Sl. No.	Specific Objectives	Expected Results	Link to SWOT Analysis
5	Improve employability of UG & PG graduates	*a. Placement rate of UG students to increase from 80% in 2010 to 90% in 2014* *b. Average UG Salary Package to increase @ 5% annually from 2010 to 2014* *c. All PG students are placed through Placement cell (15%) or after Internship with industry (35%) or by direct employment (30%) or by becoming Entrepreneurs (5%). 15% are Working Professionals.*	1-4
6	To introduce innovations in undergraduate engineering education to create interest in research	*Research interest developed among UG students in SJCE by:* *a. Selecting 60 UG students each year starting 2011 to voluntarily associate with Industry-oriented R & D projects either at SJCE or with industry during vacation. Out of these about 6-10 may continue for M. Tech after graduation.* *b. Selecting 60 UG students (5 in each branch interested in research) each year beginning 2011 to participate in an **Innovation Awareness Summer School**. About 15students participating in this program & graduating from SJCE may continue in M. Tech.* *c. Redesigned UG programs in engineering at SJCE by 2014 with provisions for:* *Interdisciplinary project-based course on Innovations in Engineering in which the I & II semester students in teams of five identify and solve an open-ended problem after getting learning inputs from faculty & industry* *Experience Design-Build-Test process in engineering leading to innovations* *Experiment with the process of commercializing their innovations* *d. Redesigned curricula of UG and PG programs in engineering at SJCE based on Learning Outcomes Approach by 2014* *e. Increased proportion of learning-centric pedagogy like discovery learning, collaborative learning in teams used by faculty at least up to 40 % of the curricula* *f. Increased proportion of open-ended problems in evaluation of student performance*	1-4, 60, 75-78

Sl. No.	Specific Objectives	Expected Results	Link to SWOT Analysis
7	To increase Industry-Institute collaboration & scale-up of R&D in areas linked to societal/ industrial demand	*a. No. of MOUs with industry to increase from 9 in 2010 to 15 in 2014 (Vol:2 - Annexure 18, Vol:1 – Section 2.16.7 & 2.16.8))* *b. No. of Sponsored Research Projects to increase from 10 in 2010 to 15 in 2014 (Vol:2 - Annexure 10)* *c. Revenue from externally funded R&D projects & consultancies as % of total annual revenue from all sources to increase from Rs 123 Lakhs (5.0% of total revenue) in 2010 to Rs170 Lakhs (7.0% of total revenue) in 2014* *d. Number of Industry/Research organizations for collaborative PG diploma courses to increase from 3 in 2010 to 6 in 2014(Vol:1 – Section 2.1.6.5)*	37-59, 60, 64-74, 78, 88
8	To increase collaboration between SJCE & other institutions	*a. No. of MOUs with other institutions to increase from 3 in 2010 to 10 in 2014* *b. No. of joint publications in Refereed National & International Journals to increase from 20 in 2010 to 40 in 2014*	37-59, 64-74, 78, 88

Sl. No.	Specific Objectives	Expected Results	Link to SWOT Analysis
9	To enhance institutional management capacity	*a. One office of the Dean, IRG(Research, Consultancy & Community Outreach) & One office of the Dean, Human Resources Management created* *b. Performance-based incentive schemes for students, faculty and staff to be introduced by end 2011* *c. An Industry Advisory Group to be constituted by BOG in SJCE to advice on strengthening existing partnerships & building new partnerships with industry by 2001* *d. One Customized Orientation Workshop for HODs & Senior Faculty Members on Management of IRG to be conducted by 2014* *e. A Study Tour of Principal & Senior Faculty Members to Purdue School of Engineering, Virginia Tech and College of Engineering & Applied Sciences, University of Colorado to be organized in 2011 for studying the innovations being introduced in engineering education, facilities created & exploring possibilities of collaboration with SJCE* *f. A Study Tour of HODs & Senior Faculty Members to IISc & IITs to be organized in 2011 to study the mechanisms of IRG through sponsored research, consultancy & continuing education projects, incentives for faculty, mechanisms for translating research findings into practical action* *g. Customized In-house Faculty Workshop on Competence Building for Industrial Consultancy to be organized & conducted in 2011* *h. Customized In-house Faculty Workshop on Enhancing Research Capabilities including IT skills to be organized & conducted in 2011* *i. Vision 2015 document prepared by April 2011* *j. Engineering Education Innovation Centre established at SJCE by 2011-12(Vol:1-Annexure 4)* *k. Policy for funding research by young faculty in place by 2011(Refer Vol:1-Section 1.6 and 2.18)* *l. A Travel Grant Scheme for Students & faculty in place by 2011(Refer Vol:1-Section 2.6.2)* *m. A Manual containing SJCE organization, policies, regulations (academic, administrative & financial) procedures & forms, rules, entitlements, incentives, opportunities for growth for ready use by faculty & staff to be prepared & distributed by 2012* *n. One In-house Seminar each in 2011, 2012, 2013 & 2014 to be conducted to disseminate & exchange experiences & ideas gained by Senior Faculty with Younger Faculty members*	16-36, 61-63

2.3.2 Justification for SJCE to participate in Sub-component 1.2 of TEQIP II

The institution has successfully implemented TEQIP I that contributed to the development of its infrastructure, faculty & staff. Grant of autonomy to the institution has been the major gain from TEQIP I. This has resulted in enhancing the abilities of the faculty in designing, implementing and evaluating UG & PG academic programs independently of the university system.

Experts who conducted the post-TEQIP I evaluation of institutions have placed SJCE amongst the top Engineering institutions in the country. In the World Bank publication on the Governance of Technical Education in India key issues, principles and case studies edited by Andreas Bloom and Jannette Cheong highlights the SJCE achievement in respect of Industry institute collaboration in the case study on Karnataka institutions (The BOSCH Industrial Automation Laboratory, The PHILIPS Electronics Laboratory, and GENERAL MOTORS PACE Program).

SJCE's faculty composition with 63 Ph. Ds (27% of faculty) and 117 Masters Degree Holders (50% of faculty) in Engineering/Basic Sciences and Technology is fully geared to meet the challenges under TEQIP II more specifically in the areas of postgraduate education and research in engineering and introducing innovatory approaches to engineering education.

During the SWOT Analysis Workshop, SJCE faculty members, staff, students and alumni openly came out with strengths, weaknesses, opportunities and threats and expressed keenness and unanimity in leveraging strengths & opportunities and overcoming weaknesses & threats to take the institution to greater heights of achievements in engineering education & research.

The management of SJCE, JSS Mahavidyapeetha which was supportive to TEQIP I, is fully supportive of the institute's TEQIP II proposal.

All these have motivated the faculty and management to take the institution to greater heights through TEQIP II and TEQIP III later.

2.4 ACTION PLAN FOR SCALING-UP ENROLMENT INTO MASTERS & DOCTORAL PROGRAMS IN ENGINEERING / TECHNOLOGY AT SJCE

2.4.1 Increasing intake in existing M.Tech Programs & Cost Estimate

Only a very small proportion of engineering graduates opt for postgraduate education & research in engineering partly due to relatively good salary packages and career advancement offered to bright graduates in industry and partly due to industries being not fully aware of the role of R & D in gaining competitive advantage in business. In such an environment, it is not an easy task for SJCE to scale-up PG Education & Research. The action plan as depicted in the table below is based on this scenario and hopefully will bring about the needed changes to make PG Education & Research more attractive.

Sl. No.	Key Activities	Project Months																
		2010	2011				2012				2013				2014			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
Improving the quality & relevance of existing M. Tech Programs																		
1	Revising the curricula of existing 12 MTech Programs in consultation with faculty, experts from industry in workshops & obtaining required approval																	
	Modernizing 12 classrooms for existing M. Tech Programs																	
	Refurbishing existing laboratories for establishing new laboratories/installing new equipment																	
	Procuring equipment and furniture for new laboratories for existing M. Tech Programs																	

Sl. No.	Key Activities	Project Months																
		2010	2011				2012				2013				2014			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
	Procuring learning resources (books, journals, CDs) for existing M. Tech programs revised																
	Identify M. Tech student projects from industry																
	Ensuring student dissertation results in a research publication																
2	Increasing the intake in 11 existing M. Tech Programs from current 18 to 25 each resulting in a total intake of 300 by seeking approval from BOG, VTU & AICTE																
3	Obtaining approval for 50 Teaching Assistantships																
4	Exploring additional Teaching/Research Assistantships																
5	Executing Faculty & Staff Development Plan																
Improving quality & relevance of PhD programs																	
6	Specifying rigorous coursework, regular seminars on progress in research																

Sl. No.	Key Activities	Project Months																
		2010	2011				2012				2013				2014			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
7	Mentoring students at critical stages of research																
8	Exploring Internship Opportunities in industries/institutions in India & abroad																
9	Exploring Joint/ Part-Time/ Integrated PG & PhD programs with industry																
10	Modernizing two classrooms into Research Seminar Rooms																
11	Procuring furniture for research students																
12	Obtaining approval for 15 Ph.D. Research Assistantships																
13	Supporting outstanding students to participate in Conferences/ Programs in India/ abroad																
14	Recruiting additional faculty for guiding increased PhD students																
15	Publicize PG & PhD importance to industry & public in media to create awareness about PG & PhD programs & attract quality students																

2.4.2 Cost Estimate for Increasing intake in existing M.Tech Programs

Sl. No	Description	Quantity Sq. m	Unit Cost lakh Rs.	Total Cost lakh Rs.
1.	**Refurbishment of space for setting new laboratories for existing M. Tech programs (Details in Vol: 1 Annexure 1)**			
	Industrial Electronics	140	0.013	1.82
	Industrial Structures	45	0.013	0.59
	Environmental Engineering	150	0.013	1.95
	Maintenance Engineering	150	0.013	1.95
	Computer Engineering	30	0.013	0.39
	Biomedical, Signal Processing & Instrumentation	70	0.013	0.91
	Software Engineering	30	0.013	0.39
	Engineering Management	270	0.013	3.51
	Networking & Internet Engineering	60	0.013	0.78
	Polymer Science and Technology	500	0.013	6.50
	Energy Systems & Management	200	0.013	2.60
	Health Sciences and Water Engineering	650	0.013	8.45
	Miscellaneous			2.16
	Total			**32.00**
2.	**Equipment for new laboratories in Existing M. Tech Programs (Details in Vol: 1 Annexure 2)**			
	Industrial Electronics			13.0
	Industrial Structures			45.0
	Environmental Engineering			20.0
	Maintenance Engineering			40.0
	Computer Engineering			31.0
	Biomedical, Signal Processing & Instrumentation			35.0
	Software Engineering			27.5
	Engineering Management			50.5
	Networking & Internet Engineering			13.0
	Polymer Science and Technology			49.35
	Energy Systems & Management			26.20
	Health Sciences and Water Engineering			20.00
	Equipment for Modernizing Classroom			22.50
	Total			**393.05**

Sl. No	Description	Quantity Sq. m	Unit Cost lakh Rs.	Total Cost lakh Rs.
3.	**Furniture for new laboratories in Existing M. Tech Programs (Details in Vol: 1 Annexure 3)**			
	Industrial Electronics			0.56
	Industrial Structures			2.54
	Environmental Engineering			0.92
	Maintenance Engineering			1.00
	Computer Engineering			1.75
	Biomedical, Signal Processing & Instrumentation			1.00
	Software Engineering			0.75
	Engineering Management			1.00
	Networking & Internet Engineering			0.56
	Polymer Science and Technology			1.00
	Energy Systems & Management			0.76
	Health Sciences and Water Engineering			1.00
	Furniture for modernizing Classroom			4.80
	Total			**17.64**
4.	**Teaching Assistantships**	35	0.96/year for 4 years	**134.40**

2.4.3 Starting New M. Tech Programs & Cost Estimate

Sl No.	Key Activities	Project Months																
		2010	2010-11				2011-12				2012-13				2013-14			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
1	Assess the demand for the following new M. Tech programs by conducting a demand survey in the industry a. Automotive Electronics b. Bio-Technology																	
2	Design the curriculum for the new M. Tech Programs by conducting a workshop for each program involving experts from industry, faculty from within and outside SJCE. Specify space, equipment, furniture, learning resources, faculty and support staff required																	
3	Refurbishing existing laboratory spaces for establishing laboratories for the new M. Tech programs																	
4	Procuring equipment, furniture, books, journals, computers for laboratories for new M.Tech Programs a. Automotive Electronics b. Bio-Technology																	
5	Exploring additional assistantships for M. Tech students from DST, AICTE, DBT, CSIR and Industry in addition to 50 assistantships under the project																	
6	Conducting awareness workshops on SJCE M. Tech programs to create interest amongst engineering graduates to join the PG programs																	
7	Exploring sponsorship of working engineers from industry for new M. Tech Programs																	
8	Recruiting additional faculty needed a. Automotive Electronics b. Bio-Technology																	
9	Implementing the new M. Tech Programs Offering admission, assistantships/loans to non-GATE qualified students and implementing the new M. Tech Programs																	

2.4.4 Cost Estimate for Starting New M. Tech Programs

Sl. No	Description	Quantity	Unit Cost lakh Rs.	Total Cost lakh Rs.
1.	**Refurbishment of Laboratory Space for new M. Tech programs**	Sq.m		
	Automotive Electronics	100	0.013	1.30
	Bio-Technology	15	0.013	0.19
2.	**Laboratory Equipment for new M. Tech Programs**			
	Automotive Electronics			27.00
	Bio-Technology			29.50
3.	**Furniture for new M. Tech Programs**			
	Automotive Electronics			1.5
	Bio-Technology			1.5
4.	**Teaching Assistantships**	15	0.96/year for 4 years	57.6

2.4.5 Increasing Enrolment in PhD programs & Cost Estimate

Sl #	Key Activities	Project Months																
		2010	2010-11				2011-12				2012-13				2013-14			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
1	Closing in on areas, Research/Projects, research equipment and faculty guides for doctoral research																	
2	Exploring additional assistantships for PhD students from DST, AICTE, DBT, CSIR and Industry in addition to 30 assistantships under the project																	
3	Exploring sponsors for SJCE Doctoral programs highlighting serious shortage of PhDs in engineering/ technology in India and inviting ME/MTech holders to avail the opportunity and join the program																	
4	Identifying SJCE faculty members willing to register for PhD																	
5	Refurbishing existing space to provide working office for research scholars																	
6	Organizing orientation program to PhD students and faculty registrants on the criteria for award of PhD in engineering/ technology																	
7	Procuring books, journals etc., needed by PhD students																	
8	Monitor progress of PhD registrants in their research work																	
9	Sponsoring PhD registrants to participate and present papers in conferences																	

2.4.6 Cost Estimate for Increasing Enrolment in PhD programs

Sl. No	Description	Quantity Sq m	Unit Cost lakh Rs.	Total Cost lakh Rs.
1.	**Refurbishment of Office Space for Research Scholars**			
	Civil Engineering	15	0.013	0.20
	Mechanical Engineering	60	0.013	0.78
	Industrial & Production Engineering	75	0.013	0.98
	Electrical & Electronics Engineering	110	0.013	1.43
	Electronics & Communication	216	0.013	2.81
	Instrumentation Technology	30	0.013	0.39
	Computer Science & Engineering	30	0.013	0.39
	Environmental Engineering	140	0.013	1.82
	Polymer Science & Technology	148	0.013	1.92
	Miscellaneous			0.99
	Total			**11.71**
2.	**Furniture for Research Scholars**			
	Civil Engineering			1.00
	Mechanical Engineering			1.97
	Electrical & Electronics Engineering			0.75
	Electronics & Communication			1.00
	Instrumentation Technology			1.00
	Computer Science & Engineering			0.50
	Environmental Engineering			2.00
	Polymer Science & Technology			0.90
	Biotechnology			0.40
	Total			**9.52**
3.	**Research Assistantships**			
	Civil Engineering			
	Mechanical Engineering			
	Industrial & Production Engineering			
	Electrical & Electronics Engineering	15	1.68/year for 3 yrs	75.60
	Electronics & Communication			
	Instrumentation Technology			
	Computer Science & Engineering			
	Environmental Engineering			
	Polymer Science & Technology			
	Information Science & Engineering			
	Biotechnology			
	Construction Technology & Management			

Sl. No	Description	Quantity Sq m	Unit Cost ` Lakhs Rs.	Total Cost Lakhs Rs.
4.	Reimbursing tuition fees for in-service Ph.D students			
	Civil Engineering			
	Mechanical Engineering	80	0.4	32.0
	Industrial & Production Engineering			
	Electrical & Electronics Engineering			
	Electronics & Communication			
	Instrumentation Technology			
	Computer Science & Engineering			
	Environmental Engineering			
	Polymer Science & Technology			
	Information Science & Engineering			
	Biotechnology			
	Construction Technology & Management			
Total				**128.83**

2.5 ACTION PLAN FOR IMPROVING COLLABORATION WITH INDUSTRY & COST ESTIMATE

SJCE has developed reasonably productive partnership by the efforts of faculty, the training & placement office and the Industry-Institute Interaction Cell. So far the major thrust had been the undergraduate programs covering student training, student projects, industry participation in curriculum design & guest teaching and campus placement. Extending such existing partnerships to newer areas required under TEQIP II such as research, commercialization of innovation, industrial consultancy and joint PG programs will be attempted by undertaking the activities proposed below. This action plan and the next action plan on quantitative and qualitative increase in research by faculty are mutually interdependent. Unless high quality research outputs are produced by SJCE faculty that can be translated into commercial products/services, it is difficult to attract industries to collaborate with the institution. All research need not be in the frontier areas of technology for use by industry. Innovations directed to improve the quality of life of rural populace and differently-able communities also need considerable attention as depicted in the following table showing the bar chart for key activities in this action plan.

Action Plan for Improving Collaboration with Industry & Cost Estimate

Sl. No.	Key Activities	Project Months																
		2010	2010-11				2011-12				2012-13				2013-14			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
1	Creating awareness in industry for PG & PhD students by: a. Assessing the need for PG & PhD students b. Forming Research Consortia in areas of importance to industries for providing a long range thrust to research in making Indian industry competitive c. Identifying research problems d. Translating research findings into practical action e. Sponsoring students for M. Tech & PhD Through workshops at SJCE on above issues involving CII, FICCI & CSIR (One in each year)																	
2	Creating **Research & Innovation Hub** in SJCE campus by establishing a **Knowledge Enclave** with a built-up space to be hired by industries willing to partner with SJCE in its research, education& entrepreneurship development programs.																	

Sl. No.	Key Activities	Project Months																
		2010	2010-11				2011-12				2012-13				2013-14			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
3	Faculty Development through a Customized Program on Exploring Major Funding Sources for Sponsored Research, Interacting with Major Funding Agencies, Developing Competence for Industrial Consultancy, Continuing Education Needs Surveys, Planning Community Outreach Programs and Revenue Sharing Regulations Organizing a 2-week customized faculty development program at SJCE to motivate the faculty to undertake research, identifying problem for research, engineering research methodology, publishing findings, responding to critical reviews, translating research findings into practical actions																	
	Preparing an info booklet to faculty on agencies of the state & central governments (like DST, CSIR, DRDO, DBT, New & Renewable Energy MoEF, AICTE, CSIR) & industry sponsoring R & D& projects/areas for which funding is available																	
	Exploring UG & PG student projects, R & D and Consultancy projects relevant to rural development and differently-able communities through GOK agencies & NGOs																	
4	Organizing a Study Tour for Senior Faculty to IITs & IISc to study their research & consultancy activities, their organization, faculty involvement and incentives for research & consultancy, mechanisms of collaboration with industry & foreign institutions and exploring the possibilities for collaboration/exchange with SJCE																	
5	Exploring collaboration with industries who have signed MOUs with GOK during the recently held Global Investors Meet																	

Sl. No.	Key Activities	Project Months																
		2010	2010-11				2011-12				2012-13				2013-14			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
6	Constituting an Industry & Academic Advisory Group in SJCE to advice on strengthening existing partnerships & building new partnerships with industry																	
7	Increase the number of industry sponsored labs																	
8	Must publish scheduled meetings with CII, FICCI, FKCCI etc. and have increased number of seminars, workshops etc.																	
9	Leverage Alumni network and existing Video-Conference facility for funding, networking, mentoring and participation in curriculum development, lab facilities, industry chairs, adjunct faculty and placements																	
10	Build active relationships with Industry bodies like TIFAC, McKenzie, Forrester, Gartner, NASSCOM, RAND etc., to explore areas of mutual interest in emerging technology																	
11	Organize interaction between Institute faculty & sponsors of R & D, Consultancy and Community Outreach for understanding clients' requirements, resource inputs and progress reporting. Organizing a 2-day workshop involving SJCE faculty & leading Consulting Firms on Consulting Competencies																	

2.5.1 Cost Estimate for Improving Collaboration with Industry

Sl. No	Description	Quantity	Unit CostRs. Lakhs	Total Cost Rs. lakhs
1.	Creating awareness in industry for PG & PhD engineers by: a. Assessing the need for PG & PhD engineers b. Forming Research Consortia in areas of importance to industries for providing a long range thrust to research in making Indian industry competitive c. Identifying research problems d. Translating research findings into practical action e. Sponsoring students for M. Tech & PhD *Through workshops one each year at SJCE on above issues involving with CII, FICCI & CSIR*		1.25/year	5.0
2.	Establishing a "Knowledge Enclave" in SJCE Campus for industries wanting to collaborate/partner with SJCE in education, training, research, consultancy, continuing education, rural development & technology transfer, entrepreneurship development			10.0
3.	Faculty Development through a Customized Program on Exploring Major Funding Sources for Sponsored Research, Interacting with Major Funding Agencies, Developing Competence for Industrial Consultancy, Continuing Education Needs Surveys, Planning Community Outreach Programs and Revenue Sharing Regulations			10.0
4.	Faculty Development through a Study Tour of IISC & IITs and Interaction with their concerned faculty/officers on mobilizing internal revenue generation and mechanisms involved			5.0
5.	Exploring collaboration with industries who have signed MOUs with GOK during the recently held Global Investors Meet			2.5
6.	Constituting an Industry & Academic Advisory Group in SJCE to advice on strengthening existing partnerships & building new partnerships with industry		0.5/year	2.0

Sl. No	Description	Quantity	Unit CostRs. Lakhs	Total Cost Rs. lakhs
7.	Increase the number of industry sponsored labs		0.5/year	2.0
8.	Must publish scheduled meetings with CII, FICCI, FKCCI etc. and have increased number of seminars, workshops etc.		0.5/year	2.0
9.	Leverage Alumni network and existing Video-Conf facility for funding, networking, mentoring and participation in curriculum development, lab facilities, industry chairs, adjunct faculty and placements		0.5/year	2.0
10.	Build active relationships with Industry bodies like TIFAC, McKenzie, Forrester, Gartner, RAND etc., to explore areas of mutual interest in emerging technology		0.5/year	2.0
11.	Organize interaction between Institute faculty & sponsors of R & D, Consultancy and Community Outreach for understanding clients' requirements, resource inputs and progress reporting.		1.0/year	4.0
Total				**46.5**

2.6 QUANTITATIVELY INCREASING & QUALITATIVELY IMPROVING RESEARCH BY FACULTY INDIVIDUALLY, JOINTLY & COLLABORATIVELY

Many faculty members in departments offering UG, PG & PhD programs in engineering/ technology are actively engaged in individual & collaborative research. Translating research findings into practical actions of patenting, developing business plans and attracting venture capital need a big boost. This calls for a change in the academic mindset of faculty to a commercial mindset if we have to survive in a knowledge economy. That research is integral to teaching is yet to be realized by many faculty members. The action plan proposed in following table is an attempt to bring about such a transformation and increase the quality and quantity of research at SJCE. Faculty members and research scholars in the institute are addressing research problems in different areas in Engineering/Technology as shown below:

Sl.No	Name of Dept.	Research Area	Remarks (Sponsor, Cost)
1	All	Engineering education innovation	Details in Vol:1 Annexure 4
2	Mechanical, IP, Civil and Environment Engg.	Vehicle Safety, Urban ecosystem and transportation Engineering.	Details in Vol:1 Annexure 5

Sl. No	Research/Project Area	Dept.	Number of Students	Justification
1	Innovations in Engineering Education	Inter-disciplinary		Innovations in Engineering Education are relevant in the context of changing scenarios in which more and more learning-centric methods of teaching and learning to increase the learning outcomes of students particularly their innovation capabilities
2	Vehicle safety, urban eco-system & transportation planning			This is relevant in the context of increasing urbanization and consequent vehicle density leading to environmental pollution, traffic congestion and accidents. This is an inter-disciplinary area requiring expertise in Civil, Electronics, Mechanical, Environmental Engineering areas.

