

DEVELOPMENT PLAN FOR CENTENARY CELEBRATIONS

in

UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING
Bangalore University, Bangalore



1917

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Submitted to

GOVERNMENT OF KARNATAKA, BANGALORE
BANGALORE UNIVERSITY



Sir. M Visvesvaraya 1860-1962



UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING
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Bangalore

04-06-2015

To,
The Honøble Minister for Higher Education,
Government of Karnataka,
Bangalore.

Dear Sir,

Subject: Development Plan for Centenary Celebrations in University Visvesvaraya
College of Engineering, Bangalore University, Bangalore.

Ref: Proceedings of the meeting of the Vice Chancellor, Alumni and Honøble
Minister for Education, dated 5.8.2014 for autonomous status to UVCE and
vision report.

I am herewith submitting the Development Plan for Centenary Celebrations in University
Visvesvaraya College of Engineering, Bangalore University, Bangalore.

Thanking You,

Yours sincerely,

(Dr. Venugopal K R)
Principal

CC: 1) The Principal Secretary, Department of Higher Education, Government of Karnataka, Bangalore
2) The Vice Chancellor, Bangalore University, Bangalore
3) The Registrar, Bangalore University, Bangalore

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Preface

University Visvesvaraya College of Engineering (UVCE) was initially established as School of Mechanical Engineering in 1913 and as Government Engineering College in 1917 by Bharatha Ratna Sir. M Visvesvaraya. UVCE at K R circle has 15 acres of prime land including 3 acres of land for student's boys hostel. The heritage buildings of UVCE are modeled on the British imperial architectures. The Civil and Architecture departments are located in Jnana Bharathi campus. The Kempegowda Bangalore bus station, the Bangalore City Railway station and the Visvesvaraya Metro Station attached to the NCC block of UVCE provide excellent connectivity by road, rail and metro for the students all over the state.

The college sports activities in central college; placement, training, seminars, workshops and conferences at Jnanajyothi auditorium, the Alumni Association building adjacent to Mechanical block provides wonderful opportunities to the students of UVCE. The Mathematics, Chemistry and Physics departments along with the laboratories for UVCE are located at K R circle. The practical experiments of Electronics, Computer Science, Electrical Engineering, Workshop and Drawing are integrated into the curriculum of the engineering courses. The evening classes in the Department of Electronics and Mechanical Engineering conducted between 5.30 pm and 9.30 pm daily including Sundays has been convenient to the working people especially the women folk. The legacy, name and fame of UVCE has spread far and wide because of its cultural, education, location relevance and its close proximity to the Vidhana Soudha and Cubbon Park.

Placement activities take place throughout the year and round the clock enabling the students to bag coveted high profile jobs bringing immense satisfaction in their career. Sir M Visvesvaraya, Visionary, Architect and legend of modern Karnataka will be ever cherished in the heart of every engineer in the country. His dream location of UVCE at K R circle will remain for ages to come and places UVCE on the world engineering map. The experts, academicians, historians, students, well wishers, alumni have expressed that this monumental buildings have to be further strengthened at K R circle by constructing new buildings and utilizing the existing central college buildings and campus for its future growth.

University Visvesvaraya College of Engineering will be completing 100 years of academic excellence in 2016-17. With this backdrop, the Government of India, the Government of Karnataka and the Bangalore University have decided to celebrate the UVCE centenary in a befitting manner. Way back in 2009, the Bangalore University in its 82nd meeting of the syndicate had resolved to construct three new buildings i.e., Mechanical block, the Visvesvaraya Centenary block and Students Hostel block at UVCE, K R Circle. In the same year (2009) the government setup Prof. N Rudraiah committee to look into the aspects of carving out new universities from the existing Bangalore University. The committee recommended trifurcation of Bangalore University which includes the creation of the

Bangalore Central University with its headquarters at the Central college and University Visvesvaraya College of Engineering (Ref: 1 ó 4). The Karnataka State Higher Education Council proposed to create Bangalore North University out of the existing Bangalore University in 2011 (Ref: 5 ó 6).

Further, the University Visvesvaraya College of Engineering was selected under TEQIP I and TEQIP II for a grant of Rs. 26.25 crores between 2004 ó 2011 with a condition that University Visvesvaraya College of Engineering should become autonomous and also accredit its courses under NBA. The report of Prof. V K Aatre and Prof. R Natarajan, Mentor for TEQIP have emphasized the necessity of University Visvesvaraya College of Engineering to get autonomy. Accordingly, Bangalore University had brought out the vision report for University Visvesvaraya College of Engineering in 2011. Between January 2013 to December 2014 the experts in various committees to name a few, Prof. N Rudraiah, Prof. N R Shetty, Dr. M R Srinivasan, Prof. R Natarajan, Dr. V K Aatre, Prof. K R S Murthy, Prof. K Narahari, Prof. N Jayadev, Prof. Mohandas Pai, Dr. Chidananda Gowda have time and again stressed the need for autonomous status to UVCE (Ref: 7 ó 12).

The expert committee constituted by the government has recommended that UVCE be modeled as an IIT (Ref: 13, 34). The Honourable Minister for Education had called for meeting of alumni and it was decided that the Principal, UVCE prepare the vision report seeking funds for centenary celebrations in UVCE (Ref: 14-18, 26).

Further meetings were held with Professors, Nodal Officers, Student representatives, Placement Coordinators, Teaching, Non-teaching and Technical staff (Ref: 19-25) to appraise the necessity for UVCE to accredit its courses under NBA and be autonomous. The meeting of BOG held on 29.01.2015 resolved to seek funds of Rs. 100 crores from Government of Karnataka for the holistic development of UVCE (Ref: 27-29).

The cabinet of the Government of Karnataka in the meeting held on 25th May 2015 has approved for the trifurcation of the Bangalore University (Refs: 30, 32, 33, 43) with Central college and UVCE as the headquarters under Bangalore Central University. The Vice Chancellor, Bangalore University and Head of the Departments have met several times in bringing out the vision report, Choice Based Credit Systems (CBCS), application for NBA and autonomous status for UVCE (Ref: 31, 35, 36, 38, 42).

The Chairpersons of all the departments of UVCE have submitted the list of equipments to be procured for their departments (Ref: 37, 39, 40, 41). We thank the experts, academicians, historians, philanthropists, industrialists, entrepreneurs, faculty, alumni and students for their suggestions and precious time in the preparation of the vision report for UVCE centenary celebrations.

Dr. Venugopal K R
Principal, UVCE

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- 2) Proceedings of 49th meeting of the Bangalore University Syndicate, Item 12, 17th February 2006 for according financial power upto Rs.50,000 to the Principal.
- 3) Proceedings of 82nd meeting of the syndicate held on 2.4.2009 resolved to invite tenders for the designs of three buildings of UVCE namely, Department of Mechanical Engineering, Centenary building and UVCE Hostel.
- 4) Bangalore University Trifurcation: Prof. N Rudraiah Committee Report, dated 10.07.2009.
- 5) Approval of TEQIP 6II to UVCE based on IDP, April 2010.
- 6) Draft proposal to create Bangalore North University out of the existing Bangalore University by the Karnataka State Higher Education Council, dated 31.12.2010.
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- 8) Report submitted by Mentor Prof. R Natarajan, Former Chairman, AICTE, and Former Director, IIT, Madras under TEQIP 6 II, dated 30.10.2012 and 13.3.2014; NBA and Autonomous report.
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- 31) Achievement and Supplementary Institutional Development Plan under TEQIP-II, dated 16.03.2015.
- 32) Trifurcation of Bangalore University Cabinet meeting held on 19.03.2015.
- 33) Direction from the Honøble Minister for Higher Education, dated 26.3.2015.
- 34) Restructuring of Bangalore University Committee report, dated 26.03.2015.
- 35) Meeting of the BOG along with Chairman, Dr. B Thimme Gowda, Vice Chancellor, Bangalore University, Bangalore, Dr. N R Shetty, Dr. Chidananda Gowda, Stake Holders and Performance Auditor, Prof. R K Dubey, Professor, IIT, Kanpur, dated 30th and 31st march - 1st and 2nd April 2015.
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- 42) Proceedings of meeting of the Vice Chancellor and Chairpersons of all the Departments, Physics, Chemistry and Mathematics for choice based system, dated 22.05.2015.
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Abstract

University Visvesvaraya College of Engineering (UVCE) was started as a School of Mechanical Engineering by Bharat Ratna Sir. M. Visvesvaraya in the year 1913 and later was converted to a full-fledged Engineering College in the year 1917 under the name *Government Engineering College* and was affiliated to the University of Mysore. It is the fifth Engineering College established in the country.

The Institution currently offers Seven Undergraduate (B.E / B.Arch) Full-time, three Undergraduate (B.E) Part-time and Twenty Four Postgraduate (M.E / M.Arch.) Programmes. The Institution has awarded 178 Ph.D degrees. The Institution has 79 eligible faculties to guide Ph.D students and presently more than 250 candidates pursuing their Ph.D. The faculty members of the institution has presented and published more than 500 technical papers in the last 3 years in International refereed Journals and National / International Conferences.

The Department of Civil Engineering being a recognized QIP centre from MHRD, has completed more than 1000 consultancy projects. The teaching faculty has completed/ engaged in a number of R & D projects sponsored by UGC, AICTE, MHRD, AR&DB, ADA, Naval Research Board, National Highways, etc. including an Indo-European project. Sixty two Books have been published by the faculty members of UVCE. The faculty have filed 92 patents. More than 1000 projects have been completed in Departments of Civil and Architecture.

Presently, 110 full-time faculty members are serving the Institute, of which 69 faculty members possess Ph.D degrees. Twenty Three faculty members are pursuing their Doctoral Programme. There are 33 Professors, 45 Associate Professors and 32 Assistant Professor and one faculty member from the Department of Physical Education, Bangalore University. In addition, sixty reputed and experienced teachers are rendering their services as Guest faculty.

There are around 4332 UG, PG, Ph.D students pursuing their degree at UVCE with a student-teacher ratio of 1:22.5. There are 1300 women students, 1300 SC students, 130 ST students and 2400 OBC students. The transition rate of all students from 1st year to 2nd year is around 95%, the transition rate of SC, ST and OBC students are around 91%, 90% and 96% respectively.

The centenary celebrations of UVCE will be held in 2017. We are approaching the funding agencies viz., Government of India and Government of Karnataka to support the University Visvesvaraya College of Engineering.

Funding Agencies

Year/ Name of Organization	2015-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	Total Rs. in crores
Govt. of India		100							100
Govt. of Karnataka		40	30	30					100
UVCE Tuition Fee	4+8	12	12	12	12	12	12	12	96
Total in Rs. Two hundred and Ninty two Crores									296

Grand Total Rs. in Crores: 296

We are expecting above funds Rs. 296 crores from the academic year 2015-16 to 2022-23. These funds are used for our buildings viz. Mechanical Block, University Centenary Lecture Complex, Hostel-Boys & Girls, Civil Block, Architecture Block and Library. Ninety Percent of the funds are utilized for the buildings.

The State Government can consider an additional special grant of Rs. 100 crores over next three years. Sixty percent of the funds are utilized for salary and the remaining Forty percent for equipment and buildings.