In addition to the above, faculty members are engaged in certain focused areas of research as shown below:

Sl.no	Name of Dept.	Research Area	Remarks (Sponsor, Cost)
1	Interdisciplinary – Electronics & Communications Engineering and Instrumentation Technology – Primary Departments	**Telemedicine for Rural Healthcare**	COE Proposal will be submitted post TEQIP Sub-component 1.2 Approval **(Details in Vol:1 Annexure 6)**
2	Inter-disciplinary – Civil and Environmental Engineering – Primary Departments	**Mitigation against Natural Disaster**	COE Proposal will be submitted post TEQIP Sub-component 1.2 Approval **(Details in Vol:1 Annexure 7)**

The cost estimates for the proposed two focused research centers namely, Engineering Education Innovation Center (EEIC) and Center for Vehicle Safety, Urban Eco System and Transportation (CVUT) are presented in the following tables. The details about the importance, objectives and proposed action plans for the same are available in Annexure-4 and Annexure-5 respectively.

Cost estimate for Engineering Education Innovation Center (EEIC)

Sl. No	Cost Component	Total Cost (Lakh Rs)
1.	High end Digital interactive Board and accessories	4.00
2.	High end Multimedia System and accessories	1.40
3.	Computer work stations 5 Nos @ Rs. 1.0 Lakhs per unit	5.00
4.	Lego Educational Resource Kits and Arduine inventor kit (Different modules of innovations in engineering)	8.00
5.	Books, Power Backup units, White board, Notice Board, other accessories	3.00
6.	Junior Research fellow @ Rs.0.12 Lakh per month for 4 years	5.76
7.	Laboratory assistant @ Rs.0.08 Lakh per month for 4 years	3.84
Total		**31.00**

Cost estimate for Center for Vehicle Safety, Urban Eco System and Transportation Engineering (CVUT)

Sl. no	Cost Component	Total Cost (Lakh Rs)
1.	Traffic data collection for intersection (hand held equipment)	4.00
2.	Traffic data collection – volume, Class, speed, etc	7.75
3.	Highway capacity, Microscopic traffic simulation, Highway safety analysis, queuing analysis, etc. Software	7.90
4.	Traffic Noise detection equipment	2.25
5.	Data analysis facilities	2.00
6.	Books and contingences	1.50
8.	Junior Research fellow @ Rs.0.12 Lakh per month for 4 years	5.76
9.	Laboratory assistant @ Rs.0.08 Lakh per month for 4 years	3.84
Total		**35.00**

Current Research Areas

Sl. no	Research/Project Area	Area	No. of Students	Justification
1	• Structural Engineering • Earthquake Engineering • Geotechnical Engineering	Civil	15/year	1. Currently 63 Faculty members possessing Doctoral degrees are working in afore mentioned research areas 2. SJCE has produced 57 Ph.Ds till date, out of which 34 are in last 3 years. 3. These areas are thrust areas of research that have national relevance and socio-technological needs 4. Sophisticated laboratory facilities in these research area are available
2	• Nano Electronics • Grid Computing & Cloud Computing • Semi conductor materials • Bio-Sensors	E&C		
3	• Image Processing & Pattern Recognition • Biometrics • Data Mining • Speech Processing	CS		
4	• Blends and Alloys • Composites • Fuel Cells	PST		
5	• Water resources • Eco-Sanitation • Pollutant Transport • Electro Chemical Treatment • Advanced Waste Water Treatment • Bioremediation • Urban Strom water run-off modeling and Management.	ENV		
6	• Cancer biology • Insilico drug designing and development • Microbial pathology • Fermentation and Bioprocess technology • Plant tissue culture of endangered and medicinal plants • Medical and Clinical Biotechnology • Neutraceutical research	BT		

Sl. no	Research/Project Area	Area	No. of Students	Justification
7	• Lean Manufacturing • Composite Materials • Just in time Manufacturing	IP		
8	• High voltage applications for vehicle pollution control • Energy Management • Electrical Drives	EE		
9	• Composite Materials related to wear studies • Vibrations • Tool wear study • Supply Chain Management • Total Quality Management	ME		
10	• Speech signal processing • MEMS • Rehabilitation Engineering • Biomedical Signal Processing	IT		
11	• Neural Network Algorithm • Web Image Retrieval • Medical Image Registration • Natural Language Processing	IS		

Action Plan for Quantitatively increasing & qualitatively improving research by faculty individually, jointly & collaboratively

Sl. No.	Key Activities	Project Months																
		2010	2010-11				2011-12				2012-13				2013-14			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
1	Establishing a Computerized Database to assist faculty & students on Interdisciplinary/ Multidisciplinary UG & PG student projects and PhD problems in engineering/ technology areas of national relevance including green technologies and alternate technologies for sustainable development and design & develop research portal of SJCE																	
2	Organize faculty & research students seminars periodically on recent advances in Engineering and Technology with emphasis on Multi-disciplinary and Inter-disciplinary areas																	
3	Use funding from different agencies including TEQIP phase II grant for modernizing laboratory facility and create Research centers/COEs in inter-disciplinary areas																	
4	Encourage PG & PhD scholars to choose multi-disciplinary research																	
5	Organize customized faculty development program in inter-disciplinary areas of research																	
6	Translate research ideas into action like patenting, product development, start-ups leading to commercialization																	
7	Identifying research needs of industries which have signed MoUs with GOK during the recently held Global Investors' Meet & their collaboration with SJCE.																	

Sl. No.	Key Activities	Project Months																
		2010	2010-11				2011-12				2012-13				2013-14			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
8	Building improved collaboration/ entering into new collaboration with University of Mysore, IISc Bengaluru, IITs, ISRO, CSIR National Laboratories, IIITs to enhance the number of collaborative research projects																	
9	Exploring, initiating, collaborating and exchanging faculty & students with technological universities abroad to pursue global opportunities for collaborative research																	
10	Establishing an incentive scheme for faculty based on their research performance																	
11	Offering Inter-disciplinary electives & projects in UG & PG programs																	
12	Organizing research seminars/ customized faculty development programs on recent advances in Engineering/ Technology highlighting Multi-disciplinary & Inter-disciplinary nature of research																	
13	Procuring state-of-the-art equipment for carrying out research by faculty																	
14	Utilizing the existing the videoconferencing facility to interact with researchers in India & abroad																	
15	Providing Start-up assistance & incubation support for business plans through SJCE - STEP																	

2.6.1 Cost Estimate for Quantitatively increasing & qualitatively improving research by faculty individually, jointly & collaboratively

Sl. No	Description	Quantity	Unit Cost Rs. lakhs	Total Cost Rs. lakhs
1	Establishing a Computerized Database to assist faculty & students on Interdisciplinary/ Multidisciplinary UG & PG student projects and PhD problems in engineering/ technology areas of national relevance including green technologies and alternate technologies for sustainable development		0.25/year	1.0
2	Organize faculty & research students seminars periodically on recent advances in Engineering and Technology with emphasis on Multi-disciplinary and Inter-disciplinary areas		1.0/year	4.0
3	Use funding from different agencies including TEQIP phase II grant for modernizing laboratory facility and create Research centers *a.* Engineering Education Innovation center *b.* Center for Vehicle Safety, Urban eco system and Transportation Engineering			 31.0 35.0
4	Organize customized faculty development program in inter-disciplinary areas of research		0.5/year	2.0
5	Translate research ideas into action like patenting, product development, start-ups leading to commercialization			2.0
6	Enhancement of innovation and research activity in basic science and mathematics		3.0/year	9.0
7	Encouraging research activities in UG Students (Details in Vol: 1 Section 2.6.3)			15.0
Total				**99.00**

2.6.2 Developing research interest among UG students

a. Introducing innovations in UG Program

Innovation is the key to success of any enterprise today including educational institutions. Several advances have been made in the field of educational sciences & technology which can enhance learning outcomes of students. There is need to switch-over from syllabus-centric, teacher-centric & examination centric education system to learning-centric system using problem-based learning, discovery learning, collaborative learning in teams and continuously evaluating student performance in terms of attainment of measurable learning outcomes. The Integrated Teaching Learning Laboratory (ITLL) at Colorado, Purdue School of Engineering Education (i2i), Wares Lab at Virginia Tech are some relevant examples of innovations in engineering education.

Undergraduate engineering education is the foundation on which postgraduate education and research must be built to ensure high quality of research and its commercialization. To attract better students to research & teaching careers, it is therefore necessary to develop research interest during undergraduate programs offered by SJCE by providing opportunities and facilities to students in experiencing design-test-build-evaluate processes of engineering in solving open-ended problems and encouraging them to translate their ideas into marketable products/services. SJCE experience in involving UG students in Industry Sponsored Projects like PACE (GM, Siemens, Autodesk, Altair), Bosch-Rexroth Industrial Automation and Nokia indicate that UG students can develop research aptitude through such Innovations.

The action plan proposed in the following table is to make a beginning in this direction. Vol:1-Annexure 4 contains more details of the Engineering Education Innovation Centre proposed to be established under this project. The major challenge is the switching-over process and the resources availability.

b. Summer Program on Innovative Engineering Projects for UG students

A 6-week program during summer vacation each year will be conducted to selected UG students (about 5 from each branch) of SJCE showing interest in research/ innovation/teaching. Invited faculty members from INFOSYS leadership institute, NITs, IISc/IITs/NID will also be invited to provide course inputs on:

a. Importance of Engineering R & D and Innovation for Economic Growth
b. Engineering Design - The Iterative Processes of Design, Test & Build in Engineering; Reverse Engineering; Aesthetics & Ergonomics in Design
c. Engineering Analysis
d. Testing, Measurements & Instrumentation
e. Computer Applications in Engineering Design
f. Working in Teams
g. Oral, Written & Graphic Communication
h. **Project** – A team of 5 students (Total about 12-15 teams) will choose an open-ended problem the solution of which requires a combination of knowledge gained from course inputs and hands-on experience in SJCE laboratories & workshops. One to two faculty members of SJCE will facilitate the students in solving the problem and the technical support staff will assist the students in fabrication, testing, measurements, instrumentation. The college will provide the required materials, tools and computer facilities needed by students. The facilitating faculty teams will monitor the progress on a weekly basis.

The final output from each team will be displayed in a room. Experts from industry will review the work of students. Highly commended projects will be rewarded.

The summer program experiences will be posted on the SJCE Website.

Action Plan for developing research interest among UG students

Sl. No.	Key Activities	Project Months																
		2010	2010-11				2011-12				2012-13				2013-14			
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
1	Conducting a 6-wk summer program on Innovative Engineering Projects to selected UG students (5 from each branch) of SJCE showing interest in research/ innovation/ teaching. (Annex 9 gives a summary)																	
2	Providing Travel Grants to UG students for presenting their Research & Innovation in conferences and seminars																	
3	*Introducing innovations in UG programs of SJCE* a. Organizing and conducting a national conference on Innovations in Engineering Education b. Creating awareness in faculty & industry on the Learning Outcomes Approach to Curriculum Design & Implementation c. Preparing and distributing a Manual on Learning Outcomes-based Curriculum, Teaching Learning Activities and Student Performance Evaluation for use by the faculty. d. Designing UG Curricula based on Learning Outcomes Approach e. Introducing a Project-Based Learning Elective Course in which 1st & 2nd Semester students choose interdisciplinary, open-ended problems that stimulate innovative & out-of-the-box thinking. f. Validating, implementing & evaluating the curricula																	

Sl. No.	Key Activities	Project Months															
		2010	2010-11				2011-12				2012-13				2013-14		
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
4	Utilizing the existing Videoconferencing facility for mentoring students by industry/alumni	■	■	■	■												
5	Establishing an Engineering Education Centre (EEIC) in SJCE			■	■	■	■	■									
6	Procuring EEIC equipment							■	■								
7	Recruiting faculty & staff for EEIC			■	■	■	■										
8	Organizing a Study Tour for SJCE faculty to Purdue School of Engineering Education, Ware Lab in Virginia Tech & ITLL at College of Engineering & Applied Science, University of Colorado(4mm)			■													
9	Select & depute SJCE faculty for acquiring PhD in Engineering Education at Purdue(2) & Virginia Tech(1)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
10	Providing consultants (6 person months) from institutions mentioned above				■								■				

2.6.3 Cost Estimate for developing research interest among UG students

Sl. No	Description	Quantity Sq.m	Unit Cost lakhs Rs.	Total Cost lakhs Rs.
1.	Conducting a summer program on Innovative Engineering Projects		1.0/year	4.0
2.	Providing Travel Grants to UG students for presenting their Research & Innovation in conferences and seminars		2.0/year	8.0
3.	Introduce Innovation in UG engineering education through an Engineering Education Innovation Center – a) Introduce an introductory course on innovation in Engineering for first year UG students b) Switch-over to learning-centric approach based on learning-outcomes Workshops for developing curriculum for the course and learning centric approach (Details in Vol:1 Annexure 4)		0.75/workshop for 4	3.0
Total				**15.0**

2.6.4 Collaborating with Indian & foreign institutions in academic and research area through MOUs

In order to strengthen the existing research interactions and collaborative activities with industries and research institutions many activities are proposed. The key activities are listed in the table below

Action Plan for Collaborating with Indian & foreign institutions in academic and research area through MOUs

Sl. No.	Key Activities	Project Months																		
		2010	2010-11				2011-12				2012-13				2013-14					
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48			
1	Prepare a booklet to the faculty of the institute on agencies of the state & central governments (like DST, CSIR, ISRO, DRDO, DBT, Ministry of New & Renewable Energy, MoEF, AICTE, UGC) and industry sponsoring R & D and the projects/areas for which funding is available and distribute it to all the faculty members of the institute.																			
2	Invite more researchers from other institutions, execute formal MOUs with them and encourage cross-leveraging of research interests																			
3	Strengthen existing partnerships and building new partnerships between SJCE and Government Organizations, NGOs to explore UG & PG student projects, Consultancy Assignments and R & D projects relevant to the rural and more challenged communities.																			
4	Strengthen & expand collaboration and exchanges of faculty with higher institutions of learning & research like universities, IISc, IITs, CSIR National Laboratories & IIITs to enhance the quality & quantity of SJCE research, consultancy and continuing education outputs.																			
5	Explore, initiate, collaborate and exchange faculty & students with technological universities abroad to pursue global opportunities for SJCE students & faculty																			
6	Share SJCE library with industry and other academic institutions																			
7	Expose faculty obtaining all qualifications from SJCE to other institutions of higher-education and research through existing mechanisms																			
8	Organize Inter-collegiate Project exhibition and Competition																			

2.6.5. Cost Estimate for Collaborating with Indian & foreign institutions in academic and research area through MOUs

Sl. No	Description	Quantity	Unit Cost lakh Rs.	Total Cost lakh Rs.
1.	Prepare a booklet to the faculty of the institute on agencies of the state & central governments (like DST, CSIR, ISRO, DRDO, DBT, Ministry of New & Renewable Energy, MOEF, AICTE, UGC) and industry sponsoring R & D and the projects/areas for which funding is available and distribute it to all the faculty members of the institute.			1.5
2.	Invite more researchers from other institutions, execute formal MOUs with them and encourage cross-leveraging of research interests		0.75/year	3.0
3.	Strengthen existing partnerships and building new partnerships between SJCE and Government Organizations, NGOs to explore UG & PG student projects, Consultancy Assignments and R & D projects relevant to the rural and more challenged communities.		0.5/year	2.0
4.	Strengthen & expand collaboration and exchanges of faculty with higher institutions of learning & research like universities, IISc, IITs, CSIR National Laboratories & IIITs to enhance the quality & quantity of SJCE research, consultancy and continuing education outputs.		0.5/year	2.0
5.	Explore, initiate, collaborate and exchange faculty & students with technological universities abroad to pursue global opportunities for SJCE students & faculty		2.0/year	8.0
6.	Share SJCE library with industry and other academic institutions		-	0.0
7.	Expose faculty obtaining all qualifications from SJCE to other institutions of higher-education and research through existing mechanisms		1.0/year	4.0
8.	Organize Inter-collegiate Project exhibition and Competition		2.0/year	8.0
Total				**28.50**

2.7. ACTION PLAN FOR FACULTY DEVELOPMENT (FIRST 18 MONTHS)

2.7.1. Training Needs Analysis Summary

All the faculty filled in the TNA proforma (for first 18 months of the project) given in the PIP document (Original forms enclosed in Vol:4). These were scrutinized by a committee headed by the Principal with senior faculty members.

Many inputs received for acquiring training in international and national programs have been deferred keeping the project budgetary constraints in view. Out of the remaining, provisions have been made for 31 international and 95 national training programs for faculty members in 98 subject areas covering Subject / domain knowledge improvement, Research & Development, Management areas and attending relevant Workshops and Conferences.

In addition, all faculty members of the college will attend in-house training programs in Basic and Advanced Pedagogy to be organized by NPIU/SPFU.

Figure below shows the distribution of Faculty Training programs – Area-wise. 47% and 41% are in the areas of Subject/Domain Knowledge Improvement & Research & Development respectively. This is in conformity with the major project objectives of Scaling up PG Education & Research.

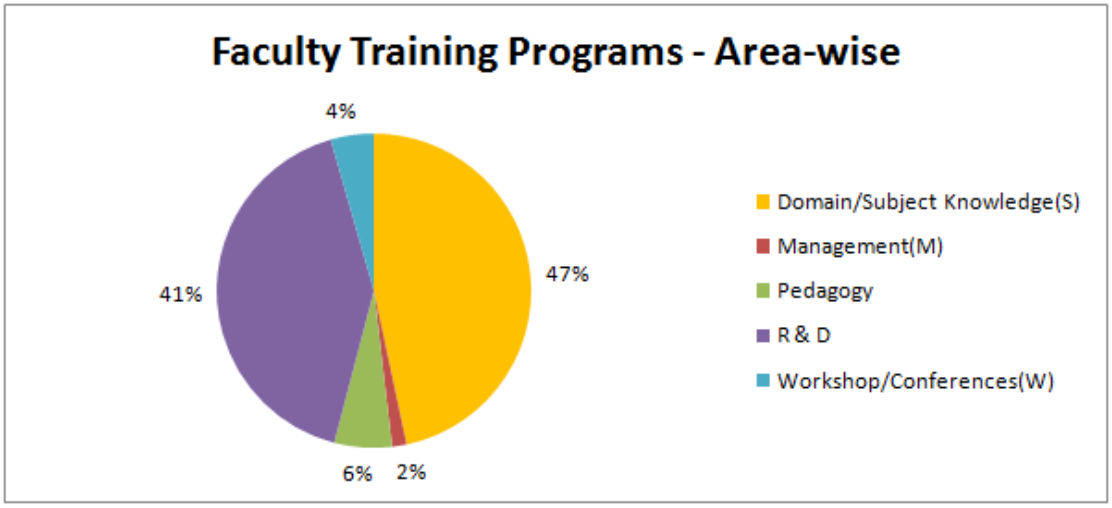


Figure in the next page shows the distribution of Faculty Training program on the basis of Person Days of training. This chart shows that 58% of the faculty training person days is in the area of Pedagogy followed by 21% in Subject/Domain Knowledge Improvement and 18% in Research & Development areas. This is in conformity with the project objective of Qualitative Improvement of Engineering Education at SJCE.

All the Staff members filled in the TNA proforma (for first 18 months of the project) given in the PIP document (Original forms enclosed in Vol:4). These were scrutinized by a committee headed by the Principal with senior Faculty and Administrative officer..

The training programs have been selected keeping in view the budgetary constraints and the need of the institution to train Staff members in different functional. 39 training programs have been proposed for the technical support staff members keeping in view their individual needs and the institutional needs of operation and maintenance of laboratory equipment.

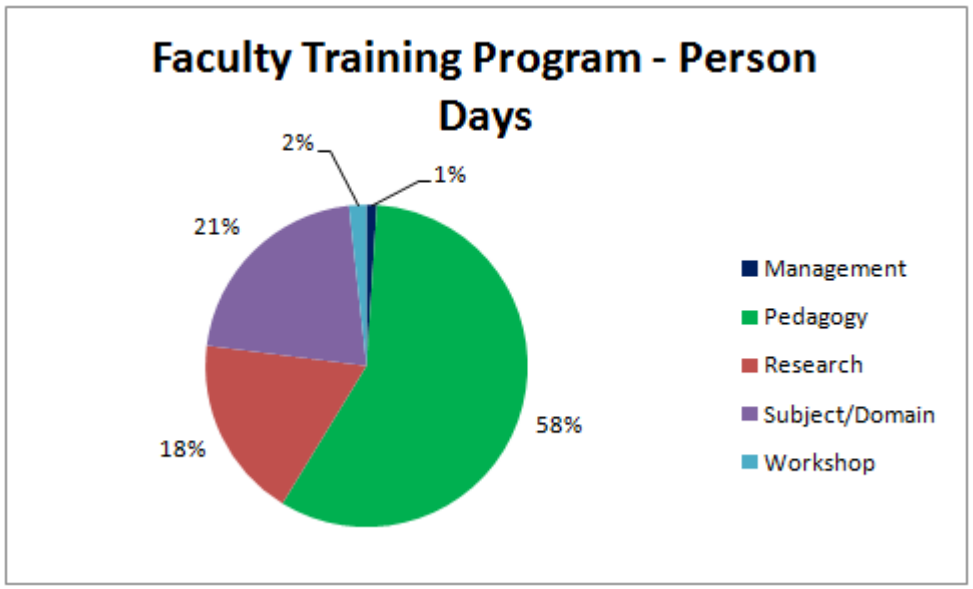
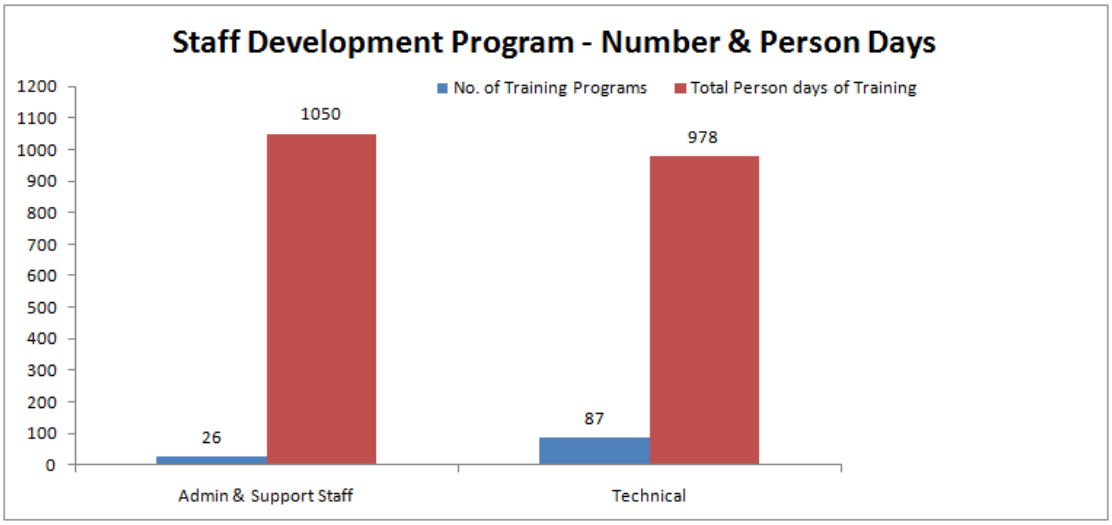


Figure below shows the distribution of Staff Development program on the basis of number of training programs and Person Days of training.



2.7.2. Faculty Development Plan for first 18 months

2.7.2.1. Plan for Training in Basic Pedagogy

All 235faculty members of SJCE have indicated willingness to participate in this training to be organized by NPIU/SPFU. The training provider to be selected for conducting the program at SJCE may be requested to consider the following suggestions in designing and implementing the program.

1) As the participant batches will be discipline-wise, examples from related disciplines should be provided during explanation of pedagogical principles
2) The experiences of using learning-outcomes approach in higher education especially in Engg. Education may be presented as case-studies during the program

Sl. No	Training in Basic Pedagogy	Category (S, R, M, W)	Number of			Project Months																
						2010	2010-11				2011-12				2012-13				2013-14			
			Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
1	Batch 1 (Civil + CTM)	-	25	7	175																	
2	Batch 2 (Env + BT)	-	25		175																	
3	Batch 3 (CS + IS)	-	30		210																	
4	Batch 4 (Mech+IP+PST)	-	30		210																	
5	Batch 5 (E&C)	-	25		175																	
6	Batch 6 (IT + EE)	-	30		210																	
7	Batch 7 (Phy+Chem+Maths)	-	30		210																	
8	Batch 8 (Others)	-	30		210																	

2.7.2.2 Cost Estimate for Training in Basic Pedagogy

Sl. No	Description	Quantity (person days)	Unit Cost lakh Rs.	Total Cost lakh Rs.
1.	The Basic Pedagogy Training will be provided by SPFU	1645	-	-

2.7.2.3 Plan for Training in Advanced Pedagogy

All 235faculty members of SJCE have indicated willingness to participate in this training to be organized by NPIU/SPFU. The training provider to be selected for conducting the program at SJCE may be requested to consider the following suggestions in designing and implementing the program.

1) Applications of educational technology while teaching discipline-wise subjects should be demonstrated during the program
2) A project to be attempted by a team of 4-5 teachers to design a learning package should be a part of the program

Sl No	Branch Training in Advanced Pedagogy	Category (S, R, M, W)	Number of			Project Months														
						2010	'11				'12				'13				'14	
			Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
1	Batch 1 (Civil + CTM)	-	25	7	175																
2	Batch 2 (Env + BT)	-	25		175																
3	Batch 3 (CS + IS)	-	30		210																
4	Batch 4 (Mech + IP + PST)	-	30		210																
5	Batch 5 (E&C)	-	25		175																
6	Batch 6 (IT + EE)	-	30		210																
7	Batch 7 (Phy + Chem + Maths)	-	30		210																
8	Batch 8 (Others)	-	30		210																

2.7.2.4 Cost Estimate for Training in Advanced Pedagogy

Sl. No	Description	Quantity	Unit Cost ` lakhs	Total Cost ` lakhs
1.	The Advanced Pedagogy Training will be provided by SPFU	1645	-	-

2.7.3 Plan for Subject/Domain Knowledge Enhancement (S)/ Research, Consultancy & Continuing Education Capabilities Enhancement (R)/ Scaling-up Qualifications/ Participation in Conferences/Seminars/Workshops (W)/ Management Training (M)

Sl. No.	Branch / Training Subject Area (I – denotes International Training)		Category (S, R, M, W)	Number of			Project Months																
							2010	2010-11				2011-12				2012-13				2013-14			
				Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
1.	IT	Bio Devices and MEMS	R	1	15	15																	
2.	IT	Signal Processing (I)	S	1	10	10																	
3.	IT	Real time Signal processing	S	3	15	45																	
4.	IT	Speech Processing	R	1	15	15																	
5.	IT	Advanced Medical Applications using MIMICS Software	R	1	15	15																	
6.	IT	PLC Training	S	1	15	15																	
7.	IT	Soft skill training program	M	1	15	15																	
8.	BT	Advanced Biofuel Technologies (I)	R	1	10	10																	
9.	BT	Bioperl and Biojava	S	1	15	15																	

Sl. No.	Branch / Training Subject Area (I – denotes International Training)		Category (S, R, M, W)	Number of			Project Months															
							2010	2010-11				2011-12				2012-13				2013-14		
				Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
10.	BT	HACCP (I)	R	1	10	10																
11.	BT	Plant cell culture	S	1	08	08																
12.	CV	New data sources to support flood modeling (I)	R	1	10	10																
13.	CV	Foundation Failures and Remedial Measures	R	1	7	7																
14.	CV	Structural Engineering (I)	S	1	10	10																
15.	CV	Managing construction site	S	1	7	7																
16.	CV	Repair, Rehabilitation and Retrofitting of buildings – Diagnosis & Preventive actions	S	1	7	7																
17.	CV	Leakages of water proofing treatment in Buildings	R	1	7	7																
18.	CV	GIS (I)	S	1	10	10																
19.	CV	Computer Aided Drafting	S	1	15	15																

Sl. No.	Branch / Training Subject Area (I – denotes International Training)		Category (S, R, M, W)	Number of			Project Months															
							2010	2010-11				2011-12				2012-13				2013-14		
				Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
20.	CV	Development of Infrastructural Facilities (I)	R	1	10	10																
21.	CV	Flexible pavements and overlays – Design, construction and maintenance	R	1	7	7																
22.	CV	Used water management	S	1	8	8																
23.	CTM	Managing construction site (with construction site unit)	R	1	7	7																
24.	CTM	Self Compacting Concrete Technology	S	1	7	7																
25.	CTM	Structural Steel Design	S	1	7	7																
26.	CTM	Executive course in disaster management (I)	S	1	10	10																
27.	CS	Abstract Models of Computation	R	5	7	35																
28.	CS	Effective implementation of curriculum	S	2	7	14																
29.	CS	Network administration	S	4	7	28																

Sl. No.	Branch / Training Subject Area (I – denotes International Training)		Category (S, R, M, W)	Number of			Project Months															
							2010	2010-11				2011-12				2012-13				2013-14		
				Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
30.	CS	Research methodology	S	2	10	20																
31.	CS	SANS: Intrusion detection in depth (I)	R	1	10	10																
32.	CS	Artificial Intelligence, pattern recognition Image Processing (I)	W	2	10	20																
33.	CS	Digital Image processing	S	1	7	7																
34.	CS	Neural Networks	R	2	7	14																
35.	CS	Signal processing applications with speech and speaker recognition	R	1	7	7																
36.	CS	Speech Processing	R	2	15	30																
37.	CS	Network security	S	2	7	14																
38.	CS	Computer forensic essentials , investigations & incident response (I)	R	1	10	10																

Sl. No.	Branch / Training Subject Area (I – denotes International Training)		Category (S, R, M, W)	Number of			Project Months																
							2010	2010-11				2011-12				2012-13				2013-14			
				Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
39.	CS	Automatic Speech & Understanding (I)	R	1	10	10																	
40.	CS	Business Intelligence and Data Mining	R	1	7	7																	
41.	CS	Wireless Communications	S	1	7	7																	
42.	CS	Biometrics (I)	R	1	10	10																	
43.	CS	Mobile Computing	S	1	7	7																	
44.	EC	LABVIEW and virtual Instrumentation	S	2	15	30																	
45.	EC	Wireless networks and broadband	S	2	7	14																	
46.	EC	Advanced Wireless networks	S	1	15	15																	
47.	EC	Medical image analysis and diagnostic systems (I)	W	1	10	10																	
48.	EC	Digital Signal Processing	S	1	7	7																	
49.	EC	Modeling and simulation of composite materials	R	1	15	15																	

Sl. No.	Branch / Training Subject Area (I – denotes International Training)		Category (S, R, M, W)	Number of			Project Months																
							2010	2010-11				2011-12				2012-13				2013-14			
				Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
50.	EC	Wireless Networks CISCO	S	1	7	7																	
51.	EC	Underground signal characterization (I)	R	1	10	10																	
52.	EC	Biometrics	R	1	15	15																	
53.	EC	Nanoelectronics	R	1	15	15																	
54.	EC	CISCO Network security	S	1	15	15																	
55.	EC	Network security	S	1	7	7																	
56.	EC	Development and fabrication of advanced nano-composites (I)	R	1	10	10																	
57.	EC	Modeling and simulation of composite materials	R	1	15	15																	
58.	EE	Lab Experiments on Sensors, Transducers and Measurements	S	1	7	7																	
59.	EE	Occupational Health and Safety Issues, Issues and	S	1	7	7																	

Sl. No.	Branch / Training Subject Area (I – denotes International Training)		Category (S, R, M, W)	Number of			Project Months															
							2010	2010-11				2011-12				2012-13				2013-14		
				Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
		Concepts																				
60.	EE	Energy management and distribution reforms and acts	R	1	7	7																
61.	EE	Applied Power Electronics (I)	W	1	10	10																
62.	EE	Effective Curriculum Implementation	S	1	7	7																
63.	ENV	ENVIRONMENTAL ECONOMICS	R	1	15	15																
64.	ENV	AERMOD, Air dispersion modeling (I)	R	1	10	10																
65.	ENV	Design, O & M of Water Supply Systems	R	2	7	14																
66.	ENV	Water GEMS; Sewer GEMS; Storm CAD (I)	S	1	10	10																
67.	ENV	Ecological Sanitation Health & Hygiene aspects Of humanure and urine (I)	R	1	10	10																
68.	ENV	Water Environment law and application	S	1	7	7																

Sl. No.	Branch / Training Subject Area (I – denotes International Training)		Category (S, R, M, W)	Number of			Project Months																
							2010	2010-11				2011-12				2012-13				2013-14			
				Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
69.	ENV	Clean Devalopment Mechanism (CDM) projects for waste Management& utilization sector	R	1	7	7																	
70.	ENV	Applied ground water modeling (I)	R	1	10	10																	
71.	ENV	Water Distribution Design & Modeling	R	1	12	12																	
72.	IP	TRIZ problem solving methods and analysis using Lean approach	R	2	7	14																	
73.	IP	Proplanner And Work Study Professional Training	S	3	15	45																	
74.	IP	ANSYS design modeling and Mechanical dynamics (I)	R	1	10	10																	
75.	IP	Customization and RoboCAD, advanced modeling and Kinematics (I)	S	1	10	10																	
76.	IP	Design Modular, ANSYS Fluent	S	3	7	21																	
77.	IS	Soft computing	R	1	15	15																	

Sl. No.	Branch / Training Subject Area (I – denotes International Training)		Category (S, R, M, W)	Number of			Project Months															
							2010	2010-11				2011-12				2012-13				2013-14		
				Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
78.	IS	Image Processing and remote sensing	R	1	7	7																
79.	IS	Artificial Intelligence (I)	W	1	10	10																
80.	IS	Linux Administration	S	1	7	7																
81.	IS	Professional Development	M	1	7	7																
82.	IS	Biometrics (I)	R	1	10	10																
83.	MECH	Quality, Reliability and Maintenance	S	1	15	15																
84.	MECH	Metallurgy (I)	R	1	10	10																
85.	MECH	Excellence in Business	S	1	7	7																
86.	MECH	Finite element Analysis using Hyper Works	S	1	15	15																
87.	MECH	Rapid prototyping	S	3	7	21																
88.	MECH	Management	M	1	7	7																

Sl. No.	Branch / Training Subject Area (I – denotes International Training)		Category (S, R, M, W)	Number of			Project Months																
							2010	2010-11				2011-12				2012-13				2013-14			
				Faculty	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	
89.	MECH	Materials selection (I)	S	1	10	10																	
90.	MECH	Renewable energy (I)	R	1	10	10																	
91.	MECH	Research Methodology	S	1	7	7																	
92.	MECH	DMC Composite material characterization and analysis	S	1	15	15																	
93.	PST	Polymer Alloys, blends and composites	R	2	7	7																	
94.	PST	Rubber Compounding and Processing (I)	R	1	10	10																	
95.	PST	Mold flow	S	1	14	14																	
96.	PST	Plastic product and mold design	R	1	7	7																	
97.	PST	Rapid Prototyping	S	2	7	14																	
98.	PST	Rubber Processibility and Dynamic Properties (I)	R	1	10	10																	

2.7.3.1 Cost Estimate for Faculty Development Program

Sl. No	Department	National - No .of Training	National Person Days	Estimated Cost @ 0.02 lakh Rs./ person days	International - No .of Training / conference / workshops	International Person days	Estimated Cost @ 1.5 lakh Rs. per program
1	**Instrumentation Technology**	**9**	**120**	2.40	**1**	10	1.5
2	**Information Science & Engg.**	**5**	**36**	0.72	**2**	20	3.0
3	**Electrical Engineering**	**4**	**28**	0.56	**1**	10	1.5
4	**Industrial Production**	**7**	**80**	1.60	**2**	20	3.0
5	**Mechanical Engineering**	**9**	**87**	1.74	**3**	30	4.5
6	**Computer Science & Engineering**	24	190	3.80	6	60	9.0
7	**Electronics & Communication**	13	155	3.10	3	30	4.5
8	**Civil Engineering**	7	58	1.16	4	40	6.0
9	**Construction Technology**	2	21	0.42	1	10	1.5
10	**Environmental Engineering**	6	55	1.10	4	40	6.0
11	**Bio Technology**	**3**	**23**	0.46	**2**	20	3.0
12	**Polymer Science & Technology**	**6**	**42**	0.84	**2**	20	3.0
Total		**95**	**895**	**17.90**	**31**	**320**	**46.5**

Total Faculty Development Cost Estimate = 17.90 + 46.50 = 64.40 lakh Rs.

2.8 ACTION PLAN FOR STAFF DEVELOPMENT IN FUNCTIONAL AREAS AND COST ESTIMATES (FOR 18 MONTHS)

Sl. No.	Branch	Training Subject Area	Category (P, T)	Number of			Project Months																	
							'10	'11				'12				'13				'14				
				Staff	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48		
1	IT	Hardware and Networking	T	2	7	14																		
2	IT	Basic Electronics Equipment Maintenance	T	2	7	14																		
3	IS	Networks	T	1	15	30																		
4	IS	Red Hat Certified Engineering (RHCF)	T	1	15	30																		
5	IS	Computer hardware and Networking	T	1	15	15																		
6	EE	Lab maintenance	T	6	7	42																		
7	EE	Computer Skill	T	1	7	7																		
8	Mech	Hydraulics and Pneumatics	T	2	15	30																		
9	Mech	Basic Computer	T	4	15	60																		
10	Mech	Computer Hardware & Networking	T	2	15	30																		
11	CS	PC Hardware & Networking	T	4	10	40																		

Sl. No.	Branch	Training Subject Area	Category (P, T)	Number of			Project Months																		
							'10	'11				'12				'13				'14					
				Staff	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48			
12	CS	VB & .NET	T	6	15	90																			
13	CS	Oracle 11g DBA	T	3	15	45																			
14	EC	Office automation	T	3	7	21																			
15	EC	Networking	T	2	7	14																			
16	EC	Internet awareness	T	2	7	14																			
17	CIV	Mason	T	4	15	60																			
18	CIV	Plumbing service	T	3	15	45																			
19	CIV	NDT of structures	T	2	7	14																			
20	CIV	Computer awareness	T	2	15	30																			
21	CIV	CAD	T	1	15	15																			
22	CTM	Basic Computer	P	1	15	15																			
23	CTM	CAD	T	1	15	15																			

Sl. No.	Branch	Training Subject Area	Category (P, T)	Number of			Project Months																	
							'10	'11				'12				'13				'14				
				Staff	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48		
24	ENV	Handling and Operation of GC, HPLC, Plasma and other higher equipments	P	3	14	42																		
25	BT	Basic computer awareness	T	1	15	15																		
26	BT	Personality development	P	1	15	15																		
27	BT	Bio Instrumentation	T	1	15	15																		
28	PST	Plastic Injection Moulding Theory & Practice	T	1	7	7																		
29	PST	Injection moulding and blow molding process	T	1	7	7																		
30	PST	Office automation	P	3	15	45																		
31	IP	Robotics	T	2	15	30																		
32	IP	Proplanner	T	2	7	14																		
33	IP	Workstudy	T	1	7	7																		
34	CHEM	Office automation	T	3	7	21																		
35	CHEM	Communication skill	P	2	7	14																		

Sl. No.	Branch	Training Subject Area	Category (P, T)	Number of			Project Months																	
							'10	'11				'12				'13				'14				
				Staff	Days	Person Days	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48		
36	PHY	Office automation	T	3	7	21																		
37	PHY	Communication skill	P	2	7	14																		
38	MATH	Office automation	T	2	7	14																		
39	MATH	Communication skill	P	1	7	7																		
40	ADMN	Administration	M	60	7	420																		
41	ADMN	Soft skills /Personality Development	P	60	7	420																		
42	ADMN	Library automation	T	10	7	70																		
43	ADMN	Finance Management	M	10	7	70																		
44	ADMN	Computer Training	T	60	7	420																		

2.8.1 Cost Estimate for Staff Development (Technical)

Sl. No	Department	Technical Training Need		
		No .of Training	Person Days	Estimated Cost @ 0.01 lakh Rs. / person days
1	Instrumentation Technology	4	28	0.28
2	Information Science & Engg.	5	75	0.75
3	Electrical Engineering	7	49	0.49
4	Industrial Production	5	51	0.51
5	Mechanical Engineering	13	120	1.2
6	Computer Science & Engineering	15	175	1.75
7	Electronics & Communication	7	49	0.49
8	Civil Engineering	6	164	1.64
9	Construction Technology	6	30	0.3
10	Environmental Engineering	7	42	0.42
11	Bio Technology	3	45	0.45
12	Polymer Science & Technology	9	59	0.59
Total		**87**	**978**	**9.78**

Total Staff Development (Technical) – Cost Estimate = 9.78 lakh Rs.