The fees collected from 4332 students of UVCE is about Rs. 12 crores per annum. This may be allocated to complete the new buildings and refurbish the old buildings. (Civil block, Architecture block and hostels)

Overall Budget Estimation of UVCE for 2016-17, 2017-18 and 2018-19

Sl No	Activities	Amount (Rs. In Crores)			
		Project Life Allocation	Financi al Year 2016- 17	Financial Year 2017-18	Financial Year 2018-19
1	Infrastructure				
	1.1 Modernization and Strengthening of laboratories (Annexure 1.1)	12.96	7.42	2.96	2.58
	1.2 Establishment of new Laboratories for Existing UG and PG programs and for New PG programs (Annexure 1.2)	27.16	13.85	8.42	4.89
	1.3 Modernization of classrooms (Annexure 1.3)	1.56	0.8	0.4	0.36
	1.4 Updating of learning Resources (Annexure 1.4)	3.64	1.7	1.1	0.86
	1.5 Procurement of furniture (Annexure 1.5)	2.28	1.23	0.55	0.5
	1.6 Establishment /up gradation of central and departmental computer centers (Annexure 1.6)	1.33	0.63	0.37	0.33
	1.7 Modernization/improvement of supporting departments (Annexure 1.7)	0.22	0.08	0.07	0.06
	1.8 Modernization and strengthening of libraries and increasing access to knowledge (Annexure 1.8)	1.28	0.46	0.42	0.4
	1.9 Refurbishment (Minor Civil Works) (Annexure 1.9)	1.93	0.86	0.55	0.52
2	Research and Development support				
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines (Annexure 2.1)	6.35	2.85	1.8	1.69
	2.2 Provision of resources for research support (Annexure 2.2)	2.70	1.36	0.7	0.64
	2.3 .1Enhancement of R&D and industrial consultancy activities (Annexure 2.3.1)	0.80	0.34	0.24	0.22
	2.3.2 Establishment of center of Excellence (Annexure 2.3.2)	16.00	7.48	5.68	2.85
3	Faculty Development support				
	a) Faculty Appointment	60.00	-	30.00	30.00
	Faculty and staff development for improved competence based on TNA (Annexure 3.1)	4.89	2.08	1.51	1.3
4	Institutional reforms				
	4.1 Technical assistance for procurement and academic activities	0.48	0.16	0.16	0.16
	4.2 Institutional management capacity enhancement (Annexure 4.2)	0.66	0.24	0.22	0.23
5	Academic support				
	5.1 Creation of new Department/courses	140.00	50.00	50.00	40.00
	5.2 Enhanced interaction with industry (Annexure 5.2)	0.8	0.3	0.26	0.24
	5.3 Student support activities (Annexure5.3)	0.79	0.3	0.25	0.24
6	Others	6.35	2.65	1.95	1.75
	Total	292.2	94.79	107.6	89.81

Annexures are consolidation of all Annexures tabulated on Page Nos: Civil (200), Mechanical (211), Electrical (223), Architecture(235), Electronics(243), and Computer Science and Engg.(258)

CHAPTER 1

INTRODUCTION

1.1 Preamble

University Visvesvaraya College of Engineering (UVCE) was started as a School of Mechanical Engineering by Bharat Ratna Sir. M. Visvesvaraya in the year 1913 to meet the needs of the State for skilled workers with S V Setty as its Superintendent. Later, it was converted to a full-fledged Engineering College in the year 1917 under the name *Government Engineering College* and was affiliated to the University of Mysore. It is the fifth Engineering College to be established in the country.

After the formation of Bangalore University in 1964, UVCE became one of the Constituent Colleges of Bangalore University. This is one of the oldest Institutions in the country imparting technical education leading to B.E, M.E, B.Arch., M.Sc. (Engineering), M.Arch and Ph.D degrees in various disciplines of Engineering and Architecture.

The Institution has grown by leaps and bounds producing highly competent graduates, postgraduates and doctorates who have occupied prestigious positions both in India and abroad. The pioneering Institution has grown manifold and has acquired a leading position in Technical Education and is rated among the top twenty-five Engineering colleges in the country.

UVCE ranks:

- 40th in Top 50 Indian Government Engineering Colleges in India, 2007
- 47th by Outlook: Top 75 colleges in India, 2009
- 24th in Best Engineering colleges in India as per survey conducted by India Today and Nielsen company for the year 2011
- 37th in Best Engineering colleges in India as per survey conducted by The Week for the year 2012.

The City campus is situated at K.R. Circle and is in the neighbourhood of Vidhana Soudha, Government of Karnataka. The Department of Mechanical Engineering, Department of Electrical Engineering, Department of Electronics Engineering and Department of Computer Science and Engineering, is spread over 15 acres of land, in the heart of the city at K.R. Circle. Proximity to the city bus stand and Visvesvaraya Metro Station connects one easily to any part of the city. The Departments of Civil Engineering and Architecture are located in the salubrious outskirts of Bangalore City at Jnanabharathi Campus.

1.2 VISION

The vision of UVCE is to strive for excellence in Advancing Engineering Education through path breaking innovations across the frontiers of human knowledge to realize a vibrant, inclusive and humane society.

1.3 MISSION

The mission of UVCE is to prepare human resource and global leaders to achieve the above vision through discovery, invention and develop friendly technologies to promote scientific temper for a healthy society. UVCE shapes engineers to respond competently and confidently to the economic, social and organizational challenges arising from globally advancing technical needs.

1.4 GOALS

The goals of the UVCE are to substantially increase the capability to become more dynamic, demand driven, quality conscious, efficient and forward looking, responsive to rapid economic and technological development both at National and Global level by undertaking the following:

- (i) Build infrastructure (Mechanical Block, Visvesvaraya Centenary Block, Hostel Block, Visvesvaraya Metro Block and Laboratories) to compete globally.
- (ii) Increase in recruitment of faculties from 175 to 500 in 12th and 13th five year plan.
- (iii) Starting of new PG, UG, PGDM and Skill Development Programs.
- (iv) Increase in the number of Under Graduates (4000 to 8000), Post Graduates (400 to 800) and Ph.Ds from 250 to 500 produced from the Institution; training and increase in employability of UG, PG and Ph.D Students.
- (v) Placement to all students, enhanced employability, scholarship to all meritorious, socially and economically challenged students.
- (vi) Increase in the number of faculty members involved in guiding Ph.D Research Scholars and encourage Interdisciplinary Research activities through Institution - Industry Interactions, collaboration with Corporate, Research Organizations and Foreign Universities.
- (vii) Establish Centres of Excellence catering to the research needs in the high end technology areas.
- (viii) Increase Internal Revenue Generation (IRG) and make it self-sustaining.

1.5 Infrastructure of the Institution

The Institution currently offers Seven Undergraduate (B.E / B.Arch) Full-time, three Undergraduate (B.E) Part-time and Twenty Four Postgraduate (M.E / M.Arch.) Programmes. The Institution has awarded 178 Ph.D degrees. The Institution has 79 eligible faculties to guide Ph.D students and presently more than 300 candidates pursuing their Ph.D. The Institution has presented and published more than 500 technical papers in the last 3 years in International refereed Journals and National / International Conferences.

The Department of Civil Engineering being a recognized QIP centre from MHRD, has completed more than 1000 consultancy projects. The teaching faculty has completed/ engaged in a number of R & D projects sponsored by UGC, AICTE, MHRD, AR&DB, ADA, Naval Research Board, National Highways, etc. including an Indo-European project. Sixty two Books have been published by the faculty members of UVCE. The faculty have filed 73 patents.

Presently, 110 full-time faculty members are serving the Institute, of which 69 faculty members possess Ph.D degrees. Twenty Three faculty members are pursuing their Doctoral Programme. There are 33 Professors, 45 Associate Professors and 32 Assistant Professors and one faculty member from the Department of Physical Education, Bangalore University. In addition, sixty reputed and experienced teachers are rendering their services as Guest faculty.

UVCE is recognized by the All India Council of Technical Education of the Government of India (AICTE) and is a recipient of financial aid under World Bank's Technical Education Quality Improvement Programme (TEQIP) totally Rs. 26.5 crores from Phase I and Phase II.

UVCE has an excellent Industry-Institution Interaction with reputed global companies. Excellent technical training is provided in the Institution to the students with regular mock aptitude tests, group discussions, soft skills, personality development and case studies to meet the expectations of the industry. There are around 4332 UG, PG, Ph.D students pursuing their degree at UVCE with a student-teacher ratio of 1:22.5. There are 1300 women students, 1300 SC students, 130 ST students and 2400 OBC students. The transition rate of all students from 1st year to 2nd year is around 95%, the transition rate of SC, ST and OBC students are around 91%, 90% and 96% respectively.

The tuition fee is the least in the state with UG students paying a tuition fee of Rs. 22,430 and PG students pay an tuition fee of Rs. 31,820 that amounts to more than Rs. 12 Crores per annum. More than 60% of the students receive scholarships to a tune of Rs. 7 Crores viz., GATE, TEQIP, PG CET, Minority, OBC, SC/ST, UVCE Alumni, Army etc., from various organizations/bodies namely AICTE, TEQIP, Government of Karnataka, Government of India etc.

Nearly 80 % of the UG students and 35 % of PG students get placed through campus interviews every year. The institute has around 800 high-end computers with an internet connectivity of 100 Mbps extendable to 1Gbps. UVCE Library has around 1,50,000 text and reference books.

1.6. Academic Reputation

- (i) UVCE produces 98% results in Undergraduate and 99% results in postgraduate courses.
- (ii) Nearly 55 % of the Postgraduate students undertake Internship or summer training at various Industries for a period ranging from 6 months to 1 year.
- (iii) Placements in the Department of Computer Science & Engineering, Information Science & Engineering and Electronics & Communication Engineering has reached nearly 100%.

1.7. Academic Achievements of the Staff.

- (i) UVCE has well qualified, experienced and dedicated Teaching Staff with an average teaching experience of 20 years and Technical Staff having an average experience of 25 years.
- (ii) 64% of the faculty are with Ph.D. degree and another 20% are in the process of completion.
- (iii) The Institution has presented and published more than 500 technical papers in the last 3 years in International refereed Journals and National / International Conferences.
- (iv) Books Published by the faculty till date: 62
- (v) Patents Filed till date: 92
- (vi) Ph.Ds awarded till date: 178.
- (vii) Ph.Ds awarded in the last three years: 68
- (viii) Students registered presently for Ph.D Programme: 251
- (ix) Consultancy Projects completed till date: 1000+

- (x) Research projects completed/ongoing since 1998 till date generating revenue to a tune of 239.74 Lakhs ó 18
- (xi) Padma Vibhushan conferred on UVCE Alumni: 3

1.8. Mode of Admission of Students and Recruitment of Teachers.

UG Students are admitted on merit basis through entrance conducted by KEA. Candidates belonging to Union Territory, Government of India, are also admitted by the Central Government. PG Students are enrolled through PG CET conducted by KEA, GATE and Ph.D students are admitted through Entrance Examination conducted by Bangalore University. Teachers are appointed through interviews by open selection.

1.9. Library and Laboratories.

UVCE is spread across two campuses, one at K R Circle with an area of 15 acres and another with 50 acres at Jnanabharathi campus. The institution has a total built up area of about 20,000 sq mtrs, 53 Laboratories and 1,50,000 volumes of books in the library.