2.8.2 Cost Estimate for Administrative Finance and Support staff

Sl. no	Training areas	Administrative, Finance and Support staff Training Need				
		No .of Training	Duration of Training in days	No of Person days per batch of 30	Estimated Cost per programme in lakh Rs.	Estimated Total Cost in lakh Rs.
1	Administration	4	7	210	0.40	1.60
2	Soft skills /Personality development	5	7	210	0.50	2.50
3	Library automation	4	7	210	0.50	2.00
4	Finance Management	3	7	210	0.75	2.25
5	Computer Training	10	7	210	0.20	2.00
Total		**26**	**35**	**1050**		**10.35**

Total Staff Development (Administrative/Finance/Support) - Cost Estimate = 10.35 Lakh Rs.

2.8.3 Cost estimate for Total Faculty and Staff Development

Cost estimate for 0-18 months

Sl No	Category of Staff	No. Of Training Programs	No. of person days	Estimated total Cost In ` lakh
1	Faculty	98	1205	64.40
2	Technical	39	978	9.78
3	Administrative and Support	5	1050	10.35
	Total	**142**	**3233**	**84.53**

Total estimated cost of Training Need for the project period

(Projected estimate for 19-48 months of the project is based on extrapolation)

Sl. No	Project period	Estimated cost in lakh Rs.
1	0-18 Months	84.53
2	19-48 Months (projected)	112.70
Total		**197.23**

2.9 RELEVANCE & COHERENCE OF IDP WITH KARNATAKA INDUSTRIAL/ ECONOMIC DEVELOPMENT PLAN

Karnataka's share in National GDP is around 6%. The character of the state economy has drastically changed from primarily agrarian in 1956 towards industrial & service economy in 2010.GOK'sVision(http://www.karunadu.gov.in/spb/Documents/KVD15th%20Jan%20English.pdf) is to develop a vibrant knowledge society and achieve a sustainable and orderly process of industrialization by enhancing human capabilities.

The document expresses the need to build excellence in its entire education system with thrust on improvements in quality and relevance of content and delivery at all levels with systemic improvements like credit transfer, synergy between research & teaching, flexibility in choice of courses within the institution and across institutions including universities abroad through exchange of students (shift from *plate meal* approach to *cafeteria* approach) emphasizing the need for cross-disciplinary courses, evaluating students continuously on the basis of understanding & application of knowledge and academia-industry interface and building centres of excellence in the higher education system.

Karnataka has also created a niche for itself in knowledge intensive sectors such as space technology, electronics, IT & BT. But application of knowledge to agriculture, rural development, SME sector and health sector to improve the quality of lives of its people are immediately needed.

The document indicates a number of areas in which research problems lie and the solutions of which may lead to well being of the people of the state.

Karnataka Industrial Policy 2009-14 intends to build a prosperous Karnataka through development of human and natural resources in a systematic, scientific and sustainable manner. It aims to provide additional employment for about 10 lakh persons by 2014 attracting Rs. 3,00,000 crores of investment and enhance the contribution of manufacturing sector to the State's GDP from the current level of 17% to 20% by 2014 focusing on skill and entrepreneurship development. It plans to set up zones specific to Aerospace, Foundry, Machine Tools & Hitech Manufacturing, Steel and Cement, IT & BT, Food Processing, Automobile, Textiles & Garments, Pharmaceuticals, Power Generation and Media & Entertainment industries. Investment needed on infrastructure development (irrigation+) in Karnataka is estimated at Rs. 92,462 crore, Rs. 1,86,275 crore & Rs. 3 ,15,657 crore during 11^{th} ,12^{th} & 13^{th} Plans.

The recently concluded Global Investors' Meet has attracted investment of nearly Rs. 5,00,000 crores with an employment potential of one million jobs. SJCE will interact with GoK and the industries who have signed MOUs to get their collaboration and support in education, training, research and consultancy.

Availability of skilled human resources including trained technical manpower in engineering and technology is major reason for growing investments in the state. In this context, technical education system has a key role and more particularly SJCE which has developed a brand image over the last 47 years of its existence. The institution availed every opportunity available through GOI, GOK and recently through TEQIP-I to continuously improve the quality of education by strengthening its infrastructure, upgrading the faculty qualifications and creating improved facilities for students.

Therefore, selection of SJCE under TEQIP 2 will benefit the students in improving the quality of their learning & better employment and faculty in increasing their competence in teaching & research and the staff in rendering improved quality of services to students and faculty. All these will transform SJCE into a World Class Engineering Institution thereby serving the people of Karnataka, India and the world at large.

2.10 PARTICIPATION OF DEPARTMENTS/FACULTY IN IDP PREPARATION AND IMPLEMENTATION

The Principal and all faculty members and staff of the institute participated in the SWOT Analysis workshops as described in the SWOT report (Vol:3). Five faculty members constituting the core group assisted the Principal in deriving the Institution Development Proposal through a continual sittings lasting for nearly a month with inputs provided by the SWOT Consultant. During this exercise all the department heads & faculty members presented their own proposals for the project and assisted the principal in getting valuable data and information. The staff of the institute cooperated in providing the required institutional information for the IDP. Details are available in Vol:1 section 2.2 SWOT Analysis methodology section

Principal addressing the faculty on preparation for SWOT analysis

Discussion among Faculty from E&C department

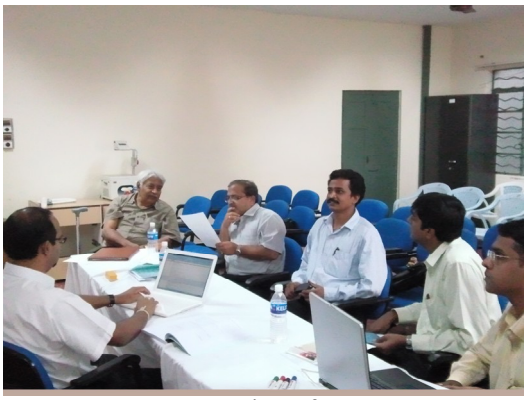
Principal and faculty of IP department

Dean (academics) and faculty of Civil engineering

Administrative Staff

Technical Staff

Consultants, Principal and Supporting staff



Preparation of IDP

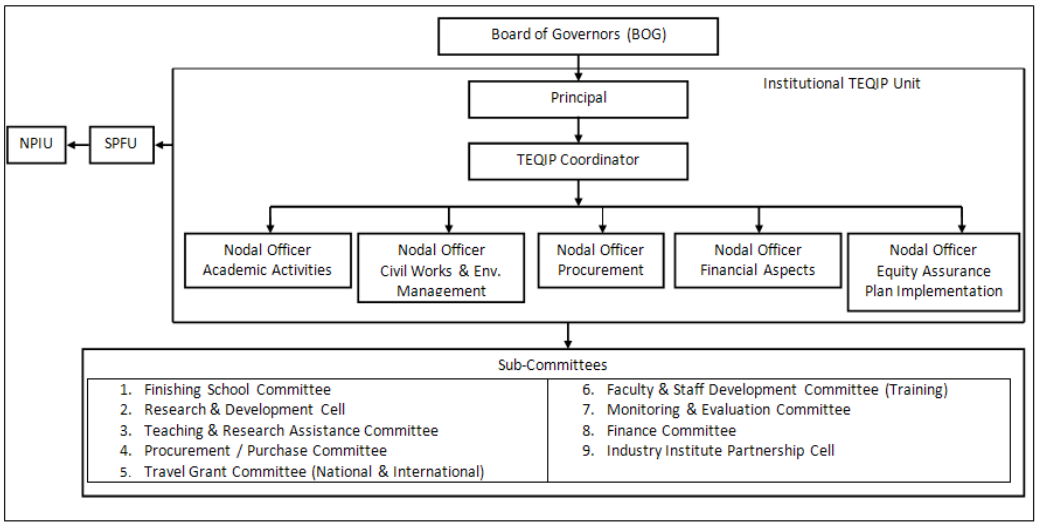
2.11 INSTITUTIONAL PROJECT IMPLEMENTATION ARRANGEMENTS

SJCE is managed by a BoG that has been constituted in accordance with UGC guidelines and the list of members is given in Vol:2 - Annexure 13. The activities undertaken by the institute ever since TEQIP II was announced have been regularly reported to the BoG as and when it met. All decisions related to project implementation will be approved by the BoG for further action by the Principal.

The institution has constituted the sub-committees shown in the following organization chart of SJCE TEQIP II implementation unit. The list of sub-committee members is given in Vol:2-Annexure 17.

A TEQIP II Implementation Unit has been constituted and its organization is as below:

Organization of SJCE TEQIP-II Implementation Unit



2.12 INSTITUTIONAL PROJECT BUDGET

Institutional Budget (lakh Rs.)

Sl No.	Activities	Project Life Allocation	2010-11	2011-12	2012-13	2013-14	2014-15
1	Faculty and Staff Development	197.23	30.00	50.00	50.00	40.00	27.23
2	Institutional management capacity enhancement	45.00	05.00	15.00	10.00	10.00	05.00
3	Academic support for weak students	38.00	03.00	10.00	10.00	10.00	05.00
4	Modernization & strengthening of PG laboratories	393.05	170.00	150.00	73.05	–	–
5	Providing assistantship for MTech & PhD Students	299.60	10.00	85.00	85.00	85.00	34.60
6	Establishing laboratory for new PG programs	56.50	30.00	26.50	–	–	–
7	Enhancement of Research & Development activities	99.00	03.00	45.00	20.00	20.00	11.00
8	Modernization & strengthening of libraries and/or access to knowledge source	108.90	–	108.90	–	–	–
9	Enhanced Interaction with Industry	75.00	05.00	30.00	20.00	10.00	10.00
10	Implementation of Institutional reforms	44.00	04.00	15.00	15.00	08.00	02.00
11	Refurbishment of infrastructure	42.83	04.00	25.00	10.00	03.83	–
12	Incremental Operating Cost	150.00	10.00	40.00	40.00	40.00	20.00
13	Furniture	30.25	–	20.00	10.25	–	–
14	Minor Items	15.00	02.00	04.00	04.00	04.00	01.00
15	Consultancy Services	30.00	02.00	08.00	08.00	08.00	04.00
Grand Total		**1624.36**	**278**	**632.4**	**355.3**	**238.83**	**119.83**
(Rupees Sixteen Crores Twenty Four Lakhs and Thirty Six Thousands Only)							

2.13 (a) *TARGETS* AGAINST DELIVERABLES

Institutional Project Targets

Sl. No	Deliverables	Baseline	Targets to be achiev	
			At the end of 2 Years	By project closing
1	Transition Rate of Students from I year to II year in UGPs	95%	96 %	97 %
2	Number of students registered for Masters Program in Engineering	190	250	325
3	Number of students registered for Doctoral Program in Engineering	95	100	110
4	Revenue from externally funded R&D projects and consultancies in total revenue (Rs. in lakhs)	123	140	170
5	No. of Research Publications in refereed National Journals	07	20	30
6	No. of Research Publications in refereed International Journals	76	90	120
7	No. of citations	1500	2000	2500
8	No. of patents obtained/filed	0	2	4
9	No. of books	10	15	20
10	No. of R&D Projects commercialized	0	1	2
11	No. of co-authored publications in national journals	05	15	25
12	No. of co-authored publications in International journals	70	85	110
13	Campus Placement Rate of UG students	79.6	85.0	90.0
14	Campus Placement Rate of PG students	12	25	40
15	Average Salary of Placement Package – UG	4.12	5.5	6.5
16	Average Salary of Placement Package – PG	3.25	5.5	7.0
17	No. of collaborative programs with industry	8	12	16
18	Accreditation Status – UGPs	91.6	100 %	100%
19	Accreditation Status – PGPs	66.7	90%	100%
20	Vacancy Position of Faculty & Staff	32 %	5% or less	0 vacancy
21	Number of regular faculty with PhD in engineering disciplines	20.9 %	30 %	50%

(b) PLAN IN DETAIL FOR ACHIEVEMENT OF THE TARGETS

On receipt of the approval for the project proposal from the competent authority by the institution the institute TEQIP Unit constituted for the purpose will swing into action towards project implementation.

1. A department wise detailed activity plan for each action plan proposed in the project along with the fund requirement on a quarterly basis will be prepared and the same will be consolidated for the institution and will be ready in a month time from the date of receipt of the approval.

2. Approval of the Board of governors will be obtained for the detailed activity plan developed as above. The approved activity plan along the fund requirement will be forwarded to the NPIU through SPFU for release of funds.

3. A brainstorming session will be organized involving all the members of the sub committees constituted under the institutional TEQIP unit to discuss the measures to be taken for implementation and achieving the targets set by the institution by project mid term and project end.

4. Preparatory efforts will be made for revising the curriculum of 12 existing PG programs and designing the curricula two new PG programs as proposed.

5. Wide publicity will be given to appropriate media including organizing an open day at the institution, inviting the attention of potential Post graduate and research students and the opportunities and financial support made available at SJCE.

6. A calendar of periodic meetings of faculty and Heads of the department will be prepared and distributed in advance to facilitate monitoring of the project activities within the institution.

7. On line Reporting of the project progress as prescribed by the project authorities will be made.

2.14 ACTION PLAN FOR SUSTAINABILITY

With the satisfactory completion of the project by 2014, institute's competence in governance of Undergraduate, postgraduate and doctoral education, research and internal revenue generation will have been enhanced to the extent of IRG capacity, to meet the development needs of the institution generated from TEQIP II implementation.

The number of collaborations between SJCE and industry resulting from project would bring in more money for establishing of new laboratories and research facilities required for continuance and expansion of postgraduate engineering education and research

The research interest created in undergraduate students as a result of innovations introduced during the project is expected to fuel the expansion of Postgraduate education and research base at the college and spreading the brand image of the institute to the extent of attracting more funds from Industry, donors (Alumni), and National and international Government/non government funding agencies contributing to the development of the institute

The corpus fund created under the TEQIP phase II could be partly utilized for sustaining the activities after termination of the project.

JSS Mahavidyapeetha, the management of SJCE, has always been responsive to the institutional development needs and will certainly continue funding those activities which have to be sustained. The management has already funded for the construction of first and second floors of Computer Science and Information Science block, third floor of Environment and Polymer science block and the extension of the administrative block costing to the tune of rupees 850 Lakhs.

All the 60 institutions selected under subcomponent 1.2 perform well which will bring a sea change in our national perspective on higher technical education and will motivate the MHRD, Government of India to allocate more funds to such institutions. We are confident that SJCE will be one such institution.

2.15 PROCUREMENT PLAN FOR CIVIL WORKS/ GOODS

18 month Procurement plan for works and goods for Sub-Component 1.2

Package No	Sl No	Activities	Description of Works/ goods	Estimate d Cost (In Lakhs)	Method of Procurement	Design / Investigation completion/ Specification finalization (Date)	Estimate Sanctioned (Date and Value)	Preparation of Bid Document (Date)	Receipt of Bank's NOC to Bidding Document (Date)	Bids		Contract Award (Date/Value)	Date of Completion of contract
										Invitation (Date)	Opening (Date)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1	Equipment for Dept. Of civil Engg.	Equipment	18.85	Through Quotations	18th Jan 2011	25th Jan. 2011						
2	2	Equipment for Dept. Of civil Engg.	Equipment	5.63	Through Quotations	18th Oct. 2011	25th Oct. 2011						
3	3	Equipment for Dept. of Mech. Engg.	Equipment	13.25	Through Quotations	18th Jan 2011	25th Jan. 2011						
4	4	Equipment for Dept. of Mech. Engg.	Equipment	9.25	Through Quotations	18th Oct. 2011	25th Oct. 2011						
5	5	Equipment for Dept. of E&EE. Engg.	Equipment	14	Through Quotations	18th Jan 2011	25th Jan. 2011						
6	6	Equipment for Dept. of E&EE. Engg.	Equipment	6.80	Through Quotations	18th Oct. 2011	25th Oct.. 2011						

Package No	Sl No	Activities	Description of Works/ goods	Estimate d Cost (In Lakhs)	Method of Procurement	Design / Investigation completion/ Specification finalization (Date)	Estimate Sanctioned (Date and Value)	Preparation of Bid Document (Date)	Receipt of Bank's NOC to Bidding Document (Date)	Bids		Contract Award (Date/Value)	Date of Completion of contract
										Invitation (Date)	Opening (Date)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
7	7	Equipment for Dept. of E&C. Engg.	Equipment	17.00	Through Quotations	18th Jan 2011	25th Jan. 2011						
8	8	Equipment for Dept. of E&C. Engg.	Equipment	18.00	Through Quotations	18th Oct. 2011	25th Oct. 2011						
9	9	Equipment for Dept. of IT	Equipment	19.00	Through Quotations	18th Jan 2011	25th Jan. 2011						
10	10	Equipment for Dept. of IT	Equipment	6.00	Through Quotations	18th Oct. 2011	25th Oct. 2011						
11	11	Equipment for Dept. of CS& E	Equipment	18.00	Through Quotations	18th Jan 2011	25th Jan. 2011						
12	12	Equipment for Dept. of CS& E	Equipment	18.25	Through Quotations	18th Oct. 2011	25th Oct. 2011						
13	13	Equipment for Dept. of ENV ENGG.	Equipment	16.50	Through Quotations	18th Jan 2011	25th Jan. 2011						
14	14	Equipment for Dept. of ENV ENGG.	Equipment	18.20	Through Quotations	18th Oct. 2011	25th Oct. 2011						

Package No	Sl No	Activities	Description of Works/ goods	Estimate d Cost (In Lakhs)	Method of Procurement	Design / Investigation completion/ Specification finalization (Date)	Estimate Sanctioned (Date and Value)	Preparation of Bid Document (Date)	Receipt of Bank's NOC to Bidding Document (Date)	Bids		Contract Award (Date/Value)	Date of Completion of contract
										Invitation (Date)	Opening (Date)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	15	Equipment for Dept. PST	Equipment	17.50	Through Quotations	18th Jan 2011	25th Jan. 2011						
16	16	Equipment for Dept. of PST	Equipment	16.85	Through Quotations	18th Oct. 2011	25th Oct. 2011						
17	17	Equipment for Dept. of BT	Equipment	12.70	Through Quotations	18th Jan 2011	25th Jan. 2011						
18	18	Equipment for Dept. of BT.	Equipment	9.50	Through Quotations	18th Oct. 2011	25th Oct. 2011						
19	19	Class Room Modernization	Equipment	21.50	Through Quotations	18th Jan 2011	25th Jan. 2011						
20	20	Library and LR	Equipment	19.60	Through Quotations	18th Jan 2011	25th Jan. 2011						
21	21	Library and LR	Equipment	4.50	Through Quotations	18th Oct. 2011	25th Oct. 2011						
22	22	e-resources	e-Books & Reference Materials	15.00	Through Quotations	18th Jan 2011	25th Jan. 2011						

Package No	Sl No	Activities	Description of Works/ goods	Estimate d Cost (In Lakhs)	Method of Procurement	Design / Investigation completion/ Specification finalization (Date)	Estimate Sanctioned (Date and Value)	Preparation of Bid Document (Date)	Receipt of Bank's NOC to Bidding Document (Date)	Bids		Contract Award (Date/Value)	Date of Completion of contract
										Invitation (Date)	Opening (Date)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
23	23	Digital library /reference resources	NPTEL Digital DVD Videos/Library package	15.00	Through Quotations	18th Oct. 2011	25th Oct. 2011						
24	24	Library Modernization equipment	EM Detection System with accessories	15.50	Through Quotations	18th Jan 2011	25th Jan. 2011						
25	25	Department & office Furniture	Tables and Chairs	18.70	Through Quotations	18th Jan 2011	25th Jan. 2011						
26	26	Laboratory furnitures	Storage cabinets, working tables, notice boards	11.30	Through Quotations	18th Oct. 2011	25th Oct. 2011						

Package No	Sl No	Activities	Description of Works/ goods	Estimate d Cost (In Lakhs)	Method of Procurement	Design / Investigation completion/ Specification finalization (Date)	Estimate Sanctioned (Date and Value)	Preparation of Bid Document (Date)	Receipt of Bank's NOC to Bidding Document (Date)	Bids		Contract Award (Date/Value)	Date of Completion of contract
										Invitation (Date)	Opening (Date)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
27	27	EEIC Equipment	Digital Board Multimedia Systems Education Resource Kit	21.40	Through Quotations	18th Jan 2011	25th Jan. 2011						
28	28	CVUT Equipment	Traffic Survey System and Noise Detector Data Analysis System	16.15	Through Quotations	18th Jan 2011	25th Jan. 2011						

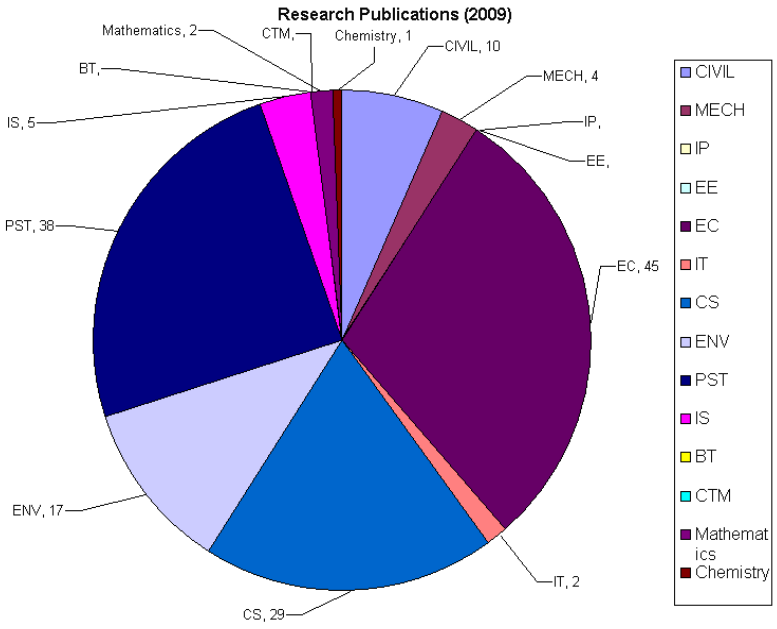
Package No	Sl No	. Activities	Description of Works/ goods	Estimate d Cost (In Lakhs)	Method of Procurement	Design / Investigation completion/ Specification finalization (Date)	Estimate Sanctioned (Date and Value)	Preparation of Bid Document (Date)	Receipt of Bank's NOC to Bidding Document (Date)	Bids		Contract Award (Date/Value)	Date of Completion of contract
										Invitation (Date)	Opening (Date)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
I	3	Equipment for Dept. of Mech. Engg.	Lathe	48.00	NCB	18th Jan 2011	25th Jan. 2011	7th Feb 2011	17th Feb. 2011	28th Feb 2011	23rd Mar. 2011	18thApr. 2011	20th May 2011

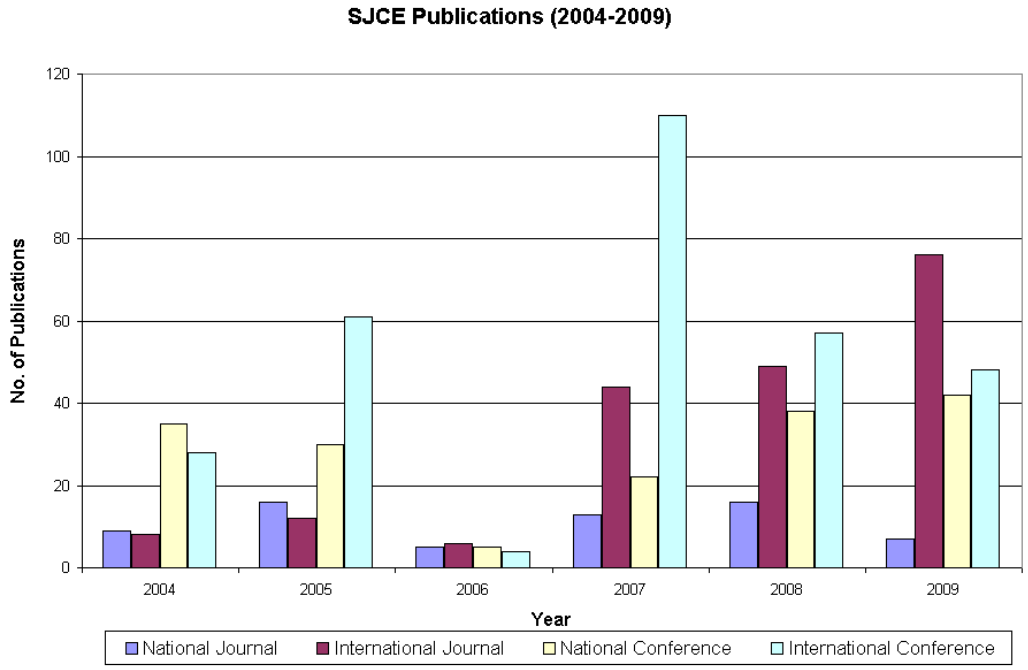
2.16 SPECIFIC ACADEMIC ACHIEVEMENTS

2.16.1 Publications (papers, books, manuals, etc.), patents, innovations

a. Research publications of faculty

The following pie chart presents the department wise research paper publications in the year 2009. The bar chart indicates the consolidated figures of faculty research publications in National and International journals and conferences year wise from 2004 to 2009. Table in the next page gives the details of research publications from faculty. Every year, SJCE publishes research bulletin comprising the details of research papers, books, Ph.D. guidance and sponsored research projects. The research bulletin of 2009 is enclosed in Vol:2





Research Publications of faculty of SJCE

Sl. No.	Year	Journal		Conference		Books
		International	National	International	National	
1	2004	8	09	28	35	-
2	2005	12	16	61	30	02
3	2006	06	05	04	05	05
4	2007	44	13	110	22	01
5	2008	49	16	57	38	01
6	2009	76	07	48	42	02

b. Engineering books published by faculty

The management of SJCE encourages faculty to author books in engineering and technology. The list of books with author names, name of publisher, and year of publication are given in the following table since the year 2005

List of Books published by the Faculty of SJCE

Sl. No	Name of the book	Author	Name of the publisher	Year of publication
1.	Practicals in Polymer science, Synthesis and Qualitatives & Quantatives	Dr. Siddaramaiah	CBS Publishers	2005
2.	Power Electronics	Mr. R.S. Anandamurthy, Mr. V. Nattarasu	Sanguine Technical Publishers	2005
3.	Computer Concepts and C Programming	Dr. B.G. Sangameshwara	Sanguine Technical Publishers	2006
4.	Elements of Civil Engineering and Engineering Mechanics	Dr. Syed Shakeeb Ur Rahman & Mr. V. Madhava Rao	Sanguine Technical Publishers	2006
5.	Basic Electric Engineering	Mr. R.S.Ananda Murthy	Sanguine Technical Publishers	2006
6.	Elements of mechanical Engineering	Dr. KVA Balaji	Sanguine Technical Publishers	2006
7.	Electronic Circuits	Dr. R.D. Sudhaker Samuel, Mr. U.B. Mahadevaswamy,Mr. V. Nattarasu	Sanguine Technical Publishers	2006

Sl. No	Name of the book	Author	Name of the publisher	Year of publication
8.	Geotechnical Engineering Characterization of coal ashes	Dr. K. Prakash	CBS Publishers	2007
9.	Materials of Construction	Mr. K.S. Manjunath	Sanguine Technical Publishers	2008
10.	8051 Microcontroller hardware software and applications	Dr. V. Udayashankara, Mr. M.S. Mallikarjunaswamy	Tata McGraw – Hill publishing co. ltd.	2009
11.	Basic Electronics	Dr. R.D. Sudhaker Samuel, Mr. U.B. Mahadevaswamy,Mr. V. Nattarasu	Sanguine Technical Publishers	2009
12.	Real Time Digital Signal Processing	Dr.V. Udayashankar	Prentice Hall	2010

c. Patents by Faculty

Though SJCE has performed very well in basic and advanced research, interest towards patents has been low. Grants from TEQIP and other funding sources should encourage more patenting. However, the following three patents have been successfully filed.

Sl. No.	Name of Faculty	Description of patent	Year
1	Dr.K.V.Sreenivasa Prasad Professor and Head Department of IP	Patent on "Method of production of Master Alloys "ALTICAB" for the grain refinement of Al and its alloys" Patent No: 29/DEL-96 dated 6/1/1996	1996
2	Dr. Siddaramaiah (Professor, Department of PST) and Baldev Raj & P.Srinivasa	A Process on Preparation of Diisocyanate crosslinked LDPE Films with Better Barrier and Grease Resistivity Properties": presented at CSIR Indian Patent – 2002 (CSIR No.389/02).	2002
3	Dr. Siddaramaiah (Professor, Department of PST) and H.Kumar	Improved and simple catalyst for the preparation of rigid and elastomeric polyurethanes. Indian Patent Application: CHE/354/2006	2006

2.16.2 Conferences Organized and the Proceedings Published

Sl. No.	Year	Details
1	2006	IPSA International conference on Physical failure and analysis at IISC, Bangalore
2	2007	CIBERIA - IEEE student conference
3	2007	Concreations - National Student Conference in Civil Engineering
4	2007	VLSI design and testing conference at Infosys
5	2008	CIBERIA - IEEE student conference
6	2009	CIBERIA - IEEE student conference
7	2009	National Resource Meet on 'Water and Waste Management' jointly organized by Association of Consulting Civil Engineers (I), Mysore Centre and S.J. College of Engineering, Mysore, at Hotel Pai Vista, Mysore
8	2010	CIBERIA - IEEE student conference

2.16.3 Seminars and workshops organized

Sl. No.	Year	Details
1	2007	TEXODO - 3 day workshop on electronic devices
2	2007	2 day IPR seminar
3	2008	TEXODO - 3 day workshop on electronic devices
4	2009	NPCBEERM - workshop on earthquake resistant construction
5	2009	TEXODO - 3 day workshop on electronic devices
6	2009	INS workshop on nuclear energy
7	2009	Two day workshop on Technical Control at Sites organized by Construction Academy of ICMQ, Bombay, between in association with ICMQ + SJCE.
8	2009	Technologics - CSI convention
9	2010	NPCBEERM - workshop on earthquake resistant construction
10	2010	Envision - 2 day workshop in Environmental Engineering
11	2010	TEXODO - 3 day workshop on electronic devices

2.16.4 Specialized Training Programs Conducted

The following special training programs (Soft Skills) have been conducted for faculty and non-teaching staff members:

- Spoken English
- Change of Mindset
- Personality Development
- Computer Skills
- KCSR rules

The following table presents a list of recent technical training programs organized.

Sl. No.	Year	Details
1	2008	CEP Training on "Computer Application in Civil Engineering" for the Professional/In-Service Engineers of Government of Karnataka, Sponsored by Government of Karnataka, Engineering Staff College, Krishnarajasagar
2	2009	Short term Course for the faculty of Civil Engineering, VTU, Belgaum on Limit State Design of Steel Structures (IS: 800-1987)-06CV72: Design of Steel Structures from 17th - 21st August, 2009 at SJCE, Mysore, Sponsored by VTU, Belgaum.
3	2009	Coordinated training Program from 16th- 20th, November, 2009 for Working Professionals under National Programme for Capacity Building of Engineers in Earthquake Risk Management, NPCBEERM, Sponsored by Ministry of Home affairs, GOI, New Delhi.
4	2010	Coordinated training Program from 18th-22nd January, 2010 for Working Professionals under National Programme for Capacity Building of Engineers in Earthquake Risk Management, NPCBEERM, Sponsored by Ministry of Home affairs, GOI, New Delhi.
5	2010	Short term Course for the faculty of Civil Engineering, VTU, Belgaum on Design and Drawing of Steel Structures -06CV82 from 4th - 6th February, 2010 at SJCE, Mysore, Sponsored by VTU, Belgaum.

In addition to the above details of the training programs conducted by SJCE, the following short term training programs sponsored by CPHEEO, Ministry of Urban development, govt. of India are being conducted since 1987

Sl. No.	Title of the Program	Target Group	Duration of Program	No. of engineers trained as on 2009
1	Certificate course in Environmental engineering	Working diploma engineers	3 months	690
2	Water quality monitoring and surveillance	Working engineers, Chemists	12 days	650
3	Computer aided design in water distribution system	Working engineers	12 days	680

2.16.5 Awards and Recognitions Received by the Faculty

SJCE has been recognised as one of the global leaders in technical education and is among the best known engineering colleges in the country. Within Karnataka, it is rated among the top 5 engineering colleges and students both at undergraduate level and postgraduate level are eager to study at SJCE. SJCE has grown not only in academics, but also in research, extracurricular and co-curricular activities as well as in sports.

The following are some of the important achievements by the students and faculty members during the last 3 years.

1. SJCE has started the following One-year collaborative PG Diploma value-addition courses.

SL. No.	Diploma	Collaborating Institute
1	Course in Non-Destructive Testing	IGCAR, Kalpakkam
2	Environmental Law	JSS Law College, Mysore
3	Telecommunication	BSNL, Mysore

2. Following students of the 6th Semester IS&E, IT, and E&C have been awarded the REDHAT Scholarship. The award contest organized by NASDOC-RHIT which is a premier supplier of open source knowledge to the world at IIT Bombay, Mumbai.

    a) Ms. Chetana A
    b) Ms. Divya A.C
    c) Ms. Sandhya N.Bhat
    d) Ms. Sumalatha

The award comprised a scholarship of Rs. 1 Lakh and a citation. Dr. C.S. Yogananda, Head of the Department of Mathematics guided and encouraged the team for the competition.

3. Research Paper submitted by Dr. Siddaramaiah and his students during the 60th Annual Technical meeting at Indian Institute of Metals held from 14th to 16th, November 2006 at Kolkata, has been awarded the 3rd Prize in Poster Session presentation.

4. Dr. Syed Shakeeb Ur Rahman, Vice Principal and Professor & HOD of Civil Engineering has been nominated as Dean of Faculty of Engineering and Member of Executive council of Visvesvaraya Technological University, Belgaum for the period 2007 - 2010.

5. Dr. C.R. Venugopal, Professor of Electronics & Communication has been nominated as member of the Academic Senate of Visvesvaraya Technological University, Belgaum for the period 2007-2010.

6. Dr. M. Mahadevaswamy, Professor, Department of Environmental Engineering has been nominated by the Ministry of Environment & Forest, Government of India as Chairman of the Thematic Expert Group on "Prevention, Abatement and Control of Pollution". This expert group would consider proposals related to the research programmes like Environmental research, National River Conservation, Climate Change / Clean Technology

7. The following faculty members published 100 papers in National and International Journals and Conferences

    a. Dr. R.D. Sudhaker Samuel, Prof. & Head, Department of Electronics & Communication
    b. Dr. Siddaramaiah, Prof. Department of Polymer Science & Technology

8. Board of I.T. Education Standards (BITES) an Autonomous body promoted by the Government, Technical Institutions and IT Industries of Karnataka have nominated Prof. B.G. Sangameshwara, Principal as one of the members of BITES Governing Board.

9. Dr. K. Prakash, Professor, Department of Civil Engineering has been awarded Dr. Satish Dhavan Young Scientist State Award for his outstanding achievements in the field of Science & Technology by the Government of Karnataka.

10. Dr. Siddharamaiah, Professor, Dept. of Polymer Science & Technology has been selected for 'Post Doctoral Research' under 'TWAS-UNESCO Associateship' in Federal University, Rio De Janiro, Brazil, from 10.06.2008 to 07.08.2008.

11. Dr. K.S. Lokesh, Professor, Dept. of Environmental Engineering has been invited as Visiting Scholar in Connectiut College, United States of America from 20.01.2009 to 31.05.2009

12. Kum. Pragna H.A. student of I Semester Electronics & Communication has represented Indian Team in the XIII Asian Rollers Skating Championship held at Haining City Shanghai, CHINA from 12th to 22nd October 2008. She won 5th place in both the events –

    a) 5000 mts. Relay on Road – Senior ladies
    b) 3000 mts. Relay on Track – Senior ladies events

The Management granted financial assistance of Rs. 30,000/- and Rs. 70,000/- from Visvesvaraya Technological University for the above Championship.

13. Dr. C. R. Venugopal, Professor, Dept. of Electronics & Communication, has been awarded the "Indian Semiconductor Association (ISA) Technovation Karnataka Best Faculty Award 2009". The award carries a certificate and a cash of Rs. 30,000/-

14. Dr. B. G. Sangameshwara, Principal, has been nominated as a Member of the Governing Body of Hindustan College of Engineering and Technology, Coimbatore.

15. Dr. B. G. Sangameshwara, Principal, has been nominated as a Member of the Governing Body of C.V Raman College of Engineering, Bhubaneswar, Orissa

16. One of the technical papers of Mr. Chandrakanth B student of V semester Electronics & Communication has been selected for the Conference on "World Congress on Power and Energy Engineering – WCPEE 09" between October 5 to 8 in Ciaro, Egypt. The student has been permitted to present the paper in the above conference and an assistance of Rs.25,000/- has been granted from the college management.

17. Dr. S. Nanjundaswamy, Lecturer, Department of Bio-Technology has presented a technical paper by name "Synthesis of New Bioactive Venlafexine Ananogs: Novel Thiazolidin-4-ones as Antimicrobials". The same has been published by Elsevier Publication's Bio-organic and Medical Chemistry (14th Edn. Vol.07 2006, pp 2290-2299) and has been awarded Most Cited Paper 2006-2009 award.

18. Dr. K.S.Lokesh, Professor in the Department of Environmental Engineering has successfully completed the Visiting Scholar assignment at Connecticut College, USA. The President and the Members of the Connecticut College, USA have appreciated his work.

19. Our Institution has been placed 5th among the South India Private Engineering Colleges by the survey conducted by South Asia's famous magazine "Electronics for You".
20. India Today, a National weekly Magazine has published India's first 50 Engineering Colleges and SJCE has been placed in the 14th position.
21. Current Science has published top 30 research engineering institutions and SJCE has been placed 30th position.
22. Smt. Vasantha Shashi an alumni of this Institution, Department of Electronics & Communication during the year 1984 has won the Bollystar Competition held at USA.
23. Dr. S. Nanjundaswamy is working as Lecturer in the Department of Biotechnology since 21.5.2007. With the approval of the Management, he had applied for DST-Boycast Fellowship for the year 2009-10 in the area of Life Sciences to undergo training under the supervision of Prof. Gautham Sethi, Department of Pharmocology, National University of Singapore, Singapore, for a period of 12 months.
24. Boycast Fellowship (Better Opportunities for Young Scientists in chosen areas of Science & Technology) is a very prestigious fellowship given by Department of Science & Technology, Government of India, providing opportunities to the young Indian Scientists to visit institutions abroad, interact with scientists / technologists there, get trained in latest research techniques and conduct R&D in specially chosen front areas in Science & Technology.
25. Dr. S. Nanjundaswamy has been awarded the above fellowship by DST. The period of fellowship will be one year. His absence during the period of fellowship will be treated as extraordinary leave. He is expected to report for the training by 30th June 2010.
26. Dr. B.G. Sangameshwara, Principal, has been conferred the "Eminent Engineer" award by the Institution of Engineers (India), Bangalore. This award was conferred on 13.03.2010 at Bangalore.
27. Dr. H.S. Ramesh, Professor and Head, Department of Environmental Engineering, has been nominated by the Government of India through Ministry of Environmental and Forest as a member for the "Expert appraisal committee for environmental clearance of infrastructure, building / construction, industrial estates and miscellaneous projects including coastal regulation zone (CRZ)".
28. Ms. Samhitha Raj, VI semester, Department of Biotechnology, is selected for "Indian Academy of Sciences" award to work on "Micro RNA, gene detection and sex determination of silk Moth" at CDFD Hyderabad under Dr. J. Nagaraju. This is a prestigious award.
29. Ms. Pragna, IV semester, Department of Electronics & Communication, is participating in the 14th Asian Roller Skating Championships scheduled to be held from 16th to 25th July 2010 at Kaohsiung City, Chinese Taipei.
30. Dr. S.K. Prasad has been on the editorial review board of international journal of Geotechnical earthquake engineering, USA
31. Dr. S.K. Prasad is serving as the member of national executive council of Indian Geotechnical Society, New Delhi continuously for the 2nd term. (2006-08 and 2008-10)

2.16.6 ISO Certification

SJCE is keen to achieve quality processes and procedure by adopting ISO certifications and audits. The management has approved to obtain the ISO 9001 certification. The process has been initiated and first level of documentation and internal auditing are completed. It is expected to achieve the ISO 9001 certification by June 2011.

2.16.7 Collaboration with foreign Universities

Sl. No.	Entered into MOU since	Foreign University
1	June 2008.	Asian Institute of Technology, Thailand
2	July 2008	Sonama State University, USA
3	Expected by Oct 2010	University of North Carolina

2.16.8 Collaboration with Multi National Companies/Research Institutes

Sl. No.	Entered into MOU since	Organization
1	June 2004	Infosys (Campus Connect Program)
2	July 2006.	JSS College of Arts, Commerce and Science, Mysore (PG Diploma course in Embedded Systems)
3	August 2007.	Bosch Rexroth AG Industrial Hydraulics, Germany (BRAG) and Bosch Rexroth (India) Limited (BRIN)
4	February 2008	NetLink Technologies Limited, Chennai (Deccan Chronicle – The Papyrus Clubs Program)
5	March 2008	Partners for the Advancement of Collaborative Engineering Education (PACE – A consortium of GM, Altair, Autodesk, Siemens etc)
6	July 2009.	Elucido Media Networks Pvt. Ltd, Bangalore
7	December 2009	Philips Electronics India Ltd., Kolkota and Philips Innovation Campus, Bangalore (Renewed)
8	August 2009	NOKIA Devises R&D Maemo, Finland through VTU
9	August 2010	Schneider Electric India Pvt. Ltd.
10	Under Process	Texas Instruments, Bangalore
11	Under Process	IGCAR, Kalpakam
12	Under Process	BSNL – RTTC, Mysore
13	Under Process	Textronics, Bangalore

The copies of the above MOUs are enclosed in Vol:2 – Annexure 18

2.17 ACTION PLAN FOR ORGANIZING A FINISHING SCHOOL

The transition rate of students from 1st year to 2nd year at SJCE in 2009-10 was 95.4% for all students, 89% for SC students, 84.2% for ST students and 99.3% for OBC students. Therefore the academically weak students constitute a very small part of the students. However, these students get opportunities to appear for make-up examination if the continuous internal evaluation (CIE) marks is greater than 60% in respective subject failed in semester end examination (SEE). The students with less than 60% CIE and failed in SEE shall repeat the course in Supplementary semester so that the successful amongst them can move to higher classes and catch up with the rest. During the project period, the identified weak students will be given remedial teaching sessions in the subjects in which they are weak. In addition, soft skill and intensive professional skill training programs will be organized to increase their employability. The proposed action plan for improving the performance of such students is presented below.