1.10. Institutional Management.

UVCE is a Constituent College of Bangalore University under the Government of Karnataka. The institution is governed by the KSU Act 2000 comprising of the following bodies: The Academic Council, The Syndicate, The Faculties, Finance Committee, Board of Studies and Department of Studies. The Board of Governors is constituted to carry out the activities under TEQIP-II.

The students (UG, PG and Ph.D) and Faculty benefit by attending Seminars, Workshops, Expert Lectures, National and International Conferences. The faculty are involved in research projects funded by external agencies like DST, VGST, AICTE, etc. Most of the Faculty are consultants in State and Central Government Projects.

1.11. Financial Resources of the Institution.

- Annual Budget is allocated from the State Government Budget and Bangalore University.
- UVCE is a recipient of financial aid under World Bank's Technical Education Quality Improvement Programme (TEQIP). A sum of Rs. 14.5 Crores during Phase-I and a sum of Rs. 12.5 Crores during Phase-II is sanctioned.

CHAPTER 2

BASIC INFORMATION OF THE INSTITUTION

2.1. Institutional Identity

- Name of the Institution : University Visvesvaraya College of Engineering (UVCE)
- Year of Establishment : 1917
- Name of the Principal : Dr. Venugopal K R
- AICTE approved : Yes
- AICTE approval No. : South-West/1-2016821057/2014/EOA dated: 04/06/2014
(Copy Enclosed)
- Type of Institution : Government funded Constituent College of Bangalore University
- Status of Institution : Constituent College of Bangalore University

2.2. Academic Information

The institution currently offers Seven Under Graduate (B.E / B.Arch), Twenty Four Post Graduate (M.E. / M. Arch.) Programmes and Ph.D. programmes. The Programmes are listed below:

UG/PG/Ph.D. Programmes offered in Academic year 2015-16

Total Number of Students: 4332 as on the Academic Year 2015 - 2016

I. Under Graduate Programmes

Sl. No	Title of Programme	Duration in Years	Year of Starting	AICTE Intake	Student Strength *
1	Civil Engineering (B.E.)	4 Years	1917	210	724
2	Mechanical Engineering (B.E.)	4 Years	1917	105	480
3	Electrical & Electronics Engineering (B.E)	4 Years	1921	85	385
4	Architecture (B.Arch.)	5 Years	1967	40	200
5	Electronics & Communication Engg. (B.E)	4 Years	1969	66	306
6	Computer Science and Engineering. (B.E)	4 Years	1983	75	345
7	Information Science & Engineering. (B.E)	4 Years	2002	65	290
8	Electronics & Communication Engg. **	3 Years	1972	60	180
9	Mechanical Engineering **	3 Years	2001	60	180
10	Civil Engineering **	3 Years	2012	60	180
Total				826	3270

Note :- * Includes supernumerary, lateral entry and Government of India (GoI) Exchange Programme

** B.E Evening course from 5:30 pm to 9:30 pm

II. Post graduate Programmes

Sl. No	Title of Programme	Year of Starting	AICTE Intake	Student Strength
(i) Department of Civil Engineering (M.E)				
1	Structural Engineering	1961	14	28
2	Highway Engineering	1963	10	20
3	Pre-stressed Concrete	1965	10	20
4	Geo-Technical Engineering	1963	12	24
5	Environmental Engineering	1969	10	20
6	Water Resource Engineering	1981	10	20
7	Construction Technology	1990	10	20
8	Earthquake Engineering	2008	18	36
(ii) Department of Mechanical Engineering (M.E)				
9	Machine Design	1964	18	34
10	Manufacturing Science and Engineering	1974	18	36
11	Thermal Science and Engineering	2001	18	35
12	Advanced Material Technology	2008	18	36
(iii) Department of Electrical and Electronics Engineering (M.E)				
13	Power and Energy Systems	1970	14	28
14	Power Electronics	1994	18	36
15	Control and Instrumentation	2008	18	36
(iv) Department of Electronics and Communication Engineering (M.E)				
16	Electronics and Communication Engineering	1987	25	50
(v) Department of Computer Science and Engineering (M.E)				
17	Computer Science and Engineering	1994	18	35
18	Information Technology	2004	25	43
19	Computer Networking	2008	18	35
20	Web Technologies	2008	18	36
21	Software Engineering	2008	18	36
22	Bioinformatics	2008	18	32
(vi) Department of Architecture (M. Arch)				
23	Construction and Project Management	2008	18	08
24	Landscape Architecture	2008	18	12
Total			392	716

III. Ph.D. Programmes (Full Time – 3 to 5 Years, Part Time – 4 to 6 Years)

Sl. No	Title of Programme	Year of Starting	Student Strength
1	Civil Engineering	1967	74
2	Mechanical Engineering	1965	103
3	Electrical Engineering	1981	6
4	Electronics and Communication Engineering	1987	24
5	Computer Science and Engineering	2001	44
6	Architecture	2009	--
Total			251

2.3. Faculty Status (Regular/On - Contract Faculty as on March 31, 2015)

Faculty Rank	No of Regular Sanctioned Posts	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				Master Degree				Bachelor Degree						
		Engg. Discipline		Other Discipline		Engg. Discipline		Other Discipline		Engg. 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
Prof.	26	24	12	4	-	4	-	-	-	1	-	-	-	29	-	12
Asso. Prof.	47	25	6	7	-	13	9	-	-	-	-	-	-	38	18	18
Asst. Prof.	102	6	-	-	-	24	39	-	-	2	-	-	-	32	58	46
Total	175	55	18	11	-	41	48	-	-	3	-	-	-	99	76	76

Prof = Professor, Assoc. Prof = Associate Professor, Asst. Prof = Assistant Professor, R = Regular, C = Contract
The column 5, 9, 10 includes teachers in Physics, Chemistry, Mathematics, Kannada, Environmental Science and Law from the Departments of Bangalore University totaling to 11 teachers.

The number of sanctioned posts = 186

List of Regular and Guest Faculty

I. List of Regular Faculty

Principal: Dr. Venugopal K R

I Department of Mechanical Engineering

Sl. No	Name (s) of the Teaching Faculty	Designation (Assistant Professor/ Associate Professor/ Professor)	Date of Joining the Institution	Highest Qualification	Experience (in Years)		
					a) Teaching	b) Industry	c) Research
					a	b	c
	Dr. N. Lakshmana Swamy						
	Chairperson						
01	Sri. M. Vishnu Kumar	Professor	22.09.1982	ME	28	-	-
02	Dr. K.V.Sharma	Professor	05.12.1985 Lecturer As TA 25/1/1988	Ph.D	25	0.5	18
03	Dr. P. Vijaya Kumar	Professor	28.01.1988	Ph.D	28	10	18

04	Dr. Paul Vizhian S	Professor	28.01.1988	Ph.D	25	--	18
05	Dr. G. Harish	Professor	01.02.1988	Ph.D	26	-	10
06	Dr. N. Lakshmana Swamy	Professor	02.02.1988	Ph.D	26	-	19
07	Dr. B.K. Muralidhar	Professor	01.02.1995	Ph.D	26	4	24
08	Dr.B.M. Rajaprakash	Professor	08.02.1988	Ph.D	26	--	18
09	Dr. U N Kempaiah	Professor	15.05.2013	Ph.D	25	1	15
10	Dr. S. Ranganatha	Professor	Feb. 1988	Ph.D	26	06	16
11	Dr. C.K. Umesh	Professor	28.09.1995	Ph.D	24	01	15
12	Sri V. Ramamurthy	Associate Professor	17.07.1989	MS	24	04	02
13	Dr. Shivarudraiah	Associate Professor	12.09.1995	Ph.D	24	--	15
14	Dr. H.N. Vidyasagar	Associate Professor	28.09.1998	Ph.D	23		18
15	Dr. Chandrashekhar Bendigeri	Associate Professor	26.11.1998	Ph.D	15	01	10
16	Dr. H.K. Shivanand	Associate Professor	04.02.2006	Ph.D	16	01	10
17	Dr. D.K. Ramesh	Associate Professor	02.04.2008	Ph.D	15	--	10
18	Dr. H.C. Chittappa	Associate Professor	13.09.1995	Ph.D	18	02	15
19	Dr. Shantharaja M	Associate Professor	04.02.2006	Ph.D	15	02	08
20	Sri. Hanumantharaju H.G	Assistant Professor	06.02.2006	M.E	15	08	08
21	Sri G. Prem Kumar	Assistant Professor	17.02.2006	M.Tech	07	--	07
22	Sri. R.Rajashekar	Assistant Professor	10.02.2006	M.E.	07	01	04
23	Dr. Saravanan R	Assistant Professor	07.06.2006	Ph.D	07	06	06

II Department of Electrical Engineering

Sl. No	Name (s) of the Teaching Faculty	Designation (Assistant Professor/ Associate Professor/ Professor)	Date of Joining the Institution	Highest Qualification	Experience (in Years)		
					a) Teaching	b) Industry	c) Research
					a	b	c
	Dr Y. R. Manjunatha	Chairperson					
24	Dr. V Satyanagakumar	Professor	12-02-82	PhD	32	--	05
25	Ms. M N Suneetha	Associate Professor	19-11-93	ME	17	--	--
26	Dr Y. R. Manjunatha	Associate Professor	02-04-08	PhD	10	03	--
27	Dr. E G Shivakumar	Associate Professor	11-09-95	PhD	17	03	05
28	Dr. B P Harish	Associate Professor	06-09-95	PhD	14	--	04
29	Mr. D Venkatesh	Sr Assistant Professor	13-04-88	BE	27	--	--
30	Mr. M V Kashinath	Associate Professor	07-04-88	ME	27	--	--
31	Ms. B C Sujatha	Associate Professor	15-12-95	ME	20	--	--
32	Dr. T S Prasanna	Associate Professor	28-03-96	PhD	19	--	01
33	Mr. H R Ramesh	Associate Professor	01-03-06	ME	10	--	--
34	Ms. H S Veena	Sr. Assistant Professor	24-09-98	ME	17	--	--
35	Mr. K P Guruswamy	Assistant Professor	03-03-06	ME	09	--	--
36	Mr. J Madhusudhana	Assistant Professor	06-03-06	ME	09	01	--
37	Ms. K P Shobha	Assistant Professor	08-03-06	ME	09	--	--
38	Mr. T N Raghavandra	Assistant Professor	09-03-06	ME	09	--	--
39	Mr. N Manjappa	Assistant Professor	08-03-06	MTech	09	--	--
40	Mr. H Prasanna Kumar	Assistant Professor	29-06-06	MTech	08	01	--
41	Mr. C M Maheshan	Assistant Professor	19-04-07	ME	08	01	--

III Department of Electronics & Communication Engineering

Sl. No	Name (s) of the Teaching Faculty	Designation (Assistant Professor/ Associate Professor/ Professor)	Date of Joining the Institution	Highest Qualification	Experience (in Years)		
					a) Teaching	b) Industry	c) Research
					a	b	c
	Dr.Sudheer.M.L.	Chairperson					
42	Dr.Narendra Kumar. G	Professor	20.07.90	Ph.D	25		
43	Dr.Sudheer.M.L.	Professor	25.07.90	Ph.D	15	03	
44	Dr. Raja.K.B.	Professor	07.04.88	Ph.D	27		
45	Dr.Suresh Babu.K	Professor	18.06.90	Ph.D	25		
46	Mr.Venugopal.B.K	Associate Professor	08.04.88	M.E	27		
47	Mr.Sreenivasa Murthy.A	Associate Professor	30.09.88	M.E	27	07	
48	Mr.Hanumanthappa. S	Assistant Professor	08.10.93	B.E	22		