Action plan for a Finishing School at SJCE

Sl. no	Key Activities	Project Years and Months															
		2010	2011-12				2012-13				2013-14				2014-15		
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48
1	Establishing a Finishing School Unit at SJCE																
2	Publicizing the Concept of Finishing School																
3	Registering willing students																
4	Organizing atleast 2 remedial teaching sessions of 2 hours each per week through each semester either in groups or individuals depending on the strength																
5	Conducting a soft skills training program of one week duration at the end of 5th, 6th,7th & 8th semesters																
6	Conducting one intensive soft & professional skills training program of 4 weeks to students failing toget selected in campus selection																
7	Evaluate																

The budget estimate for the Finishing School is given in following table.

2.17.1 Cost Estimate for organizing Finishing School

Sl. no	Cost Component	Total Cost (Lakh Rs)
1.	Honorarium to faculty & staff for handling remedial teaching 2 subjects per department per year for 12 departments @ Rs 10000 per subject for 4 years (2 sub x 12 dept x Rs.10000 x 4 years)	9.60
2.	Customized Soft Skills Training Program for 500 students @ Rs. 500 per year for 4 years (500 x Rs. 500 x 4 years)	10.00
3.	Customized Intensive Professional Skills Training Program for 200 students @ Rs. 2000 per year for 4 years (200 x Rs. 2000 x 4 years)	16.00
4.	Miscellaneous- Stationary, Course Material, Registration, Publicity @ Rs. 60,000 per year for 4 years	2.40
Total		**38.00**

2.18 COST ESTIMATE FOR INSTITUTIONAL REFORMS

The details about institutional reforms and activity chart are furnished in Section-1.6.

Sl. no	Cost Component	Total Cost (Lakh Rs)
1.	Workshops on outcome based curriculum design for 26 disciplines (12UG + 14PG) of 7 days duration @ 0.5 lakh per program (26 prog x 0.50)	13.00
2.	Revision of curriculum workshop for the existing UG programs of 7 days duration @ 0.5 lakh per program (12 UG x 0.50)	6.00
3.	Revision of curriculum workshop for the existing PG programs of 7 days duration @ 0.5 lakh per program (12 PG x 0.50)	6.00
4.	Revision of curriculum workshop for the new PG programs of 7 days duration @ 0.5 lakh per program (2 PG x 0.50)	1.00
5.	Providing minor research project grant for young faculty @ Rs. 1.00Lakh per faculty for 3 faculty per year for 4 years (3 faculty x Rs. 1.00 x 4 years)	12.00
6.	Publishing SJCE Technical Journal annually @ 1.5 lakh per year for 4 years	6.00
Total		**44.00**

2.19 INSTITUTIONAL MANAGEMENT CAPACITY ENHANCEMENT

The proposed institutional management capacity enhancement details are furnished in section 2.3 under specific objectives, expected results and link with SWOT analysis. The time frame for implementation is given in following table

Sl. No	Key Activity	Time Frame for Implementation (Months)							
		0-6	6-12	12-18	18-24	24-30	30-36	36-42	42-48
1.	Establishing Offices of Dean IRG & Dean HRM								
2.	Performance-based incentive schemes for students, faculty and staff								
3.	Constituting an Industry Advisory Group								
4.	Customized Orientation Workshop for HODs & Senior Faculty Members on Management of IRG								
5.	Study Tour of Principal & Senior Faculty Members to Purdue School of Engineering Virginia Tech and College of Engineering & Applied Sciences, University of Colorado for studying the innovations being introduced in engineering education, facilities created & exploring possibilities of collaboration with SJCE								
6.	Study Tour of HODs & Senior Faculty Members to IISc & IITs to study the mechanisms of IRG through sponsored research, consultancy & continuing education projects, incentives for faculty, mechanisms for translating research findings into practical action								
7.	Customized In-house Faculty Workshop o Competence Building for Industrial Consultancy								
8.	Customized In-house Faculty Workshop o Enhancing Research Capabilities including IT skills								
9.	Engineering Education Innovation Centre (EEIC) at SJCE								
10.	Funding for research by young faculty								
11.	Travel Grant Scheme for Students & Faculty								
12.	In-house Seminar to disseminate & exchange experiences & ideas gained by Senior Faculty with Younger Faculty members								

2.20 COST ESTIMATE FOR INSTITUTIONAL MANAGEMENT CAPACITY ENHANCEMENT

Sl. no	Cost Component	Total Cost (Lakh Rs)
1.	Customized Orientation Workshop for HODs & Senior Faculty Members on Management of IRG – One workshop during the project period	1.0
2.	Study Tour of Principal & Senior Faculty Members to Purdue School of Engineering, Virginia Tech and College of Engineering & Applied Sciences, University of Colorado for studying the innovations being introduced in engineering education, facilities created & exploring possibilities of collaboration with SJCE (1-Principal + 12 HODs + 4-Deans + 3-Management Personnel = 20) for 10 days 20 x Rs. 1.5 Lakhs	30.0
3.	Study Tour of HODs & Senior Faculty Members to IISc & IITs to study the mechanisms of IRG through sponsored research, consultancy & continuing education projects, incentives for faculty, mechanisms for translating research findings into practical action 20 members x Rs. 0.2 Lakhs	4.0
	Customized In-house Faculty Workshop on Competence Building for Industrial Consultancy (1 program per year @ Rs. 1.0 Lakh)	4.0
4.	Customized In-house Faculty Workshop on Enhancing Research Capabilities including IT skills (3 programs @ Rs. 1.0 Lakh)	3.0
5.	In-house Seminar to disseminate & exchange experiences & ideas gained by Senior Faculty with Younger Faculty members (2 programs @ Rs.0.5 Lakhs)	1.0
6.	Workshop on strategic visioning for management personnel , Principal, HODs and senior faculty members (2 numbers @ Rs. 1.0 lakh per program)	2.0
Total		**45.00**

2.21 COST ESTIMATE FOR MINOR ITEMS

Sl. no	Cost Component	Total Cost (Lakh Rs)
1.	Stationery, office supplies, photocopying @ Rs.3.75 Lakhs per year for 4 years	15.0
Total		**15.0**

2.22 COST ESTIMATE FOR CONSULTING SERVICES

In the IDP it is proposed to establish centers of focused research and several sophisticated equipment in various post graduate laboratories. Further, laboratories for new M.Tech courses are proposed. It is required to invite experts from India and abroad for utilizing their services.

Sl. no	Cost Component	Total Cost (Lakh Rs)
1.	Inviting expert faculty from Purdue university, Virginia Tech, University of Colorado, University of Tokyo @ Rs. 5.0 Lakhs per man month including travel and accommodation for 3 man months	15.0
2.	Inviting expert faculty from premier institutions such as IITs and IISc for research interactions and handling sophisticated equipments @ Rs. 1.0 Lakhs per man month for 6 man months	6.0
3.	Inviting consulting experts for establishing new research laboratories, focused research centers, etc @ Rs. 0.70 Lakhs per man month for 6 man months	4.2
4.	Travel and accommodation expense for items 2 and 3 @ Rs. 1.2 Lakhs per year for 4 years	4.8
Total		**30.00**

2.23 COST ESTIMATE FOR INCREMENTAL OPERATING COST

The cost component details for incremental operating cost are given below. The cost components include expenditure for the Institutional TEQIP-II Implementation Unit, Annual maintenance contract for sophisticated equipments and computer systems, Renewal of software services fee, faculty participation in conferences and seminars and miscellaneous expenses.

Sl. no	Cost Component	Total Cost (Lakh Rs)
1.	Institutional TEQIP office expenditure including travel, meeting expenditure, additional staff salary, audit fees, etc. @ Rs. 1.0Lakhs per month for four years	48.0
2.	Annual maintenance contract for computer systems, sophisticated equipments, renewal of software licenses, consumables for research labs, etc. @ Rs. 22.0 lakhs per year for 4 years	88.00
3.	Printing of broachers, manuals, reports, etc. @ Rs1.0 lakhs per year for 4 years	04.0
4.	Contract fee for outsourcing Services @ Rs1.0 lakhs per year for 4 years	04.0
5.	Expenditure for participation by faculty in conferences and seminars @ Rs1.5 lakhs per year for 4 years	06.0
Total		**150.00**

ANNEXURE - 1

DETAILS ABOUT REFURBISHMENT FOR LABORATORY SPACES IN DIFFERENT DEPARTMENTS

Sl. No.	Department	M^2	Rate	Total Cost (in lakh Rs)
1.	Civil Engineering	60	0.013	0.78
2.	Mechanical Engineering	480		6.24
3.	Industrial & Production Engineering	75		0.98
4.	Instrumentation Technology	100		1.30
5.	Electrical & Electronics Engineering	310		4.81
6.	Electronics & Communication	516		6.71
7.	Computer Science & Engineering	90		1.17
8.	Environmental Engineering	940		12.22
9.	Biotechnology	15		0.20
10.	Polymer Science & Technology	648		8.42
Total		**3234**		**42.83**
Total cost for refurbishment is rupees forty two lakhs eighty three thousand only				

ANNEXURE 2

DETAILS ABOUT EQUIPMENT REQUIREMENT IN DIFFERENT DEPARTMENTS

Sl. No.	Department	Estimated Total Cost (Lakh Rs.)
1	Civil Engineering	**45.00**
2	Mechanical Engineering	**90.50**
3	Electrical & Electronics Engineering	**26.20**
4	Electronics & Communication	**53.00**
5	Instrumentation Technology	**35.00**
6	Computer Science & Engineering	**58.50**
7	Environmental Engineering	**40.00**
8	Polymer Science & Technology	**49.35**
9	Biotechnology	**29.50**
10	Class Room Modernization	**22.50**
Total		**449.55**
11	Library & Learning Resources	**108.90**
Grand Total		**558.45**

CIVIL ENGINEERING DEPARTMENT

M.Tech Courses offered: Industrial Structures

Sl. No	Name of Equipment to be procured	Make , Model and specification of the Equipment	Quantity	Total Cost (in Lakh Rs.)
1	Horizontal Shake Table With Eccentric Cam	Milenium Technologies (I) pvt. Ltd., No 7, 11th Cross, Patel Channappa Indsl Estate, Andrahalli Main Road, Vishwaneedam Post, Near Peenya 2 Stage, Bangalore 560091	1	1.25
2	Horizontal Shake Table With Cylindrical Cam		1	3.00
3	Vertical Shake Table		1	1.90
4	Experimental Models consisting of 12 models		1	1.50
5	Universal Data Acquisition System 8 Channel 24 bit resolution including software DEWE-43	Foretek Marketing Pvt. Ltd. 801, 1st cross, 7th main, HAL 2nd stage, Bangalore 560008	1	4.50
6	Accelerometers +/- 5 g Dynamic range with 0-300 Hz frequency – 8 Numbers Model 4610-005-200		1	3.80
7	Block vibration apparatus a) Mechanical oscillator with Eccentricity indicator and Speed sensor Model : MX20A b) Variable speed 5 hp d.c. motor Model : MDM-01 c) Speed control unit Scr controller variable Speed drive system with Digital led display to drive The dc motor quoted above. Model : MSCU-1000 d) Accessories Fixing plates, nuts & bolts, Belt/flexible shaft, cables And tools etc. To fix the System for operation	Micron Sunhera road, kashipuri, Roorkee – 247 667	1	2.90
8	Measurement and recording System a) Pc based soil data acquisition System with accelerometer Model : microlog-5100-S b) Vibration meter with Accelerometer Model : MVM-555 + MA-201		1	3.50

9	Digital phase meter (with 02 nos. Of geophones) Model : MDP-01	Micron Sunhera road, kashipuri, Roorkee – 247 667	1	0.63
10	Single channel digital Refraction seismic timer (complete with 02 nos. Of Geophones, 50 mtr. Cable & Cable winch) Model : WRT-04C		1	0.50
11	Additional accelerometer Model : MA-201		1	0.30
12	Flowability measuring apparatus for Self compacting concrete comprising of Slump cone, V Funnel, L Box, U Box, Orimet, GTM Screen Stability Test, J Ring, Fill Box.	Micro Machine Tools, Chennai	1	0.70
13	Shock Table Test Set up - size 4 m x 3.5 m	Zicma Engineering Company, Bangalore Ph. 94484 85688	1	6.20
14	Miniature water tight pressure sensors – 2 Nos.	Kyowa Japan	2	1.00
15	Flexure Testing Frame 100kN, with pressure gauge, pressure hose and manifold having two isolating valve but without pump	AIMIL Ltd., "Naimex House" A-8, Mohan Co-Operative Industrial Estate, Mathura Road, New Delhi – 110 044	1	0.66
16	Hydraulic Jack 500kN capacity with Gauge and Hand Pump		1	0.60
17	Ring Type Load cell: capacity: 300 kN	Surya Scales No.3121, 19th Cross, K.R. Road, BSK 2nd Stage Bangalore-560070. E-mail:info@ sunsofttechnology.com	1	0.17
18	Four channel Load display with load cell excitation and measurement circuits		1	0.29
19	LVDT: Spring loaded LVDT up to 100 mm		1	0.89
20	Multi channel LVDT display unit by switch selection, Six channel LVDT excitation and measurement circuits		1	0.26
21	Strain Gauge		1	0.09
22	Four channel strain measurement Digital display unit		1	0.36

23	Air Entrainment Meter ,as per IS: 1199	AIMIL Ltd., "Naimex House" A-8, Mohan Co-Operative Industrial Estate, Mathura Road, New Delhi – 110 044		
	a) 0.005 cubic meter capacity for maximum size of aggregate 38mm		1	0.145
	b) 0.007 cubic meter capacity for maximum size of aggregate 50mm		1	0.157
	c) 0.01 cubic meter capacity for maximum size of aggregate 75mm		1	0.18
24	Aggregate impact tester with blow counter		1	0.052
25	Aggregate Crushing Value app., as per IS: 383 a) 7.5 cm dia for 1/8" to1/4" aggregate b) 15 cm dia for 3/8" to3/4" aggregate c) 30 cm dia for 1" to 2" aggregate		1	0.16
26	Bulk Density Measure capacity 3, 15,30 ltrs Bulk Density Measure capacity 10 - 20 ltrs	AIMIL Ltd., "Naimex House" A-8, Mohan Co-Operative Industrial Estate, Mathura Road, New Delhi – 110 044	1	0.1
27	Buoyancy balance , with electronic balance 15kg least count lgm		1	0.3
28	Blain air permeability App, as per IS: 4031		1	0.02
29	Compaction factor App, as per IS: 1199		1	0.15
30	Concrete mixer , laboratory ,WITH ½ HP moter		1	0.5
31	Cement Autoclave , as per IS : 4031		1	0.4
32	Concrete permeability , as per IS: 3085 a) 100mm dia X 100mm high single cell		1	0.3
33	Cement permeability , as per IS: 1727/2645 a) three cell model		1	0.77
34	Compression testing machine, electrical operated, with 3 phase 440 volts motor 100 tons capacity,		1	6.77
Total				**45.00**

MECHANICAL ENGINEERING

M.Tech Courses offered : a) Maintenance Engineering

b) Engineering Management

Sl. No	Name of Equipment to be procured	Make , Model and specification of the Equipment	Quantity	Total Cost (in Lakh Rs.)
1.	Computers	Genuine Windows 7.0, 64-bit, Intel Core 2 Duo Processor 2.8GHz, 3MB L2, 4GB DDR2 memory 500GB hard disk, 256MB graphics card, 5-in-1 memory card reader, slot load super multi DVD Burn, Wireless-N LAN card and Bluetooth. 19" TFT Monitor	25	10.00
2.	Lathe		1	48.00
3.	Advanced Manufacturing Lab – Equipments and Relevant software	---	1	20.00
4.	Printer	LaserJet Printer - prints up to 22 ppm, 1200 x 1200 dpi resolution, 16 MB expandable to 144 MB, input tray - 250 sheets, 1 USB 2.0 port, HP Jetdirect 10/100 Ethernet Network Capable	1	0.25
5.	Slip gauge Box -2	Mittutoyo make	2	3.00
6.	Gear Tooth Caliper -2	LC 0.02 mm Mittutoyo make		
7.	Lever Type Dial Indicator	LC 0.01 mm Mittutoyo make		
8.	Lathe tool Dynamometer -2			
9.	Hydraulics and Pneumatics – (License for 10 seats)	India Soft Technologies (P) Ltd	1	9.25
Total				90.50

ELECTRICAL AND ELECTRONICS ENGINEERING

M.Tech Courses offered : Energy Systems and Management

Sl. No	Name of Equipment to be procured	Make , Model and specification of the Equipment	Quantity	Total Cost. (Lakh Rs.)
1	Induction Motor Control Trainer with motor	Integrated Electric Co	1	3.0
2	Switched Reluctance Motor Trainer	Integrated Electric Co	1	3.0
3	PMDC Motor Trainer	Integrated Electric Co.	1	3.0
4	Virtual Instrumentation facility with related hardware and software	National Instruments	1	5.0
5	10 kVA UPS with associated batteries to provide at least 2 hours backup	APLAB, 10 kVA Output with at least 2 hrs backup	1 Set	2.0
6	Laptop Computer with latest hardware configuration	DELL/Lenovo	1	0.4
7	LCD Projector with document camera review facility.	Toshiba TLP-XC2500U	1	1.0
8	Video camera	Sony/Samsung make	1	0.40
9	Desktop computers with latest hardware specifications to run latest versions of operating systems.	Latest AMD processor with at least 2 GB, RAM, DVD RW drive, 105 KB, optical mouse, 17" LCD monitor	10	3.00
10	Air conditioner	Voltas make 1.5 T split type	1	0.4
11	Smart energy meters and associated CT/PT	ShneiderElectric/L&T/ABB/ Seimens	1	2.0
12	Server and software	Same as above.	1	2.0
13	Computer networking	Same as above.	1	1.0
Total				**26.20**

ELECTRONICS AND COMMUNICATION

M.Tech Courses offered : a) Industrial Electronics

b) Networking and Internet Engineering

M.Tech Courses Proposed: Automotive Electronics

Sl. No	Name of Equipment to be procured	Make , Model and specification of the Equipment	Quantity	Total Cost (in Lakh Rs.)
1	Network Software, Debugging and Simulation Tools,	Cadence, CoreEL, India Soft, B'lore	1	8.00
2	FPGA development Kits and debugging Tools	Spartan 3E Starter Kit, Xilinx Spartan 3e FOGA, CoreEl, B'lore	1	5.00
3	Adv. Microcontrollers	8/16 -bit uC kits ALS, ESA B'lore	1	2.00
4	Adv. Microcontrollers	8/16 -bit uC kits ALS, ESA B'lore	1	2.00
5	Advanced DSP Workstations	Texas TMS 72 Series, DSP with composite studio. Crane Software, CoreEL, B'lore	1	3.50
6	Advanced Control System Tools	Shimdien Controller, Salvin make pH controller set, SALVIN Inst. B'lore	1	3.50
7	Power electronics lab facilities, PCI devices intrfaces, PLDs and PLCs.	Drives, Interfaces, Elctrosystems Associates, B'lore	1	4.00
8	PC Based Engine	Ind Lab Equipments	1	3.0
9	Automobile lab	Car Engine,Mhadu"s Mysore	1	4.0
10	Simulation Tool	India Soft	1	3.0
11	Signal Processing and Instrumentation Lab	Cranes Software,B'lore	1	3.0
12	Vibration Lab (LDS Vibration & Testing Systems)LDS Vibration Controller with USB connection	Buerl & Kjaer, Denmark, Joe's B'lore	1	3.0
13	Measuring Instruments with transducer(Digital Storage Oscilosope)	Tektronics, B'lore	1	3.0
14	Signal Processing and Instrumentation Lab	Cranes Software,B'lore	1	3.0
15	Vibration Lab (LDS Vibration & Testing Systems)LDS Vibration Controller with USB connection	Buerl & Kjaer, Denmark, Joe's B'lore	1	3.0
Total				53.00

INSTRUMENTATION TECHNOLOGY

M.Tech Courses offered : Biomedical Signal Processing and Instrumentation

Sl. No	Name of Equipment to be procured	Make , Model and specification of the Equipment	Quantity	Total Cost (in Lakh Rs.)
1	PLC trainer Kit with simulation modules	8 digital i/p and 6 digital op with panel	1	3.5
2	Data acquisition Cards (Virtual Instrumentation)	National instruments	1	1.5
3	8051 Microcontroller with interface cards (5 nos)	Flash type boards	5	0.5
4	FPGA kit XC3S400 board with interface cards(5Nos)	With on board display	5	1.0
5	DSP starter Kit (DSK) TMS320C6713 with CCS (10 Nos)	Floating point processor	10	2.5
6	MSP430 Microcontroller (10 Nos)	Low power	10	1.0
7	DSP starter Kit (DSK) TMS320C6713 with CCS (10 Nos)	Floating point	10	2.50
8	Audigy card with microphone & speakers (2Nos)	To acquire speech signals	2	2.35
9	Biokit and accessories	ECG, EEG, EMG acquisition	1	4.15
10	Biomedical signal & Image acquisition using labview software	With data acquisition card	1	3.0
11	Workstations (5nos)	With large memory & high speed	10	10.0
12	Online UPS	5KVA	2	2.0
13	LCD Projector	XR 10s	1	1.0
Total				**35.00**

COMPUTER SCIENCE AND ENGINEERING

M.Tech Courses offered : **a) Computer Engineering**

b) Software Engineering

Sl. No	Name of Equipment/Facilities to be procured	Make , Model and specification of the Equipment	Quantity	Cost (Lakh Rs.)
1	Desktop Systems – 7 Numbers	**HCL Infiniti Pro BL 1330** Intel G41 Chipset based motherboard Intel Core 2 Duo E7500 2.93Ghz, 3MB 2 GB DDR-3 800Mhz RAM 500GB SATA HDD HCL TFT/LCD 19" Colr monitor	14	4.20
2	Network and accessories (Switch, Network Cabling)	CISCO 24 port Switch and CAT 6 cables		2.2
3	Multimedia projector	SONY VPL DX-15 * 0.63 (1.6 cm) XGA panel, 2,359,296 (1024 x 768 x 3) pix els *1.2 times zoom lens, f=18.63 to 22.36 mm, F 1.65 to 1.80	2	2.2
4	UPS	5 KVA 1 Hr Backup Aplab	2	5.0
5	Color Laser Printer	HP / Hewlett-Packard CP1215 Color LaserJet Printer, Ultra-compact Design, Simplified Control Panel, Instant-on Technology, 150-sheet Capacity, HP Color Toner, Easy-to-install Print Cartridges, Hi-Speed USB 2.0 Port	2	0.40
6	Multimedia Workstations	HCL-Intel core2quad 3.0 GHZ Processor, Intel extreme DP45FP Mother Board 4GB DDR-3 Ram (extend up to 8 GB) 500 GB SATA Hard drive NVIDIA Ge-Force 9800GT 512 MB DDR-3 Graphics card Portable DVD Writer (USB Connector) I Ball Workhorse Cabinet Logitech Wireless Keyboard and wireless mouse + 8 Rechargeable AA Size battery and rechargeable unit. SAMSUNG Sync Master 2033sw (15000:1) 20" Monitor	30	15.0

Sl. No	Name of Equipment/Facilities to be procured	Make , Model and specification of the Equipment	Quantity	Cost (Lakh Rs.)
7	Network and accessories (Switch, Network Cabling)	CISCO with 24 Port and CAT 6 Cables	1	1.0
8	Software Tools	(a) Lab View Full Development System, Windows(5 Users) (b) Image-Pro Analyzer 3D v7.0 Additional License(5 Users)	1	3.0
9	UPS	APLAB - 7.5 KVA 3 Hrs Backup	1	3.25
10	Color Printer	HP Color LaserJet Enterprise CP4020 Printer series	1	0.25
11	Blade server	DELL / HP	2	4.0
12	30 Desktop computers	DELL/HP/HCL	30	8.0
13	Wi-Fi/Network/accessories	CISCO	1	10.0
Total				58.50

ENVIRONMENTAL ENGINEERING

M.Tech Courses offered : a) Environmental Engineering

b) Health Science and water Engineering

Sl. No	Name of Equipment to be procured	Make, Model and specification of the Equipment	Quantity	Cost (Lakh Rs.)
1	COD analyzer (2 nos.)	HACH, Germany , 24 vials	2	2.00
2	BOD analyzer	HACH/ AQUALITIC, 6 bottles	1	0.80
3	UV Spectrophotometer (2 No.)	1cc Perspex cuboidal vials, Schimdzu, Japan	2	3.20
4	Compound microscope (2 No.)	Sartorius, 500X with camera facility	2	3.50
5	Vertical autoclave (2 No.)	Schimdzu, Japan, 100 L capacity	2	2.00
6	High volume air sampler fitted with cyclone (2 No.)	4 thimble, 100lpm, Schimdzu, Japan	2	1.20
7	X Ray diffractogram	Schimdzu, Japan, 1 – 16 D theta	1	7.30
8	COD analyzer	HACH, Germany , 24 vials		1.00
9	BOD analyzer	HACH/ AQUALITIC, 6 bottles	1	0.80
10	TOC analyzer	Schimdzu, Japan	1	2.00
11	AOX analyzer	1.5ml capacity carbon column, Skytech Systems/ Mitsubishi	1	6.90
12	CHNS analyzer	1g sludge/carbon analyzing capacity, Skytech Systems / Orbit	1	4.00
13	Bomb Colorimeter	10g capacity, Cole-Paramer/ Optics Technology	1	0.80
14	Particle size analyzer	Schimdzu, Japan, 0.01 to 5 microns, Malvern Instruments/ Sysbery	1	4.50
Total				**40.00**

POLYMER SCIENCE AND TECHNOLOGY

M.Tech Courses offered : Polymer Science and Technology

Sl. No	Name of Equipment to be procured	Make , Model and specification of the Equipment	Quantity	Total Cost (Lakh Rs.)
1.	Hot air ovens (5 nos)	Ambient to 250°C Dimension: 455mm x 455mm x 455mm Digital Temperature Controller cum Indicator	5	0.30
2.	Electronic balances – 1no.	Electronic top loading balances with transparent case having following specifications: Readability 0.1 mg Capacity 200g Repeatability 0.1 mg Linearity ± 0.2mg Stabilization time < 5 sec. Adjustment weight (Int. wt.)200g Adjustment weight (Ex. Wt.) 500 mg,1 gm,10gm, 50gm,100 gm,200gm.	1	0.40
3.	Distill water still with water flow sensor	• Typical unit is shown above;. • It should have 4 coils • Should be able to produce at least 5 liters per hour. • Unit should automatically shut –off if there is no water in-flow	1	0.15
4.	Fuming chamber	1.5mx0.75mx2.4m	1	1.00
5.	Renovation of Labs	Synthesis lab Physical chemistry lab Research _lab-1 (GMS) Research _lab-2 (SR) • Replacement of table tops sinks taps. • White washing of wails • Gas-line revamping • Painting of reagent racks	1	5.00
6.	Sp. Gravity balance	Suitable for direct measurement of SG of rubber lumps	1	0.10
7.	Centrifuge 1 No.	Up to 4500 RPM Should be capable of using 12x15 mm tubes	1	0.20

8.	Refrigerator	300 Liters Single door	1	0.20
9.	Heating mantles 10 Nos	1000 ml – 3 Nos 500 ml – 5 Nos. 250 ml – 2 Nos.	10	0.15
10.	High temperature Hydraulic Press	• 75 Tons capacity • Temperature: up to 450^{o}C	1	10.0
11.	VARTM facility	Basic module for training	1	10.0
12.	High speed hand operated circular saw	-	1	0.15
13.	Pendulum Impact tester for plastics (Izod / Charpy)	high-performance pendulum impact tester that precisely determines absorbed impact energy and resistance to breakage of plastic specimens. Should meet ASTM and ISO requirements and has the flexibility to satisfy future test standards. PC based Pentium processor and Windows based soft software High speed A/D converter with a 12-bit resolution Sampling rate: 500,000 samples/second Band Width: 1 MHz Automatic shut-off of sampling	1	15.0
14.	Molds for Inkection molding machine	To mold test speciens as per ASTM standards	1	2.70
15.	FT-IR library for the existing JASCO 4100 FTIR spectrophotometer	JASCO 4100	1	1.00
16.	Audio visual equipments for PG Class Rooms	• Overhead projector • LCD projector • Audio system	1	0.50
17.	Fuming duct	To be fabricated as per our requirements		1.50
18.	Air conditioners – 2 No.	2 Ton wall mount type	2	0.80
19.	Small capacity Compressor	• ½ “ oil free compressor • 1 HP motor • Single stage • Delivery: 3.1 cfm • Max. Working pressure: 8.5 kg.cm^{2}	1	0.20
Total				49.35

BIOTECHNOLOGY

M.Tech Courses Proposed: Biotechnology

Sl. No	Name of Equipment to be procured	Make , Model and specification of the Equipment	Quantity	Total Cost (in Lakh Rs.)
1	UV –visible spectrophotometer	Beckman	01	1.5
2	Centrifugal pumps	Remi	01	0.5
3	Submarine Gel electrophoresis system with power pack	Green view gel electrophoresis set, GVS 01(2No) GVS 03 (2No)	04	1.0
4	Vertical gel electrophoresis with power pack	Pharmacia/any other make	02	0.5
5	Stereo binocular Microscope with cold light illumination	DSS Image tech (Olympus	01	1.0
6	Micro centrifuge	JH BIO/any other make	02	1.0
7	Deep freezer (-20)	JH Bio/ any other make	01	1.0
8	Sieve shaker	MAC	01	0.5
9	Cyclone separator	VI Microsystems Pvt Ltd	01	1.0
10	Automated Thin Layer Chromatography System	Chromline	01	1.0
11	Cell homogenizer	Genetics Biotech	01	1.0
12	Ball mill	VI Microsystems Pvt Ltd	01	1.0
13	Liquid nitrogen containers different sizes	Deepak enterprises	04	1.2
14	Gel rocker	Bangalore Geni	01	0.5
15	Micropipettes All sizes (0.2-2µl, 0.5-10µl, 2-20 µl, 5-50 µl, 10-100 µl,20-200 µl,100-1000 µl)	(ecopipette) Labindia	02 sets	1.0
16	Digitally controlled Hot air ovens	MEMMERT/any other make	01	1.0
17	Digitally controlled incubator	MEMMERT/ any other make	02	1.0
18	Analytical Balance	Ohaus/any other make	02	1.0

19	Analytical pH meter	Eutech	01	0.5
20	Ultra-Sonicator	Alliance, ALUP 500 W	01	1.0
21	Light microscope system with Florescence, Phase, densitometer and Photomicrography.	DSS Image tech (Olympus)	01	3.0
22	Inverted stereo microscope with photomicrography	DSS Image tech (Olympus	01	1.0
23	Carbon dioxide incubator	JH BIO	01	1.3
24	Incubator Shaker	Scigenics	01	2.0
25	Viscometer	Brookfield	01	1.0
26	Hybridization Oven	JH Bio	01	1.0
27	Analytical Balance	Ohaus	01	1.0
28	Analytical pH meter	Eutech	01	1.0
Total				**29.50**

MODERNISATION OF CLASS ROOMS

Sl. No	Name of Equipment to be procured	Quantity	Total Cost (in Lakh Rs.)
1	Multimedia Projector (Ceiling Mounted)	30	10.50
2	Green glass board	30	4.50
3	Computer system	30	7.50
		Total	**22.50**

LIBRARY & LEARNING RESOURCES

Sl. No.	Item	Description			Total Amount (Lakh Rs.)
	1. E-Resources				
1	E-Resources	Engineering Books, Journals & Reference Materials, NPTEL Digital CD/DVD, videos , Knovel Library package etc.			45.00
Total					**45.00**
	2. Hardware and Software Components				
1	Server	DCIB blade with four Intel Xeon 5500 CPU with 8GB memory & 2TB storage with windows enterprise edition **DCIB blade servers:** We are proposing DCIB blade server with four slots populated. This may be expanded to 6 server based on the future requirement. Two blades has suggested for the Dspace requirement & another blade for the & virtual class room. **DCIB blade with Windows servers:** NAS storage We have also suggested NAS storage for the file serving requirement for the Dspace. Same NAS storage may be used for file serving requirement for the students also.			16.00
2	Keyboard & Monitor	42U rack with one keyboard & monitor We have proposed 42 U rack with one monitor & keyboard for providing centralized access to these servers.			0.50
3	LAN Setup	Wi-Fi connectivity			0.50
4	Software	Dspace Installation for one time with remote support for one year			2.60
5		2 Graphics work station with one back up Device for backing up the digital content			4.00
6	Scanner	Two medium / high end scanners			0.50
Total					**24.10**
	3. 3M Electromagnetic Tattle Tape /Strips and 3M RFID solution for the Library materials				
1	EM Detection system with single corridor with Buried cable Kit		1.00	6,35,000.00	6.35
2	Electromagnetic based Tattle tape security strips for books		40,000	9.50	3.80
3	Workstation – Circulation 946 workstation for De/Re-sensitizing of tattle tapes and check in/out of RFID tags		1.00	5,35,000.00	5.35
4	SELF CHECK SYSTEM for check in/out of items by students themselves		1.00	14,90,000.00	14.90
5	Book Drop		1.00	9,40,000.00	9.40
Total					**39.80**
Grand Total for Library and Learning Resources					**108.90**

ANNEXURE – 3

DETAILS ABOUT FURNITURE REQUIREMENT IN DIFFERENT DEPARTMENTS

Sl. No.	Department	Estimated Total Cost (Lakh Rs.)
1	Civil Engineering	**3.54**
2	Mechanical Engineering	**3.97**
3	Electrical & Electronics Engineering	**1.51**
4	Electronics & Communication	**3.62**
5	Instrumentation Technology	**2.00**
6	Computer Science & Engineering	**3.00**
7	Environmental Engineering	**3.92**
8	Polymer Science & Technology	**1.99**
9	Biotechnology	**1.90**
10	Class Room Modernization	**4.80**
Total		**30.25**

CIVIL ENGINEERING

Sl. No.	Details of Furniture	Quantity	Cost (Lakh Rs.)
1	Tables to house the equipments	10	1.00
2	Tables for computer systems	10	1.00
3	Chairs	15	0.60
4	Almirah's	04	0.52
5	storage cupboards	03	0.42
Total			**3.54**

MECHANICAL ENGINEERING

Sl. No.	Details of Furniture	Quantity	Cost (Lakh Rs.)
1	Tables	15	1.50
2	Chairs	30	1.20
3	Almirah's	3	0.42
4	storage Cabinets	5	0.65
5	White Board	2	0.20
Total			**3.97**

ELECTRICAL & ELECTRONICS ENGINEERING

Sl. No.	Details of Furniture	Quantity	Cost (Lakh Rs.)
1	Working tables with built-in power sockets	4	1.00
2	Chairs/Stools	5	0.12
3	Almirahs	3	0.39
Total			**1.51**

ELECTRONICS AND COMMUNICATION

Sl. No.	Details of Furniture	Quantity	Cost (Lakh Rs.)
1	Computer Tables and chairs	20	2.0
2	Almirahs	4	0.52
3	Executive Faculty Table	5	0.50
4	Executive chairs	15	0.60
Total			**3.62**

INSTRUMENTATION TECHNOLOGY

Sl. No.	Details of Furniture	Quantity	Cost (lakhs)
1	Computer tables	8	0.8
2	Chairs	20	0.8
3	White boards	2	0.2
4	Notice Boards	2	0.2
Total			**2.00**

COMPUTER SCIENCE & ENGINEERING

Sl. No.	Details of Furniture	Quantity	Cost (lakhs)
1	Computer Tables and Chairs	20	2.0
2	4 Almirah , white board, pin board, discussion table and chairs		1.0
Total			**3.00**

ENVIRONMENTAL ENGINEERING

Sl. No.	Details of Furniture	Quantity	Cost (lakhs)
1	Steel Almirahs	04	0.52
2	Tables	10	1.0
3	Computer Tables & chairs	20	2.0
4	White Board	02	0.2
5	Notice Board	02	0.2
Total			**3.92**

POLYMER SCIENCE AND TECHNOLOGY

Sl. No.	Details of Furniture	Quantity	Cost (lakhs)
1	Working tables (office type) with drawers 3'x5'	8	0.8
2	Chairs / Stools	20	0.80
3	Steel Almirah	03	0.39
Total			**1.99**

BIOTECHNOLOGY

Sl. No.	Details of Furniture	Quantity	Cost (lakhs)
1	Executive Tables	10	1.00
2	Storage cabinets, Book Racks	05	0.70
3	Chairs	05	0.20
Total			**1.90**

ANNEXURE - 4

ENGINEERING EDUCATION INNOVATION CENTRE (EEIC)

Background

There are 2872 degree level institutions[1] in engineering & technology in India with an annual intake capacity of 1,071,896 students. Many innovations are being introduced in engineering education in all over the globe. The NAE Vision of Engineer 2020 & Educating the Engineer of 2020 (USA) [2, 3] and Duderstadt Report on Engineering Education in the Changing World[4], Engineering Education Coalition Project funded by NSF USA, Learning Outcomes Approach introduced in ABET Accreditation System & European Higher Education Area, Indo-US Collaboration for Engineering Education (IUCEE) [5] and Mentor-Mentee Scheme of IIT Alumni [6], NPTEL [7] are a few examples. Engineering education in India except in IITs & NITs to some extent, haven't kept pace with the innovations in the area.

Problem of curriculum quality

Curricula for undergraduate and postgraduate programs are formulated on the basis of similar programs implemented elsewhere either in foreign universities or IITs. They usually follow the conventional route – basic science courses (common to all branches) ► engineering science courses ► engineering application courses ► engineering management course. All courses are college-based and engineering courses are essentially unidisciplinary. Students are rarely exposed to professional engineering practice & are not taken through the iterative process in engineering – analyze ► design ► test ►. They rarely study successes & failures in engineering.

Quality of undergraduate and postgraduate programs in engineering/technology is neither specified nor measured based on quality of *learning outcomes*. The NBA accreditation is input-based. Even so only3444 programs & 906 institutions have been accredited by NBA by July 2009[1].

Curriculum revisions are done using the scissors & paste method (cut some thing and add something else) rather than on the basis of evidence. The success is measured on the basis of students' achievement in examinations and placement data. There is no deliberate attempt in designing & executing demand-driven curricula.

Problem of faculty quantity

Annual growth rates of student outputs are estimated at 12.5%, 7.5% and 6.1% for BE/BTech, ME/MTech and PhD. The current faculty strength is about 80, 000. It is estimated that shortage of PhD qualified faculty exceeds 30,000 and ME/MTech qualified faculty exceeds 24,000. At a student–faculty ratio of 15:1, the total additional faculty requirement is of the order of 185, 000. This means about 17, 000 new faculty needs to be added each year[8].

Problem of faculty quality

Most faculty members in engineering colleges are not trained in learner-centric pedagogy. As a result teaching learning processes are essentially teacher-centric (using mainly the lecture method). Using active approaches to learning like the discovery learning, problem solving, cooperative learning and team building is very rare. There are deficiencies in subject matter competence of faculty members. Majority of faculty members have directly joined the teaching profession after obtaining their qualifications. They neither possess industrial experience nor are exposed to industrial processes and practices.

Non-Innovative system

Neither the faculty nor the administrators want to take risks in initiating and implementing innovatory approaches in curriculum design, teaching learning processes and performance evaluation of students and the associated components of the system due to prevailing non-innovative education system.

This proposal

EEIC proposed here is aimed at addressing these problems & provide the best possible learning experiences to students and enable SJCE to reach greater heights as a *leader engineering college*.

Objectives

- Research in Engineering & Technology Education
- Introducing innovations in Engineering & Technology Education
- Human Resource Development
- Establishing & operating Computerized Database
- Collaboration
- Publications

Activities

Research in Engineering & Technology Education

Forecasting demand for the type, quantity and quality of engineering education on a continuous basis through surveys

Undertaking research on problems related to curriculum, teaching learning processes, assessment of student performance, student-faculty interaction, departmental & institutional management, industry-institute interaction and utilization of educational resources, attracting high quality students for PG, PhD programs and faculty, finding solutions for implementation to support introduction of innovative approaches

Introducing innovations in Engineering & Technology Education

Creating a climate for introducing and encouraging innovations in engineering education amongst faculty, staff, students and management through print & electronic media campaigns, awareness programs/seminars/conferences

Redesigning the curricula of undergraduate and postgraduate programs in engineering & technology offered by the college based on the *learning outcomes approach* with built-in flexibility of not being restrictive in extending the boundaries of knowledge

Switching over to more learning-centric teaching learning processes in courses offered by all departments in SJCE gradually increasing the proportion of active learning methods like problem solving, team building, discovery learning & collaborative learning

As an initial step under 3.2.1 and 3.1.2, a course on interdisciplinary/multidisciplinary project requiring innovative & out-of-the box thinking will be introduced in 1st & 2nd semester. Students are expected to select projects of their choice and work in teams. Faculty inputs will be provided on design and innovation in engineering. Relevant technology-based learning materials developed by IITs under NPTEL will be made available to students. The students have to go through the iterative process (design-experiment-build-test) which a practicing engineer uses in his/her profession. A new facility (as detailed in 3.5.2) will be created with management & industry support to enable students to visualize, design, build & test their solution.