IV Department of Computer Science & Engineering

Sl. No	Name (s) of the Teaching Faculty	Designation (Assistant Professor/ Associate Professor/ Professor)	Date of Joining the Institution	Highest Qualification	Experience (in Years)		
					a) Teaching	b) Industry	c) Research
					A	b	c
	Dr. P Deepa Shenoy	Chairperson					
49	Dr.Venugopal K R	Professor	1982	Ph.D	33	02	28
50	Dr. P Deepa Shenoy	Professor	1986	Ph.D	29	-	10
51	Dr. Thriveni J	Associate Professor	2008	PhD	20	03	05
52	Dr. Manjula S H	Associate Professor	2008	PhD	21	---	05
53	Aruna latha J S	Associate Professor	2008	ME	22	---	---
54	Dr. Champa H N	Associate Professor	2008	PhD	25	01	04
55	Dr. Dilip Kumar S M	Associate Professor	2008	PhD	17	01	05
56	H S Vimala	Associate Professor	1995	MS	24	---	---
57	Pushpa C N	Assistant Professor	2008	M.Tech	14	00	00
58	Lata B T	Assistant Professor	2008	M.Tech	12	00	00

59	Kiran K	Assistant Professor	2008	ME	13	00	00
60	Venkatesh	Assistant Professor	2008	M.Tech	13	00	00
61	Tanuja R	Assistant Professor	2008	ME	14	00	00
62	Dharmendra chauhan	Assistant Professor	2008	ME	12	02	00
63	Samyama Gunjal	Assistant Professor	2008	M.Tech	07	01	01

V Department of Civil Engineering

Sl. No	Name (s) of the Teaching Faculty	Designation (Assistant Professor/ Associate Professor/ Professor)	Date of Joining the Institution	Highest Qualification	Experience (in Years)		
					a) Teaching	b) Industry	c) Research
					A	b	c
	Dr. B.S.Nagendra Prakash	Chairperson					
64	Dr. B.R.Niranjan	Professor	26/04/1983	Ph.D	26	-	29
65	Dr. H.N.Ramesh	Professor	14/02/1996	Ph.D	22	2	18
66	Dr. V.Devaraj	Professor	19/06/1981	Ph.D	29	-	29
67	Dr. Usha N Murthy	Professor	08/04/1983	Ph.D	27	-	20
68	Dr. M.S.Amarnath	Professor	13/07/1983	Ph.D	26	-	28
69	Prof. G.R. Harish	Professor	22/08/1984	M.E.	25	10	15
70	Dr. B.Santhaveerana Goud	Professor	01/02/1988	Ph.D	22	-	22
71	Dr. B.S.Nagendra Prakash	Professor	07/11/1984	Ph.D	25	-	25
72	Dr.A.S.Ravikumar	Associate Professor	10/12/1998	Ph.D	15	-	16
73	Sri M.Keshavamurthy	Associate Professor	04/04/1988	M.E	20	-	05
74	Dr. L.Manjesh	Associate Professor	11/05/1994	Ph.D	18	1	05
75	Dr. S.Gangadhara	Associate Professor	17/07/1998	Ph.D	16	-	16
76	Dr. M. Inayathulla	Associate Professor	14/08/1998	Ph.D	24	-	08
77	Dr. G. Suresh	Associate Professor	19/06/1998	Ph.D	16	-	16
78	Dr. Shivakumar J Nyamathi	Associate Professor	08/06/1998	Ph.D	21	½	15
79	Dr. P.S. Nagaraj	Associate Professor	02/06/1998	Ph.D	21	-	18
80	Dr. B.Vishwanath	Associate Professor	08/07/1998	Ph.D	25	00	12

81	Dr. Sadath Ali Khan Zai	Asst Professor	01/06/1998	Ph.D	20	-	17
82	Sri.S. Bhavani Shankar	Asst Professor	10/07/2008	M.Tech	18	2	-
83	Dr. L. Govindaraju	Asst Professor	05/06/1998	Ph.D	18	-	10
84	Dr. A.Krishna	Associate Professor	08/07/1998	Ph.D	16	04	05
85	Dr. B.P. Annapurna	Associate Professor	04/06/1998	Ph.D	17	1	09
86	Sri A.V.Sriram	Associate Professor	08/06/1998	ME	16	-	05
87	Sri. N.Jayaramappa	Associate Professor	26/10/2006	M.E.	11	03	02
88	Sri T. Kiran	Associate Professor	26/10/2006	M.E.	11	03	02
89	Smt. H.B. Rekha	Assistant Professor	02/11/2006	M.Tec	4	½	-
90	Dr. K.V.S.B. Raju	Assistant Professor	29/03/2007	Ph.D	05	05	06
91	Sri.H.C. Muddaraju	Assistant Professor	29/03/2008	M.E	02	04	-
92	Dr.Chethan. K	Assistant Professor	31/03/2008	Ph.D	2	-	3

VI Department of Architecture

Sl. No	Name (s) of the Teaching Faculty	Designation (Assistant Professor/ Associate Professor/ Professor)	Date of Joining the Institution	Highest Qualification	Experience (in Years)		
					a) Teaching	b) Industry	c) Research
					a	b	c
	Prof. S V Ravindra	Chairperson					
93	Prof. K V Guruprasad	Professor		B.Arch			
94	Prof. D Azad	Professor		MUD			
95	Prof. S V Ravindra	Professor		M.C.P			
96	Sri. M Nagendra	SR Assistant Professor		M.Arch			
97	Sri. Haroon Salim	SR Assistant Professor		MLA			
98	Sri. Satyam J Vora	Assistant Professor		M.Tech			
99	Sri. Pedagadi Pavan Kumar	Assistant Professor		Ph.D			

VII Department of Chemistry

Sl. No	Name (s) of the Teaching Faculty	Designation (Assistant Professor/ Associate Professor/ Professor)	Date of Joining the Institution	Highest Qualification	Experience (in Years)		
					a) Teaching	b) Industry	c) Research
					a	b	c
100	Dr. Suresh Babu V V	Professor	11/06/1990	Ph.D	20		
101	Dr Chandrappa G T	Associate Professor	1993	Ph.D	17		
102	Dr. Chetana P R	Associate Professor	1995	Ph.D	15		

VIII Department of Physics

Sl. No	Name (s) of the Teaching Faculty	Designation (Assistant Professor/ Associate Professor/ Professor)	Date of Joining the Institution	Highest Qualification	Experience (in Years)		
					a) Teaching	b) Industry	c) Research
					a	b	c
103	Dr. Kokila	Professor	1990	Ph.D	20		
104	Dr. Doddamani V H	Associate Professor	1992	Ph.D	18		
105	Dr. Renuka C G	Associate Professor	1996	Ph.D	14		

IX Department of Mathematics

Sl. No	Name (s) of the Teaching Faculty	Designation (Assistant Professor/ Associate Professor/ Professor)	Date of Joining the Institution	Highest Qualification	Experience (in Years)		
					a) Teaching	b) Industry	c) Research
					a	b	c
106	Dr. Maralabhavi Y B	Professor	01/07/1988	Ph.D	22		
107	Dr. Pradeep Siddeshwar	Professor	1988	Ph.D	22		
108	Dr. Medha	Associate Professor	1992	Ph.D	18		
109	Dr. Muddhe Bihal	Associate Professor	1994	Ph.D	16		
110	Dr. Harina P Vaghmore	Associate Professor	1994	Ph.D	16		

II List of Guest Faculty**I Department of Computer Science and Engineering**

Sl No.	Name of the Guest Faculty	Semester & Branch	Place of Work
1.	Anand R Umarji	II ME Bioinformatics	Samsung
2.	Anitha Kanavalli	II ME Computer Science & Engg. Information Technology	MSRIT
3.	Balaji B G	II ME Computer Networks	Nokia
4.	Dhamodhar P	II ME Bioinformatics	MSRIT
5.	Krishna Kumar P	II ME Software Engg.	Cambridge Institute of Tech.
6.	Mustafa B	II ME Software Engg.	IBM
7.	Shantha Kumar S	II ME Bioinformatics	MSRIT
8.	Namitha Murugesh	II ME Software Engg.	---
9.	Prakash. G. L	II ME Computer Networks	Alpha Institute of Technology
10.	Prashanth kumar H P	II ME Bioinformatics	Sapthagiri Institute of Tech.
11.	Chandranth Naikodi	Project Lab (PG)	Oracle
12.	Prathap U	II ME Web Technology	Nokia
13.	Shaila K	II ME CSE.	VIT
14.	Sivashankari G G	II ME Computer Networks	AMC
15.	Shrikantaiah K C	II ME Web Technology	SJBIT
16.	Rama Sivakiran Reddy	Biotechnology Lab	MSRIT
17.	Siva Subramanyam	II ME Web Technology	Lucent
18.	Suhail Ahmed	II ME Web Technology	IBM
19.	Sunil Kumar G	II ME Software Engg.	Alpha Institute of Technology
20.	Veena Bhat	II ME Information Technology	ICFAI
21.	Vishwanath R H	II ME Software Engg.	Sambram Institute of Tech
22.	Yamuna Devi C R	II ME Computer Science & Engg. & Information Technology	Dr. Ambedkar Institute of Technology
23.	Ramu S	VI Sem Information Science & Engg	Advocate
24.	Girish G S	III ME Web Technology	BNMIT, Bangalore
25.	Gururaj M	I ME Software Engg.	Nagarjuna Institute of Tech.
26.	Indira Priyadrashini	I ME Bioinformatics	Oxford College of Engg.
27.	Jagadish S k	I ME Information Technology	MSRIT
28.	M A rajan	I ME Computer Science & Engg.	TCS
29.	Shiva Kiran R	III ME Bioinformatics	MSRIT
30.	Thraiambaka	V BE Computer Science & Engg. & Information Science & Engg.	Jain College, J C Road

II Department of Electronics and Communication Engineering

31.	Sudhi	VII Sem Cryptography	
32.	B N Manjunatha Reddy	V Sem MP	
33.	D Kumaraswamy	V Sem Analog	
34.	Vijaya Prakash A M	DSD	
35.	Rangaraju H J	SAT Comm	
36.	Parameshwara	III Sem, Fields	
37.	M L Shylesh	Multimedia	
38.	Shankar B B	Multimedia	
39.	Channe Gowda G C	English	
40.	Hemanth Kumar	VII Sem, Wireless	
41.	Chandrashekar B S	III Sem ME, Microwaves, Embedded Systems	
42.	Gangadhariah	I ME VLSI	
43.	Santosh Emmaule Georg	Electronics Lab II	
44.	Chintamani C	DSP Lab	
45.	Sana Dhalayat	Controls	
46.	Kakesa Awati	Networks and Lines	

III Department of Electrical Engineering

47.	Ms. R Hemavathi	Digital Control Systems, Electrical Machine Design, Non conventional Energy Sources	
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IV Department of Civil Engineering and Architecture

48.	K G Krishna Murthy	Construction Management	
49.	Swetha Baliga	History of Architecture	
50.	Sridhar	Building Material and Construction	
51.	Shyam Sundar		
52.	Bhavana	Building Services	
53.	Bhaskar	Visual Arts	
54.	M S Amarnath	Visual Arts	
55.	Dr. H Sharada Bai	Structural Engineering I	
56.	Dr. H N Ramesh	Strength of Materials	
57.	Dr. B P Annapurna	Structural Engineering II	
58.	Dr. L Manjesh		
59.	Dr. G R Harish	Structural Engineering I	

V Department of Mechanical Engineering

60.	Pandurangappa	Engineering Mathematics (Bridge Course)	
61.	Subramanyam J	Applied Thermodynamics	

+ 15 Guest Faculties (Kannada, English, Constitution of India, etc.)