Monitoring the effectiveness of innovations introduced in curriculum, teaching learning processes and student evaluation through a performance evaluation system for students, and all categories of staff and the college as a whole based on measurement of performance indicators

Human Resource Development

Conducting short courses/workshops on integrating pedagogical principles with teaching engineering specific to each course based on best practices

Championing teaching & learning by celebrating & recognizing good teaching

Establishing & nurturing e-groups and networks among teaching community for exchanging best teaching practices and innovations in engineering education

Exploring the feasibility of offering long term programs in engineering education leading to Masters & PhD degrees

Establishing & operating Computerized Database on:

Interdisciplinary projects for solution by UG & PG students of SJCE in engineering & technology areas with particular emphasis on green technologies and alternate technologies for sustainable rural development

Research projects of national relevance in emerging areas of engineering & technology with particular emphasis on green technologies and engineering education

Abstracts of papers published nationally and internationally on innovations in engineering education with specific emphasis on curriculum, teaching learning processes & performance evaluation of students

Publishing principles of engineering pedagogy with examples on the SJCE website for use by students and teachers

Creating New facilities

Assessing adequacy of existing physical facilities – buildings& workshops, welding centre, equipment (HW & SW) & specialized industry-supported laboratories

Establishing new facilities like design-media (whole-room sketch based environment)-prototyping-fabricating-testing/measuring-demonstration-exhibition centre (like Ware lab, *tools*LAB-using digital tools in reorganizing knowledge sharing & knowledge building and its impact on learning & workplace practices in Virginia Tech, i2i Learning Laboratory at Purdue School of Engineering Education , Integrated Teaching & Learning Program & Laboratory and Discovery Learning Laboratories at University of Colorado at Boulder) that promotes multidisciplinary/transdisciplinary thinking resulting in innovative solutions

Collaboration

Interacting, networking, collaborating & utilizing the expertise of SJCE Alumni in India and abroad

Collaborating with organizations engaged in similar objectives in India & abroad like Purdue School of Engineering Education, Virginia Tech Engineering Education Department, Clemson University-Department of Science & Engineering Education, The Higher Education Academy (UK) [9], NITTTRs, INAE, CSIR, IITs, IUCEE & Industry

Publications

- EEIC Newsletter (monthly)
- A quarterly journal of Engineering Education Research & Innovation
- A digest of research & innovations carried out in India and abroad
- Annual Report

Advisory Committee

The existing academic committee of SJCE may be strengthened by including 3 leading engineering education researchers & innovators chosen from IITs/NTTTRIs/IGNOU

Resources

Buildings: 100 m^2 built-up office space with furniture & computers

Building & Equipment (HW & SW) for new facilities as required (See 3.5.2)

Faculty: Professor – 1, Assistant Professors – 4, Research Assistants – 3

Support Staff: Statistician – 1, Computer Operator – 1, Technicians for the new facility as required

Fellowships

a. PhD fellowships – 2 no. for faculty to acquire PhD in Engineering Education – one at Purdue School of Engineering Education and one at Virginia Tech
b. PG Certificate Fellowship – 2 no. for faculty to acquire PG Certificate in Engineering Education at Virginia Tech
c. Short Term Training Fellowships – 3 no. for technical support staff

Study Tour

a. 2 person months for the Principal and HODs to visit IITs (Chennai, Delhi, Kanpur, Kharagpur, Mumbai) to study the programs & facilities and interact with their faculty and technicians
b. 4 person months for the Principal and HODs to visit Virginia Tech Department of Engineering Education, Purdue School of Engineering Education, study the programs & facilities and interact with their faculty and technicians

Selection of Faculty

Bright graduates and postgraduates from SJCE/ NIE/IITs willing to join the teaching profession and serve as faculty members in SJCE for not less than 10 years may be selected. Selected postgraduates should be awarded PhD fellowships for study & research leading to PhD either at Purdue or at Virginia Tech or in an IIT where such a facility exists. Selected graduates should be sent to study leading to Postgraduate Certificate in Engineering Education at Virginia Tech. Till they return, a program coordinator may be employed to assist the Principal in undertaking preparatory steps needed to start the Centre.

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ANNEXURE - 5

CENTER FOR VEHICLE SAFETY, URBAN ECO-SYSTEM & TRANSPORTATION ENGINEERING (CVUT)

Vision and Mission Planned for the Center

Every 8 minutes one person dies in a road accident in India and 10 are injured. The problem of road safety is serious and it is genuine and yet it does not get the attention it deserves, because the attrition toll on the highways is not as dramatic as an air crash. There are problems right from the planning stage, vehicle design, certification, traffic volume monitoring and data collection, planning, supervision and maintenance of vehicles. Highway and city intersections are often glittered with broken windshields and are scattered with shoes, bits and pieces of vehicles and clothes with blood stains, which tell the tales of rolled over trucks and speeding buses. With each passing day, the situation is becoming more dangerous with almost every Indian family living in urban area loosing one of its family members or friends on the road.

A lethal combination of poor road planning, poor truck and bus body vehicle design, inadequate law enforcement, increase truck and bus traffic with a flood of untrained drivers have made India's the world's death capital. As the country's fast growing economy and huge population raises its importance on the world economic state, the raising number of road accidents is a reminder that the government is still struggling to keep its more than a billion people safe. By contract, China, which has also undergone an auto boom of its own, has demonstrated a fall in road deaths by adopting new designs for its highways segregating fast moving and slow moving traffic and vehicles. In a survey conducted by WHO (World Health Organization), the number of deaths in China due to road accidents was 73,500 as against India which had 1, 18,000.

India has the largest railway network in the world. It is the biggest government employer in the world, and profitable. In spite of all these accolades, in recent times India has witnessed several train accidents, after a brief investigation, the conclusions drawn are sabotage of rails, malfunctioning of the signals and unmanned level crossing. All these problems have an answer, Radio Frequency (RF) forward looking strobes is ideal and cost-effective solution for collision avoidance of any kind and sabotage of rails can be detected by pulse echo systems.

Yet another major area of concern is the air-traffic. The number of air-traffic density is growing rapidly, and there is serious lack of trained man power at air-traffic control stations, airport operations ground staff and run-way and parking area monitoring staff. Many accidents have been avoided by shear alertness of the staff concerned, however there is a need for instruments assisted system for safe airport operations.

The proposed objectives of this research center are

(1) Make trucks and buses safe on the road – by educating and training the drivers, install tamper proof vehicle monitoring systems with period check on maintenance, improve design of the existing bus and truck body design, design trailers to suite Indian road conditions, conduct survey and develop statistical models for providing solutions to specific problems – traffic density, environmental effects, professional maintained rest houses for long distance truck and bus drivers. Study various transportation models around the world, and adopt or modify the same for implementation for Indian conditions.

(2) Conduct surveys; perform analysis on rail transport systems, methods to improve fuel efficiency, cost-effective up-gradation plans, logistics management network, train accident avoidance technologies.

(3) Take up extensive air-traffic survey, perform analysis and comparative studies with respect to international standards, develop suitable management models, assist government agencies in identifying problem areas and provide specific solutions.

(4) Conduct traffic surveys to know traffic volume characteristic of vehicles on road like 2-wheeler, 3-wheeler (auto), 4-wheeler car, bus and trucks. Perform analysis to know what are the major factors influencing the accident with respect to Geo-metric characteristic, traffic characteristics and vehicle characteristics.

Proposed Activities at the Center

Department of Mechanical Engineering

Most often transportation engineering subjects are addressed mainly by civil engineering department, with supplementary support from the mechanical and environmental engineering. However, this trend is changing with increase in number of vehicles, their power, design, control methods and associated electronics. One of the best examples is micro-controllers mounted on Volvo buses, which continuously monitors and records most of the engine parameters, vehicle subsystems and vibration, which are then carefully reviewed by supervisory staff to access the condition of the engine and also the performance of the drivers. The supervisors in turn recommend to the monitoring agencies, the actions to be taken to ensure safe and efficient operation of the vehicles.

Under the TEQIP – Phase II program the department will take up the following activities:

(1) Bachelors and Master degree students will be given final year projects in road, rail and air-traffic areas, to generate necessary database, perform statistical analysis and to develop new designs and prototypes for field testing.
(2) Offer certificate courses in vehicle design, operation, monitoring and maintenance.
(3) Design and develop cost-effective vehicle and driver monitoring systems
(4) Conduct extensive survey of existing truck and bus body design and analyze failure modes and recommend changes to the Govt. for further implementation
(5) Offer certificate course in design, maintenance and operation of locomotives, provide training on advanced collision warning system for trains.
(6) Offer certificate courses on airport ground staff, maintenance of aircrafts, runway and parking bay monitoring systems.

Indian roads have a large number of trucks and buses operated by private transport operators, who have least regard for safety, driver's health, and goods that they transport. The above activities and its results and recommendation will provide the necessary input for the Government to initiate strong measures to ensure higher safety of its citizens.

In addition, to all these, technical functions, the center will take on social responsibility to educate and to create public awareness on transportation safety issues. At present, most organizations working for people awareness and safety, lack the necessary data and statistics to take up the cause with required level of force.

Department of Environmental Engineering

Any mode of transport has a strong influence on the environment, both in terms of pollution due to emissions from the moving vehicles and deforestation to make room for new roads, rail tracks and airports. One of the most glaring facts about urban leaving is lack of quality fresh air, which is most important for a human being to be healthy. In fact, many environmentalist call today's urban leaving as 'high-tech slums'.

This center intends to provide holistic solutions, well planned transportation system with balance environment comprising of lakes and tress along the way. The department will address the following needs:

(1) Extensive data collection, analysis and modeling of urban and semi-urban cities in India, focusing on transportation infracture and its influence on environment.

(2) M.Tech and PhD work in the area of alternate fuels, vehicle emission monitoring systems, impact on birds, animals and trees. Some of these projects will be done jointly with mechanical and electrical and electronics departments.

(3) Conduct certificate and short term courses on ecological balance for all sectors – industrial, transport, infrastructure, business.

(4) India saw an unprecedented and unexpected economic boom during the late 90s and early 2000; the government was unprepared to handle such a sudden change in economic pattern, resulting in chaotic situation in some of the urban areas. In order to ensure no such disorderly development happens in the future, the center will work on developing growth plans for long term and short terms models for urban and semi-urban areas.

Department of Civil Engineering

The major role of the civil engineering department in this proposed program is as follows:

(1) Improvement in transportation would bring in higher percentage of floating population in the cities, the city transportation systems must be designed to handle peak traffic loads – road, rail and air efficiently. This requires exceptional road layout, planning and signally systems.

(2) The department will take up design and analysis of roads, bridges for vehicular and train traffic. It will also work with airport authority of India in design and development of small airstrips and airports in Grade 2 cities.

(3) Bachelors, Master's and Doctoral degree students will have an opportunity to work with latest design software tools.

(4) Even after 60 years of India's Independence, one of the major limitations has been the availability of quality drinking water and sanitation. One of the objectives of this center will be to address this issue.

Vision for the Center

The **Main Vision for the center** is to educate planners, engineers, managers, government employees and public who are able to plan, functionally design and operate facilities and systems which satisfy the demand for both common people and freight transportation services. To fulfill both the traditional and urban mission the Center for Vehicle Safety

Studies has to establish strategic planning initiatives to fulfill both short- and long-term needs. The Transportation Studies at the Center shall:

- Improve and expand transportation education, training and research.
- Advance technology transfer and expertise.
- Foster sound linkages between the department, other University units, and the public and the private transportation sectors.
- Participate in local, state and central government research and training initiatives.

Mission for the Center

The Mission for the center is as follows:

1. To provide students with the professional knowledge and skills needed to compete successfully in a global economy;
2. To enhance students' abilities to develop creative solutions to complex problems in the context of socioeconomic and environment considerations; and
3. To develop innovative ways to address the Vehicle safety needs and problems.

Interactions Planned with San2 Inc

SAN2 Inc, USA, with vast experience in transportation field in North America, will facilitate and provide technological resource like Transportation software and equipments from America. Mr. Ashok Chatra, who is a Managing Director of SAN2 Inc., will involve in establishing collaborations with host institution in India (SJCE) and various distinguished institutions and Universities in Northern American Viz. University of Maryland at College Park, Morgan State University at Baltimore and University of Tennessee at Knoxville. SAN2 Inc will also facilitate the Memorandum of Understandings for mutual tie-up with Southeastern Transportation Center at Knoxville, and other transportation centers in North America; SAN2 can provide technical and handhold support for designing the courses, technical and teaching inputs to graduate courses and studies including various transportation consulting projects of India.

ANNEXURE - 6

Center of Excellence under TEQIP Phase-II

TELEMEDICINE AND REMOTE MONITORING OF RURAL HEALTH CARE

Real problems in the Rural Health Care in India

India's rural health centers are critically short of trained medical personnel. The country's 22,669 primary health centers are in sorry state of affairs increasing people's suffering. According to the recent National Rural Health Mission report nearly 8% PHC don't have a doctor while nearly 39% were running without a lab technician and about 17.7% without a pharmacist. The PHCs are supposed to have one medical officer supported by paramedical staff.

Innovation in technology can play a key role in reversing the scenario of both accessibility and manpower shortage. Convergence of telecommunications and IT has changed the life of a rural citizen in the past few decades and now convergence of cloud computing and wireless technologies could be useful in improving the quality of healthcare at affordable rates to rural India. Technologies like Rural Participatory Sensing (RuPS) and Wireless Sensor Networks (WSNs) can be very useful.

Since medical practitioners along with basic facilities such as clinics, medicines, hospitals, and diagnostic laboratories are not available in many rural areas of India-and these areas are located considerably far from each other and occupied by smaller communities in each location-setting up permanent facilities is not economical. Solutions that enable doctors located in a "central specialty center" to attend patients from multiple remote locations through a unique "hub and spoke" model are seen as an alternative. These centers in rural places are to have basic diagnostic equipment and an appointed paramedic who will conduct the physical examination and facilitate virtual (audio-video) consultation with a doctor on-line.

The key questions that need to be answered include: Which telemedicine applications can change the prevailing scenario? What adaptation strategies are needed to increase the adoption and bring down the cost of treatment? How are changes in ecosystems going to affect the treatment and health of the rural citizens? To answer these questions we will need technology advances and better observation systems.

Need of Cloud Computing

One industry that could get a serious advantage has, so far, not come up much in that conversation: health care. The truth of the matter is that the health care industry can take a huge edge in the emerging movement to cloud computing, considering how it needs to provide care to patients through federation and analysis of clinical data at some central location.

Most of us live in very populated centers with well-staffed and well-equipped clinics, having access to medical imaging systems and other diagnostic tools that make diagnosis and treatment more effective. But in rural areas, clinicians typically don't have direct access to the same technology, and in many instances have to send patients miles away for diagnosis and treatment.

Today, doctors have to rely on their own experience, conversations with colleagues, and publications to keep up with current treatments. But by rolling up treatment and outcome data

into a central data repository, doctors can use petabytes of information in a centralized, cloud-based database to determine exactly what's working to treat a diagnosed ailment. In other words, doctors would know what worked most of the time for others with the same issues and is very likely to be the best course of treatment. Doctors would be less likely to be using outdated assumptions or study results.

Objective

This project envisages a real time implementation and associated research and training activities related to

1. Remote Patient Monitoring
2. Wireless Health care will be the key factor for Broadband policy
3. Sharing, Analysis and Diagnostic of Patient Data Centers

Collaborations

1. BSNL, RTTC Mysore
2. Philips Innovation, health care, Bangalore
3. VM Ware, Bangalore
4. JSS Medical College, Mysore

Implementation Strategy

The remote monitoring data center will have all the necessary medical units, computers, software interfaces, I/O devices and measuring units for patient data diagnosis, analysis and drug administrations. Implication has three level strategies. First, collection of patient data, second analysis and diagnosis, and finally application. At each level both hardware/ software installations and deployment of medical units and connecting them over the broadband network connectivity.

Philips will provide necessary medical electronics equipment for diagnosis and analysis, VM ware will collaborate in the software development for automation and analysis. BSNL will deploy a Next generation switch (NGN) on the network which is operator independent and will provide connectivity to some villages over landline and mobile network. The data collected will be transmitted and can be analyzed and necessary diagnosis done by medical experts.

1. The department of E&C and department of Instrumentation Technology are involved in the academic aspects.
2. BSNL will deploy a Next generation Switch on their live network for this purpose.
3. Philips Innovation B'lore will be providing the necessary medical units such as, health monitoring units, scanners, ultra sound devices, etc.,
4. VM ware will provide the necessary cloud computing hardware and software to meet the requirements of the total health care data centers for diagnostics and analysis.

As an off shoot of this live project, associated research, training will also be taken up. Students of UG/PG and research will be involved on an interdisciplinary basis. Consultancy activity can also be taken up wherever possible.

Budget

The following organizations will co-ordinate the project to reach out the needs of rural health care. Many software interfaces have to be developed by the Collaborative research. Objective is to cover around 20 to 30 villages in the

Beginning and later it will be expanded.

Sl. No	Activites	Category of Expenditure	Cost (Lakhs Rs.)
1	Infrastructure improvement for R& D work	(1) Procurement of Goods Equipment – Next Generation Switch Medical Diagnostic Devices High - end Servers Software (diagnostic) tools Testing and Measuring Instruments b) Furniture	250.00
		(II) Refurbishment (Minor Civil Works)	15.00
		(III) Consultant Services	10.00
2	Additional Teaching Assistance & Research Assistance	TA & RA	50.00
3	Natl./Intl. collaborate for R& D organization	R & D	50.00
4	Faculty Training India/Abroad	Faculty and Staff Development	50.00
5	Collaboration with Industry	Industry Institute Interaction - IISc. VMware, BSNL, JSS	25.00
6	Operational costs	Incremental Operational Cost	50.00
TOTAL			**500.00**

ANNEXURE - 7

Center of Excellence under TEQIP Phase II

MITIGATION AGAINST NATURAL DISASTER (COMAND)

A disaster is a perceived tragedy, being either a natural calamity or man-made catastrophe. It is a hazard which has come to fruition. A hazard, in turn, is a situation which poses a level of threat to life, health, property, or that may deleteriously affect society or an environment.

A natural disaster can be broadly classified in to following three categories.

1. Earth related
2. Wind related
3. Water related

Earth related natural disasters are earthquakes, volcanoes and landslides. Wind related natural disasters are cyclones and hurricanes and Water related disasters are floods and Tsunami. In spite of the developments in science and technology, the knowledge on the effects of forces caused by such disasters on the structures have not been fully understood. The forces being unexpected, dynamic and huge in magnitude, it requires sufficient understanding of performance of structures against such forces. Further, ground on which these structures rest is likely to undergo degradation in strength and stiffness during the disaster. One of the means of understanding the performance of structures to these forces is to simulate the effect of disaster in the laboratory. Model tests are therefore important ingredients of research to understand the effects of such natural disasters.

Importance of Natural Disaster Mitigation

The initiative for disaster management globally started with the number of states of United Nations General Assembly declaring the 90s as the International Decade for Natural Disaster Reduction. This international initiation was conceived to motivate actions to reduce loss of life, property damage, social, economical and emotional disruption, etc. There is sufficient scientific and technical knowledge that cam save life and property from natural and other disasters. The international impact on the subject was expanded in May 1994 during the World Conference of Natural Disaster Reduction convened by the UN at Yokohama, Japan, in which including India 155 countries participated.

India has suffered during natural disasters on a regular basis whether it is Earthquake (Latur earthquake of 1993, Bhuj earthquake of 2001, Kashmir earthquake of 2005), Tsunami (caused during Sumatra earthquake of 2004), Floods (Karnataka and Andhra Pradesh of 2009), or Cyclone (Killer cyclone in Orissa of 1991). Karnataka is equally vulnerable to natural disasters such as floods, drought, land slides, etc. The following two tables (Table 1 and Table 2) provide the information about vulnerability of different states to such calamities.

Disaster Vulnerability of different States

Type of Disaster	States
E, F, C, D	Andhra Pradesh, Gujarat, Maharashtra and West Bengal
E, F, D	Bihar, Haryana, Jammu & Kashmir, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and Goa
E, F	Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Tamilnadu, Kerala, Mizoram, Assam, Tripura

E-Earthquake, F-Flood, C-Cyclone, D-Drought

Natural Disasters in India from 1990 to 2005 (Source : NIDM)

Natural Disaster	Frequency of Occurrence
Cyclones	4
Earthquakes	5
Floods	Every year
Droughts	Every 2-3 yrs
Tsunami	on 26 Dec 2004

List of expected National and International Partners

International	National		
University of Tokyo, Japan	NIDM, New Delhi	IIT, Kanpur	CPRI, Bangalore
International Center for Urban Safety Engineering, Japan	KERS, KR Sagar	IIT, Bombay	SERC, Chennai
Asian Institute of Technology, Bangkok	ATI, Mysore	IIT, Roorkee	IISc, Bangalore
Kagoshima University, Japan	IIT, Madras	NITK, Surathkal	IIT, Delhi

Objectives of the proposed Center

1. To establish a world class testing facility for studies related to most of natural disasters under one roof.
2. To expand scope for model testing of infrastructural facilities such as bridges, dams, tall structures, geotechnical facilities such as embankments, retaining walls, slopes, foundations, etc.
3. To create models of above mentioned structures and study their performance under forces exerted by simulating natural disaster using the facilities created.
4. To develop methodologies / design principles based on the findings especially with focus on national interest.
5. To attempt analytical support for the findings
6. To push the incorporation of new findings into Indian Standards Codal provisions and encourage government bodies, and private sectors to incorporate changes.

7. To create awareness among general public on the importance of natural disaster mitigation.
8. To share the facilities with other research organizations
9. To train working professionals, fellow teachers from other institutions in Natural Disaster management.

In India, there are a few laboratories that possess facilities for model testing. A few IITs, IISc, and central research laboratories such as SERC, Chennai and CPRI, Bangalore, possess the state of the art facility for model testing. Considering the amount of damage suffered in terms of loss of life and damage to life line and homes during the past disasters in India, a study on these aspects is vital.

It is proposed to build a state of the art model testing laboratory at one place for studies related to mitigation against natural disaster. The following are the facilities proposed.

List of major equipment proposed in the center

Sl No	Facility	Specification	Amount in Lakhs Rs
1	Shaking Table	One dimensional shaking at varying frequency and varying amplitude, 1200 kN pay load, 1 g max acceleration with transducers for dynamic motion measurement and pore pressure recording and 64 channel data logger	100.0
2	Wind Tunnel	6 directional wind tunnel 1.2 m X 1.2 m with controlled wind pressure and transducers	60.0
3	Flume Channel	Controlled water motion and transducers for measurement	30.0
4	Cyclic Triaxial Equipment	Testing soil specimens under cyclic loading at 1 Hz, and large strain level	25.0
Total			**215.0**

The main objective is to carry out model tests using the above facilities and make performance study of various facilities such as foundations, slopes, retaining walls, embankments, tall structures etc. The total expected budget requirement shall be around 500 Lakh Rupees.

Proposed budget for the Center

Sl No	Description	Estimated Cost (in Lakhs Rs.)
1	Equipment (Refer Table 4)	215.0
2	Furniture, Learning Resources, Refurbishment etc.	60.0
3	Teaching & Research Assistantships	50.0
4	Research & Development	50.0
5	Faculty & Staff Development	50.0
6	Industry Institute interaction	25.0
7	Incremental Operating Cost	50.0
Total		500.00

It is hoped that TEQIP II grant for establishing the center of excellence for mitigation against natural disaster will create interest among the faculties of Civil and Environmental engineering to enhance their research capabilities in the area, thereby helping the community as a whole.