Total Faculty on Contract: 76

2.4. Baseline Data (2014 – 15)

Sl. No	Parameters	Particulars
1	Total strength of students in all programmes and all years of study	4332
2	Total women students in all programmes and all years of study	1382
3	Total SC students in all programmes and all years of study	824
4	Total ST students in all programmes and all years of study	131
5	Total OBC students in all programmes and all years of study	2436
6	Number of fully functional P4 and above level computers	526
7	Total number of syllabus Text books and Reference books in library	147257
	7a) Student -Teacher ratio	17.7:1
8	% of UG students placed through campus interviews	80.5
9	% of PG students placed through campus interviews	35.7
10	% of High quality under graduates (>75% marks)	42.64
11	% of High quality post graduates (>75% marks)	87.43
12	Research publications in Indian refereed Journals (2005 ó 15)	85
13	Research publications in International refereed Journals (2005 ó 15)	371
14	Number of Books Published	65
15	Number of Patents obtained	--
16	Number of Patents filed	92
17	Number of sponsored research projects completed	12
18	The transition rate of students in percentage from 1 st year to 2 nd year for : (i) All Students (ii) SC (iii)ST (iv)OBC	86.3% 81.2% 79.8% 85.6%
19	IRG from students fee and other charges (Rs. in lacs)	1000
20	IRG from externally funded R & D products, consultancy & other sources (Rs. in lakhs)	193
21	Total Internal Revenue Generated (Rs. in lakhs)	1193
22	Total annual recurring expenditure of the institution (Rs. in lakhs)	1049

CHAPTER 3

SWOT ANALYSIS OF THE INSTITUTION

3.1 Methodology in Analyzing Primary and Secondary Data

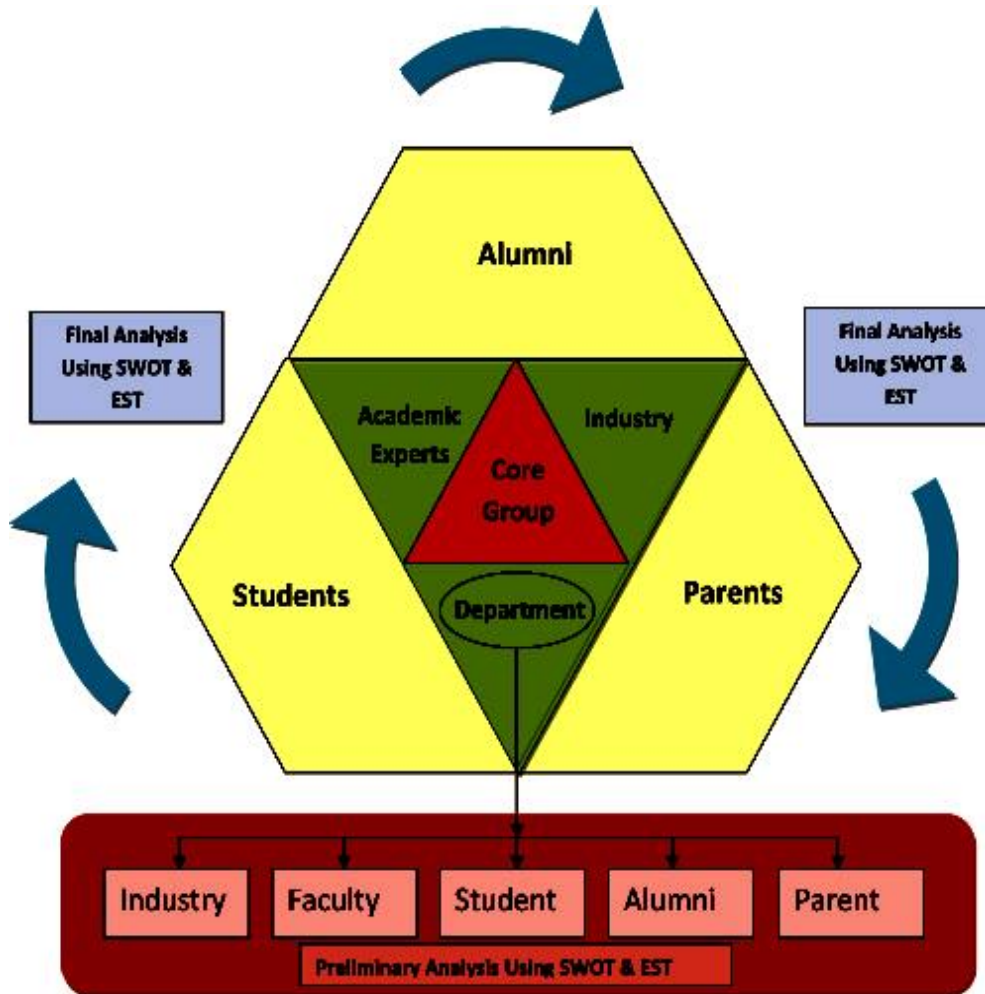


Figure 1: Showing Methodology adopted for Analysis of Primary and Secondary Data.

The Seven-Step strategic analysis method is adopted in conducting SWOT analysis. Strategic planning of *Institution* is carried out keeping in mind to preserve the great reputation and heritage of the college along with its mission to be an Icon of advanced technical Institute. Primary and secondary data is collected and analyzed from faculty, students, alumni, industry experts, academic experts, parents and individual Departments.

Step 1. Fifteen Teams were Constituted for SWOT Analysis.

The following is the list of different teams and their tasks assigned for the preparation of SWOT analysis and Strategic Planning.

Sl.No	Tasks Assigned	Number of Team Members	Team Members associated
1	Monitoring	1	Dr. K. R. Venugopal (Principal)
2	Tasks Co-coordinators	3	Dr. Paul Vizhian S. Dr. P. Pavan Kumar Dr. Shantaraja M.
3	Documentation	2	Dr. K. B. Raja Dr. S. H. Manjula
4	Academic Nodal Officer	2	Dr. P. Deepa Shenoy Prof. Kiran K
5	Civil works including Environment Management	2	Dr. H. N. Ramesh Dr. Govinda Raju L.
6	Procurement	2	Dr. Thriveni J Ms. H. S. Veena
7	Financial	2	Dr. K. B. Raja Dr. Y. R. Manjunath
8	Equity assurance (Implementation and plan)	3	Dr. G. Harish Dr. B. M. Rajaprakash Prof. Mudduraj H. C.
9	Center of Excellence (R&D and Interaction Cell)	2	Dr. M. L. Sudheer Dr. C. K. Umesh
10	General (Think tank)	9	Prof. S. V. Ravindra Dr. K. V. Sharma Dr. B. K. Muralidhara Dr. B. M. Rajaprakash Dr. K. Suresh Babu Dr. E. G. Shivakumar Prof. A. V. Sriram Dr. H. N. Champa Prof. H. R. Ramesh
11	Head of the Departments	6	Dr. Dr. N. Lakshmana Swamy (Mech) Dr. B. S. Nagendra Prakash (Civil) Prof. S. V. Ravindra (Architecture) Dr. M. L. Sudheer (E & C) Dr. P. Deepa Shenoy (CSE) Dr. Y. R. Manjunath (EEE)

Sl.No	Tasks Assigned	Number of Team Members	Team Members associated
12	Department Coordinators	7	Prof. K. P. Shobha (EEE) Dr. Inayathulla (Civil) Dr. K. Suresh Babu(ECE) Dr. B. M. Rajaprakash (Mech) Dr. Hanumantharaju (Mech) Dr. S. H. Manjula(CSE) Dr. P. Pavan Kumar (Arch)
13	Civil	8	Dr. H. N. Ramesh Dr. Sadath Ali Khan Zai Dr. Govindaraju L. Dr. Inayathulla M Dr. Annapurna B. P. Prof. Kiran T. Dr. Chethan K.
14	Architecture	3	Prof. S. V. Ravindra Prof. M. N. Nagendra Dr. P. Pavan Kumar
15	Resource Persons	8	Prof. Pushpa C N Prof. Tanuja R Desai Sejal Nimborkar Vasanthakumar G U Gomathy Prathima E. Vandhana Jha S. Vishwa Kiran Raghavendra S

SWOT Analysis framework is adopted along with EST (Economical, Social and Technical) viability in preparation of institutional analysis report. SWOT analysis is a strategic planning method used to evaluate the Strengths, Weaknesses, Opportunities and Threats involved in a project or business venture, indicating where opportunities and risk should be pursued, where certain threats or risks are easily avoided when resources are allocated properly. Core group implemented the following seven step process:

Step 2. Provided Pre-work to Prepare the Participants

The Principal and coordinators prepared a detailed event schedule and distributed the schedule among all team members in advance, for the initialization of the work. This included listings of all the meetings, agendas for each of those meetings, and the purpose and objectives of the process.

Both primary data as well as secondary data was collected by the documentation team well before the initial meeting. Key factors and indicators are derived from the data and respective teams are assigned with identification of Institutional requirements.

Step 3. Head of the Institute Conducted Round-robin Meetings to Collect Input on Internal Factors

The Coordinators interacted with each Department coordinators and individual participants to provide a list of requirements and factors under various heads. Executive summary of all the factors and requirements is prepared and placed under Strengths and those that weaken the situation and competitive position under Weaknesses.

Step 4. Head of the Institute Conducted Round-robin Meetings to Collect Ideas on External Factors

The Coordinators repeated the round-robin exercise looking at external factors. Factors that are possibly detrimental to the institution competitive position are considered as threats and those factors that enhance the institution position are classified as opportunities.

Step 5. Vote on Top Strengths, Weaknesses, Threats and Opportunities

Under the guidance of the Head of the Institution, all coordinators made separate teams to review them. Time frame was set and time was scheduled when all participants voted on Strengths, Weaknesses, Opportunities and Threats.

Step 6. Prioritized Strategic Alternatives

The Head of the Institute conducted brainstorming session of the list prepared in the previous steps. For each opportunity, coordinators identified the Institute's relevant Strengths and Weaknesses. Repeated the process for each Threat, identifying the strengths that the institution used to defend itself from the Threats and the Weaknesses that leave the institution exposed.

Step 7. Final Assessment

The Head of the Institution personally orchestrated the process, setting up a series of half-day work sessions that involved his direct reports and several members of the functional areas reporting to him. He had the groups use SWOT analysis as a key job aid in their work sessions, supported by facilitators who understood the process.

3.2 SWOT Analysis

The following SWOT Analysis has been accomplished by concerted involvement of each Department on the guidelines provided. A comprehensive institutional SWOT analysis has been compiled based on the inputs of academic, technical, and administrative personnel of the Institute.

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks
I. CAPABILITIES: Strengths						
1	The Institute will be celebrating its centenary year in the year 2016-17	✓				Strong Base
2	The existing teaching staff are highly qualified and experienced in their field of specialization.	✓				Global Strength
3	The Institution offers SEVEN Under Graduate courses and TWENTY FOUR Post Graduate courses apart from M. Sc., (Engg.) and Ph.D. by research. Twenty Three new PG Courses have been proposed	✓				Global Recognition
4	The Institution has 110 faculty members with 68 faculty members possessing Ph.D. Degree, while 34 faculty members are pursuing their Ph. D. programme. In addition, 86 qualified and experienced guest faculties are associated with the Institution. The teacher student ratio is 1: 22.5	✓				Global Recognition
						STRENGTHS

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks
5	UVCE has been recognized as one of the nodal centres for the prestigious Rs. 6,00,000 crores öPradhana Mantri Gram Sadak Yojana (PMGSY)ö of Government of India and is also Principal Technical Agency (PTA) to scrutinize DPRs for 4 Southern states based on its research capabilities.	✓				Global Recognition
6	The Institution has been conducting various Research and Consultancy projects to Central and State Governments, National Laboratories and Private Sectors Organizations.	✓				Global Recognition
7	Several Special Equipments have been developed indigenously by this Institution which are helpful for Advanced Research and Consultancy work in areas like Material Characterization, Pavement Design, Evaluation and Management.	✓				Good Practice
8	The Institute is actively involved in Industry Institute Interaction programmes and has carried out several training programmes for Engineers of public sectors enterprises like Bharat Electronics, Hindustan Machine Tools, Karnataka Rural Roads Development Agency etc.	✓				Good Governance
9	Several full scale test track studies were carried out in south India by collaborating with various agencies like state PWD and National Highways.	✓				Strong Base
10	Interdisciplinary research with UGC-CAS in Fluid Mechanics is going on in the area of Smart Materials of Nano Structures.	✓				Global Strength
11	UVCE has been selected under TEQIP-II for subcomponent 1.2 (setting up of Post Graduate studies and research in development and innovation).	✓				Strong Base
STRENGTHS						

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks
12	The fee structure is one of the lowest in the Country. Total number of students is 4332. In addition, 70% of students are being awarded scholarship to a tune of 7 crores per annum. The scholarships are given through various bodies like Government Scholarship (SC / ST, OBC), Multinational Companies (MNCs), UVCE Alumni, PG CET, GATE Scholarship etc.	✓				Good Governance
II. RECOGNITION : Strengths						
13	The Institute established in 1917 and is one of the oldest in the country. Over the years it has earned a reputation well worth recognized both within and outside the country setting up several benchmarks on its way to growth which is its Unique Selling Point (USP).	✓				Strong Bases
14	Some of the faculties are recipients of Young Scientist Award, Best Thesis Award, Best Paper Award, Best Presentation Award and Best Teacher Award.	✓				Global Recognition
15	Many faculty members are in the expert committees of AICTE, Task force for maintenance of roads in Karnataka and in selection committees as subject experts in Karnataka Public Service Commission (KPSC), Union Public Service Commission (UPSC), NAL, ISRO, KPWD, KSPCB, ISRO, KPSCE, NRRDA, KRRDA, BEL etc.	✓				Strong Base
16	Many faculty members have been recognized as experts to review research papers in National and International refereed Journals.	✓				Global Strength
17	Library is in possession of highly valuable volumes relating to Science, Technology and Arts over a long period of time, making it an exclusive library possessing rare volumes relating to Engineering and Technology in the entire State of Karnataka. It continues with the same spirit of maintaining these high standards as a referral library.	✓				Global Strength
STRENGTHS						

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks
18	Students have represented the College and University in sports both at National and International level.	✓				Global Recognition
19	The Department of Civil Engineering is recognized as QIP centre.	✓				Global Recognition
20	The faculty members have written 65 high quality books which have been prescribed as text / reference books throughout the country.	✓				Global Recognition
21	A team of students from Mechanical Department, Arjun Premchandran, Keerthivas and Vaisakh R. Sarma won the FIRST Prize in Inventor Sustainable Design Competition 2012 at IIT Madras conducted by National Skill Development Corporation and Autodesk (Total Prize Money : Rs. 1 Lakh).	✓				Good Practice
22	A team of 7th Semester students of Electronics and Communication, Samhitha M. R., Akshay Kumar B. U. and Gowrishankar A. have won the SECOND Prize in National Level Design Fellowship Contest ó ANVESHAN conducted by Analog Devices, Bangalore, June 2013 (Total Prize Money: Rs. 75000/-).	✓				Good Governance
23	Dr. P. Deepa Shenoy, Professor, Department of Computer Science and Engineering was invited by IEEE-WIE committee at Atlanta, USA, in May 2013.	✓				Global Recognition
24	Twenty one sponsored projects were under taken and 12 were successfully completed.	✓				Global Strength
25	Seven hundred and fifty Consultancy Projects have been completed out of which 240 were completed in the last 3 years. The Institute has entered MOU with 30 leading industries.	✓				Strong Base
26	Two hundred and two Ph.Ds. were produced in UVCE till date and of which fifty four were awarded in the last 3 years.	✓				Global Strength

STRENGTHS

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks	
27	International Journal in Information Processing (IJIP) is in its 10 th Year of publication and is edited by Dr. L. M. Patnaik, Professor, IISc and Dr. Venugopal K. R., Principal UVCE. Dr. Venugopal K R, Principal has authored and edited 51 books and has filed 91 patents.	✓				Global Recognition	
III. COMPETITIVE ADVANTAGE: Strengths							
28	Admission to UVCE is based purely on merit through Common Entrance Test conducted by Govt. of Karnataka for both U.G., P.G. courses and Ph.D. programmes.	✓				Good Practice	STRENGTHS
29	Institution is located in the heart of Bangalore city close to central railway station and bus terminal, and has access to different well known Research Institutions and advanced industries relating to manufacturing and knowledge processing. It is also at a distance of about 50 meters from Visvesvaraya / Central College metro station.	✓				Strong Base	
30	Department of Civil Engineering is located in the Jnanabharathi campus which helps students to use the wide area and the field for Surveying.	✓				Strong Base	
31	University is having bus facility from all over the city to reach the campus. Hostel facilities for both boys and girls who are studying in UG, PG and Research courses like M. Sc. Engg.(by Research) and Ph.D. in the campus. In addition, the college caters to and admits students from Union territories inter-state and sponsored by Government of INDIA as a proactive measure.	✓				Strong Base	STRENGTHS
32	UVCE supports meritorious students of economically weaker sections by providing scholarships and fee waivers (Rs. 6 Crores).	✓				Good Practice	

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks	
33	Final year U.G. and PG students are also offered internships in various companies (Rs. 10,000 to 25,000).	✓				Global Strength	
34	The placement and training centre of the college creates employment opportunities for more than 80% eligible UG and PG students.	✓				Good Governance	
IV. RESOURCES: Strengths							
35	Resources in terms of equipments were procured over the years, for catering to UG, PG and Ph.D. courses.	✓				Good Governance	STRENGTHS
36	Resources in terms of extension of facilities in R & D establishments like NAL, GTRE, ISRO, IBM, SUN Microsystems, etc., to students of UVCE is existing since many years by way of non-formal networking.	✓				Good Practice	
37	Resource persons in and around Bangalore in specialized fields are invited and encouraged to be a part of our academic activities on a sustained basis.	✓				Good Practice	
38	Equipments and learning resources were augmented by utilizing funds efficiently from TEQIP phase - I.	✓				Good Governance	
39	National/International Journals and e-Journals are available in the Institution for reference work.	✓				Global Recognition	
V. ASSETS AND PEOPLE: Strengths							
40	The Institution possesses highly experienced Faculty and Staff members with long standing experience.	✓				Global Strength	STRENGTHS
41	The Faculty members have been trained in Institutions of higher learning.	✓				Good Governance	

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks
42	Faculty have visited various Universities and Institutions in developed countries and are exposed to state of art knowledge and technology.	✓				Global Recognition
43	The Faculty and Staff members have rich traditional Indian cultural values because of Institution's 100 years of long existence.	✓				Strong Base
44	The Faculty and Staff enjoy healthy student-teacher relationship.	✓				Strong Base
45	Many of the teaching faculties are recognized for their expertise in relevant fields and are serving as panel members on several boards of state and central Governments including, KPWD, KSPCB, ISRO, KPSCE, NRRDA, KRRDA, BEL etc.	✓				Strong Base
46	Faculty members have also taken up responsibilities as members of accreditation committees of AICTE for accreditation of other engineering colleges.	✓				Strong Base
47	The institution benefits tremendously from a illustrious list of eminent alumni and experts, 1. Prof. Roddam Narasimha, Professor, Jawaharlal Nehru Centre for Advanced Scientific Research 2. Dr. M. R. Srinivasan, Former Chairman, Atomic Energy Commission. 3. Prof. M. A. L. Thathachar, Chairman, EE, IISc 4. Dr. V. K. Aatre, Former Scientific Advisor to Defence Ministry, Government of India. 5. Dr. R. Natarajan, Former Chairman, AICTE 6. Prof. S S Iyengar, LSU,USA 7. Dr. S. Rame Gowda, Former Chairman, AICTE. 8. Prof. G Krishna, Chairman, CSA, IISc. 9. Prof. Viktor K Prasanna, Chairman, University of Southern California 10. Prof. T S Ramamurthy, IIT Madras 11. Prof. P A Aswathanarayana, IIT Madras	✓				Global Strength

STRENGTHS

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks
	12. Prof. B. T. Lakshman, Educationalist 13. Prof. Achyutha H, IIT Madras 14. Dr, T S Prahalad, Former NAL Chairman 15. Prof. Y. N. Srikant, , Chairman, CSA, IISc 16. Prof. H. S. Jamadagni, Chairman, CEDT, IISc 17. Lt. Commander V. J. Sundaram 18. Sri Ramesh Arvind, Actor 19. Sri H G Dattatreya, Wing Commander, Actor 20. Sri Mano Murthy, Music Director 21. Sri B V Jagadeesh, Entrepreneur					
48	UVCE Alumni, UVCE Centenary Foundation, Vision UVCE and UVCE Foundation: A Conglomeration of Alumni is dedicated to serve the Institution in all possible ways such as: 1. Providing scholarship and to aid deserving students. 2. Promoting development of technical education related activities like seminars, debate, invited lectures and interactive sessions with experts in the field. 3. Providing improved amenities at UVCE.	✓				Global Recognition
VI. INNOVATIVE ASPECTS, MARKETING AND QUALITY OF PROGRAMMES : Strengths						
49	Students of UG Courses are encouraged to publish technical and research articles in journals and conferences apart from PG and Ph. D. students.	✓				Global Recognition
50	The Institution has carved for itself a niche in the field of technical education through its emphasis on quality and sustained stress on research by its teaching fraternity as seen in Research Publication and Placement programme with participation by well known	✓				Global Recognition
						STRENGTHS

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks
	organizations like Infosys, Wipro, TCS, L&T, Accenture on a priority basis.					
51	The quality of programmes offered at UG, PG and Ph. D. levels in the institution is on par with National level institutions of higher learning.	✓				Good Practice
VII. LOCATION, ACCREDITATIONS, CERTIFICATIONS AND PROCESSES: Strengths						
52	The Institution is centrally located connecting all parts of the city of Bangalore.	✓				Strong Base
53	The Institution is a constituent college of the Bangalore University and is accredited by NAAC with 'A' Grade. However, applications for NBA accreditation of UG & PG programmes of the institution have been sent to AICTE.	✓				Global Strength
54	The Institution is governed by existing norms of the Karnataka State University Act.	✓				Strong Base
55	The Institution gets regular grants from State Government and UGC as per the prevailing norms.	✓				Strong Base
Weakness						
56	There has been a delay in the sanction of available funds at appropriate time.		✓			Lack of Staff
57	There is shortage of Teaching staff to teach existing and newly introduced P.G. courses and Technical staff to run existing P.G. laboratories.		✓			Lack of Awareness
58	Building space is insufficient for the class rooms and laboratories for the approved intake		✓			Lack of Awareness

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks
	of U.G., P.G. and Ph. D. programmes.					
59	New equipments are required in the Departments as some of the equipments are obsolete & new equipments in emerging fields and also new licensed version software in all the Departments		✓			Lack of Staff
60	More than 75% of the students belong to Scheduled Caste, Scheduled Tribe and Other Backward Communities. Hence they require more training and facilities.		✓			Lack of Staff
I. SHORT TERM OPPORTUNITY (1-2 YEARS): Opportunities						
61	The USP of the Institution is its long standing existence and large alumni.			✓		Large Market
62	All the nine newly introduced PG courses under TEQIP-I are running with full student strength. This reflects that these PG programmes are catering to the growing student and industries demand.			✓		Large Market
63	Being a University Constituent College, the pay scales of sixth pay commission are being implemented, thereby; there is always increased attraction for the qualified faculty joining this Institution.			✓		Active at Global level
II. MEDIUM TERM OPPORTUNITY (4-8 YEARS): Opportunities						
64	The Institution is located strategically where there are innumerable IT Industries, Manufacturing/Automobile Industries and National R & D Establishments. The Institution is meeting the skilled manpower requirements of the above organizations. It has opportunities for carrying out demand driven Industry related R & D projects leading to award of M.E. and Ph. D. Degrees.			✓		Land Mark

Sl. No	Items	Strengths	Weaknesses	Opportunities	Threats	Remarks	
III. LONG TERM OPPORTUNITY (8-10 YEARS): Opportunities							
65	Based on the opportunities exploited during medium term time frames, the Institution is having opportunities for getting associated with innovations made by various R&D/IT /Manufacturing/Automobile Organizations.			✓		Large Market	OPPORTUNITIES
66	The Institution is also having bright opportunity for acquiring patents in the Industry relevant areas.			✓		Large Market	
Threats							
67	Lack of incentives: like appreciation, recognition and promotion on time may deter qualified teachers in undertaking additional innovative and R&D works.				✓	Loss of Talent	THREATS
68	External Factor: competition by the way of attractive infrastructure and higher salaries to key faculty and staff is a threat to the Institution which may result in declining quality of students.				✓	Loss of Talent	
69	Internal Factor: Strengthening the available opportunities in the Institution to overcome risk factors, such as, threats of changing technology, lack of accessibility to fast changing technology, lack of Industryó Institution partnership by sustainable financial autonomy by the Institution.				✓	Loss of Talent	

3.3 SWOT analysis results for Strategies in the following Action Plan

SWOT ANALYSIS LINK TO ACTION PLAN	Threats <ul style="list-style-type: none"> • Flow of Funds, • Poor Advertisement. 	Opportunities <ul style="list-style-type: none"> • Global Market, • Active at National as well as Global Level.
Strengths <ul style="list-style-type: none"> • Strong Base, • Great Image at National Level, • Great Image at International Level, • Good Practices. 	Action Plan Using Strength of the Institute to Reduce Threat. <ol style="list-style-type: none"> 1. Buildings: Mechanical Block, Visvesvaraya Centenary Block, Visvesvaraya Metro Block, Hostels etc. 2. Evaluation Buiding for UVCE: Stone Building (Cental College) 3. Achieving 100% Accreditation of UG&PG 4. Enhanced Academic Performance of SC/ST/OBC <p style="text-align: center;">(S.T)</p>	Action Plan Exploiting Various Opportunities by using Strength. <ol style="list-style-type: none"> 1. Obtaining Autonomous Institution/University Status, 2. Enhancement of Research and Consultancy Activity. 3. 100% Placement. 4. Establishing Centres of Excellence 5. Increase in internal revenue generation. <p style="text-align: center;">(S.O)</p>
Weakness <ul style="list-style-type: none"> • Lack of Staff (Both Teaching and Non Teaching), • No Marketing strategies in Place, • Flow of Funds. 	Action Plan Eliminating Weakness to Reduce Impact of Threats. <ol style="list-style-type: none"> 1. Improving employability/package of Graduates 2. Increased Learning Outcomes of Students in Skills and Academics 3. Implementation of Academic and Non Academic Reforms 4. Scholarship to all meritorious students/ socially challenged students <p style="text-align: center;">(W.T)</p>	Action Plan Exploiting Opportunities to Support reduction of Weakness. <ol style="list-style-type: none"> 1. Improving Interaction with Industry, DRDO, Foreign University 2. Increase in UG, PG, Research Programs 3. Faculty Development Programs to enhance the quality of teaching (QIP) <p style="text-align: center;">(W.O)</p>

3.4 Action Plan

Action plan and Strategies are prepared after detailed analysis of the above SWOT analysis and matrix for action plan.

3.4.1 Strategic Plan

- Increase Institute Industry Interaction programmes to carry out demand driven R & D work by involving UG, PG and Ph.D. students.
- At present, the institution offers Post Graduate programmes in 24 specialized areas with a total intake of 784 students. The plan is to start 23 new PG courses and also increase the total intake of post graduate students to 1600. It is proposed to strengthen the infrastructure by way of purchase of equipments for the laboratories belonging to existing PG programmes.
- There are 55 eligible faculties to guide Ph.D students. At present, there are 251 research scholars working for their Ph. D. Degrees. The plan is to increase the number of Ph. D. enrolment to 500.
- It is proposed to encourage demand driven Industry related projects leading to award of Ph. D. Degree.
- The Institution is situated in a place where there are number of IT, Manufacturing, Automobile, Industries and R & D establishments. During the project period it is envisaged to explore and identify common avenues of interaction with these industries and R & D organizations as per the requirements of Institution leading to increased rate of campus placements, increase in solving the real life problems of the region.
- MoU with Foreign Universities.
- Establish Incubation Centers.

3.4.2 Challenges to Implement Strategic Plan:

- The main challenge for the implementation of the strategic plan is the shortage of teaching and non-teaching staff.
- The other challenge is the insufficient building space for establishment of new Laboratories and for carrying out other technical activities.

- Implementation of Administration, Academic and Financial autonomy is another major challenge.

3.5 Specific Objectives and Expected Results

The specific objectives and outcome based on the SWOT analysis is as follows. These objectives are in terms of scaling up PG education.

1. Build infrastructure (buildings and laboratories) to compete globally.
2. Increase in the number of Postgraduates and Ph. D.ø produced from the Institute, training and increase in employability of UG, PG and Research Students.
3. Increase in the number of faculty members involved in guiding Ph. D. students and encourage Interdisciplinary Research activities through Institution - Industry interactions.
4. Establish Centres of Excellence catering to the research needs in the high technology areas.
5. Promote internal revenue generation.

3.5.1 Justification

- The Institute has a large number of experienced and dedicated faculty members possessing Ph. D. degree and are capable of carrying out the various activities envisaged by Institution.
- The institution is one of the oldest in the country (Est:1917). The institution is funded totally by the State Government offering engineering education to students of all sections of the society as per the government policy admitted through common entrance test only.
- Since the institution is located strategically close to many varied types of Industries/R&D establishments, it is possible to carry out more meaningful demand driven R & D works continuously.

3.5.2 Improving Employability of Graduates

The following specific activities are proposed to be held to improve the employability of academically and socially needy students:

- Add-on course/Training for effective communication skills and personality development

- Add-on course/Training for facing competitive exams and interviews
- Talks and Expert lectures
- Academic support for weak student by arrangement of remedial classes and tutorials.
- Awards for notable academic improvement by student
- Student appraisal and reward system
- Psychological counseling by Experts
- Seminars and Expert Assistant Professors related to employment opportunities
- Financial assistance for project work in thrust area
- Awards for good project work carried out
- Career counseling by Experts
- Arrangement of Industrial visit
- Financial support for seminars, exhibitions and paper writing
- Student development program through short term and long term training/course

3.5.3 Increased Learning Outcomes of Students

- Effective teaching learning process due to Smart Classrooms in each Department
- Wi-Fi facilities in both college and hostel premises resulted in enhanced knowledge assimilation.
- A separate Seminar hall for UG and PG courses in each Department has resulted in effective teaching learning process.
- College must be able to pull the talented persons from Industries to come and teach one or two courses for the students to acquire the Industry related problems and work based on the practical situation.
- MoU with R & D organizations, IISc, IITs, NITs, ISRO, ADA, NAL, GTRE, WIPRO, SAP etc. for enhanced Industry Institute Interaction and joint R & D programmes.
- The Professors from International Universities are invited to give special lectures to our students and research resulting in global exposure.

3.5.4 Obtaining Autonomous Institution/University status within 2 years

UVCE was started in the year 1917 by Engineer Statesman Sir. M. Visvesvaraya and was affiliated to University of Mysore. In the year 1964, when Bangalore University was established, UVCE got affiliated to Bangalore University. During 1998 after the formation of Visvesvaraya Technological University at Belgaum, Karnataka, UVCE remained as the only Constituent Engineering College under Bangalore University. The current goal is to obtain autonomous status to UVCE and ultimately to establish a deemed university based on the model of IIT.

CHAPTER 4

ACADEMIC PROGRAMME AND FACULTY RECRUITMENT

4.1 New Academic Programmes

The institute has proposed to start five Under Graduate Courses and twenty three Post Graduate Courses, two Evening UG Programs, Skill Development Programs, Certificate Courses and PG Diploma Programs under the 12th and 13th five year plans viz.:

4.1.1 NEW POST GRADUATE COURSES: 23 (2 Years Course)

- (i) M.E in Digital Communication Engineering
- (ii) M.E in VLSI and Signal Processing
- (iii) M.E in Embedded System
- (iv) M.E in Communication Networks
- (v) M.E in Digital Signal Processing
- (vi) M.E in Digital Forensics
- (vii) M.E in Disaster Management
- (viii) M.E in Geomatics Engineering
- (ix) M.E in Energy Systems Engineering
- (x) M.E in Computer Application in Industrial Drives
- (xi) M.E in AeroScience and Space Technology
- (xii) M.E in Nano Technology
- (xiii) M.E in Mechatronics
- (xiv) M.E in Data Mining and Warehousing
- (xv) M.E in Computer Security
- (xvi) M.E in Cyber Security
- (xvii) M.E in Cognitive Science
- (xviii) M.E in Bio Computing Engineering
- (xix) M.E in Free and Open Source Software Technologies
- (xx) Master of Urban and Regional Planning (M.U.R.P)
- (xxi) Masters in Housing
- (xxii) Masters in Environmental Planning (M.E.P)
- (xxiii) Masters in Heritage Conservation (M.Hc) to improve the Gross Enrolment Ratio (GER)

4.1.2 NEW UNDER GRADUATE COURSES: 05 (4 Years Course)

- (i) B.E in Instrumentation Engineering
- (ii) B.E in Aeronautics Engineering

- (iii) B.E in Mechatronics
- (iv) Bachelors of Planning (B.Plan)
- (v) B.E in Telecommunication Engineering

4.1.3 NEW UNDER GRADUATE EVENING COURSES: 04 (3 Years Course)

- (i) BE in Computer Science and Engineering
- (ii) BE in Electrical and Electronics Engineering
- (iii) BE in Telecommunication Engineering
- (iv) BE in Architecture

4.1.4 NEW POST GRADUATE DIPLOMA COURSES: 05 (1 Year Course)

- (i) PGDM in Computer Science
- (ii) PGDM in Electrical Engineering
- (iii) PGDM in Management
- (iv) PGDM in Product Design
- (v) PGDM in Refrigeration and Air Conditioning

4.1.5 NEW SKILL DEVELOPMENT CERTIFICATE PROGRAMS (3 Months – Morning / Evening)

a. CIVIL ENGINEERING: 11

- (i) Plumbing, Sewage and Water Supply
- (ii) Specifications and Contract
- (iii) Foundations
- (iv) Barbending and Schedule
- (v) Painting
- (vi) Acoustics
- (vii) Canal Irrigation
- (viii) Flooring
- (ix) Masonary Construction
- (x) Roads
- (xi) Pollution (Air, Water, Soil)

b. ARCHITECTURE: 03

- (i) Interior Decoration
- (ii) Planning of Green Building
- (iii) Landscaping

c. ELECTRONICS ENGINEERING: 07

- (i) Television
- (ii) PCB Manufacturing
- (iii) Electronic Circuit Design
- (iv) Microprocessor
- (v) Embedded Design
- (vi) Beagle Boards
- (vii) DSP Signaling and Processing

d. ELECTRICAL ENGINEERING: 03

- (i) Electrical Repair and Maintenance
- (ii) Electrical Wiring
- (iii) Power Electronic Circuit Design

e. COMPUTER SCIENCE AND ENGINEERING: 12

- (i) Database Management
- (ii) Computer Networks
- (iii) Script Languages
- (iv) Oracle
- (v) Automation
- (vi) Programming Languages
- (vii) Business Analytics
- (viii) Cyber Security
- (ix) Big Data
- (x) Biometrics
- (xi) Bio-Informatics
- (xii) Software Development and Maintenance

f. MECHANICAL ENGINEERING: 14

- (i) Refrigeration and Air Conditioning
- (ii) Diesel Mechanics
- (iii) Fitters
- (iv) Sheet Metal Work
- (v) Die Casting
- (vi) Turners
- (vii) Quality Control
- (viii) CNC Programming and Maintenance

- (ix) Auto CAD
- (x) Auto Desk - Inventor
- (xi) CADD
- (xii) Catia
- (xiii) Ansys
- (xiv) Pro-E

4.1.6 Admissions to Postgraduate Programmes

M.E admission is through GATE and PG CET examination. To attract more number of enrolments every year, the students are benefited with scholarship from various bodies viz., MHRD, Minority, OBC, SC/ST, State Government etc., and TEQIP assistantship. At present, the intake for Post Graduate program is 784 and it is planned to increase to 1600. The students knowledge is enriched by internship training under Industry Institute Programs.

4.1.7 Admissions to PhD Programmes

The Ph.D. enrolment is through Bangalore University Entrance Examination as per UGC norms and the Institute encourages full time Ph.D. scholars with TEQIP scholarship of Rs. 18,000 p/m. More than 250 students are registered to the Ph.D. program. We are planning to double this number in the 12th five year plan and triple it by 13th five year plan. The institution has proposed four Centres of Excellence in the areas of:

- (i) Disaster Mitigation and Management
- (ii) Signal Processing
- (iii) Emerging Materials
- (iv) Enhancement of Existing Centre of Excellence for Electromagnetic Compatibility and Power Quality

4.2 Staff Recruitment

The recruitment of teaching faculty is planned to increase from 186 to 500 and non-teaching technical staff from 150 to 350. Faculties and students are deputed for advance training program with foreign universities and R&D institutions by facilitating fellowships and encourage them to attend Faculty Development Programs, Workshops, Seminars, Conferences and Symposium. Improving collaborative activities by exchange

programs to enhance interaction with Industries, R&D Institutions and Foreign Universities through MoU.

4.3 Industry-Institute Interaction

The college has an excellent Industry-Institute relationship with all the reputed global companies visiting the campus. Excellent technical training is provided in college to the students with regular mock aptitude tests, group discussions, soft skills, personality development and case studies are conducted to meet the expectations of the industry.

In view of Centenary celebration in 2017, the institute has planned to build the following buildings: Visvesvaraya Centenary Block, Mechanical Engineering Block, separate Hostel blocks for boys and girls, Open Air Theatre, Visvesvaraya Metro Block, Civil Engineering Block, Architecture Block and refurbish the existing UVCE Heritage building.

4.4 Project target for the 12th and 13th five year plan (2016-2022) is as follows:

1. Buildings of Mechanical Block, Visvesvaraya Centenary Block, Separate Hostel blocks for boys and girls, Open Air Theatre, Visvesvaraya Metro Block, Civil Engineering Block, Architecture Block and refurbish the existing UVCE Heritage building.
2. Increase in recruitment of faculties from 186 to 500 in 13th five year plan.
3. Starting of 5 new UG, 23 PG, 5 PGDM and 50 Skill Development Programs.
4. Increase in the number of Under graduates, Post graduates and Ph.D.s produced from the Institute (from 4000 to 8000).
5. Scholarship to all meritorious, socially, economically challenged and differently abled students from 6 crores to 10 crores.
6. Increase in employability rate of the students from 90 % to 100 %.
7. Increase in the transition rate and pass percentage of weak students from 95% to 100%.
8. Increase in MoUs with the Industry, R & D organization and leading Universities of the world from 42 to 120.

9. Finishing school training to all the students.
10. All Faculty and staff should undergo training in domain area, pedagogy, attend conference, symposium, soft skills and research.
11. Increase in the number of faculty members involved in guiding Ph.D. Research scholars and encourage Interdisciplinary Research activities through Institution - Industry Interactions, collaboration with corporate, DRDO and foreign universities.
12. Enhancing Research and Innovation in the institute by creating Centres of Excellence in Disaster Mitigation and Management, Signal Processing and Emerging Materials
13. Increase in the number of research publications from 200 to 800 by the faculty and students.
14. Incubation Centres in collaboration with Industries.
15. Digital library, WiFi connectivity and unlimited internet facility in next year: 2016-17.

4.5 Action plan for organizing finishing school and for improving academic performance SC/ST/OBC/Academically weak students

The action plan for organizing finishing school with an intention to improve the academic performance of SC/ST/OBC/Academically weaker students through innovative methods such as improving the pass rate, improving performance of individual students and increasing satisfaction index of students is listed below:

1. Conducting remedial teaching in professional subjects in all Departments.
2. Conducting specialized soft skill training during semester breaks for weak students in all Departments
3. Providing intensive training for development of soft and professional skills for students who have not secured employment(4 weeks duration)
4. Organizing campus interviews with a view of achieving 100% placement.

4.6 Action plan for strengthening of existing PG Programs and starting of new PG programs

The new PG programs that are planned to be commenced in due course of the proposed project is listed below

A. COMPUTER SCIENCE AND ENGINEERING

SL No	Name of Course	Intake	Number of faculty required	Number of Non-Technical Staff required	Building Area	Equipment Cost
1	Data Mining and Warehousing	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03	03	Classrooms - 5 Seminar hall ó 1 Labs-2 (4262.52 sqft)	Rs. 1 Crore
2	Computer Security	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total - 03			
3	Cognitive Science	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total - 03			
4	Bio Computing Engineering	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03			
5	Free and Open Source Software Technologies	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03			

B. MECHANICAL ENGINEERING

Sl. No	Name of Course	Intake	Number of faculty required	Number of Non-Technical Staff required	Building Area	Equipment Cost
1	AeroScience and Space Technology	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03	03	Classrooms - 2 Seminar hall-1 Labs-4 (12000 Sq ft)	Rs. 3 Crores
2	Nano Technology	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03		Rs. 4 Crores Classrooms - 2 Seminar hall-1 Labs-8 (18000 Sq ft)	Rs. 20 Crores
3	Mechatronics	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03		Classrooms - 2 Seminar hall-1 Labs-2 (9000 Sq ft)	Rs. 3 Crores

C. CIVIL ENGINEERING

Sl. No	Name of Course	Intake	Number of faculty required	Number of Non-Technical Staff required	Building Area	Equipment Cost
1	Disaster Management	25	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03	Diploma -1 ITI -1 Total ó 02	Classrooms - 2 Seminar hall ó 1 Labs-2 (4262.52 sqft)	Rs. 5 Crores
2	Geomatics Engineering	25	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03	Diploma -1 ITI -1 Total ó 02	Classrooms - 2 Seminar hall ó 1 Labs-2 (4262.52 sqft)	Rs. 5 Crores

D. ARCHITECTURE ENGINEERING

Sl. No	Name of Course	Intake	Number of faculty required	Number of Non-Technical Staff required	Building Area	Equipment Cost
1	Master of Urban and Regional Planning (M.U.R.P)	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total - 03	02	Classrooms - 2 Seminar hall-1 Labs-4 (12000 sqft)	Rs. 10 Crores
2	Masters in Housing	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total - 03		Classrooms - 2 Seminar hall-1 Labs-2 (16000 sqft)	Rs. 5 Crores
3	Masters in Environmental Planning	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03		Classrooms ó 2 Seminar hall-1 Labs-2 (16000 sqft)	Rs. 2 Crores
4	Masters in Heritage Conservation	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03		Classrooms ó 2 Seminar hall-1 Labs-1 (14000 sqft)	Rs. 2 Crores

E. ELECTRICAL ENGINEERING

Sl. No	Name of Course	Intake	Number of faculty required	Number of Non-Technical Staff required	Building Area	Equipment Cost
1	Energy Systems Engineering	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total - 03	Diploma -2	Classrooms ó 2 Seminar hall ó 1 Labs-2 (4262.52 sqft)	Rs. 2 Crores
2	Computer Application in Industrial Drives	18	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total - 03		Classrooms ó 2 Smart Classroom ó 1 Labs-2 (4262.52 sqft)	Rs. 2 Crores

F. ELECTRONICS AND COMMUNICATION ENGINEERING

Sl. No	Name of Course	Intake	Number of faculty required	Number of Non-Technical Staff required	Building Area	Equipment Cost
1	Digital Communication Engineering	25	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total - 03	2	Classrooms ó 2 Seminar hall ó 1 Labs-2 (6000 sqft)	Rs. 5 Crores
2	VLSI and Signal Processing	25	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total - 03	2	Classrooms ó 2 Seminar hall ó 1 Labs-2 (6000 sqft)	Rs. 5 Crores
3	Embedded System	25	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total - 03	2	Classrooms ó 2 Seminar Hall ó 1 Labs - 2 (6000 sqft)	Rs. 5 Crores
4	Communication Networks	25	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total - 03	2	Classrooms ó 2 Seminar hall ó 1 Labs-2 (6000 sqft)	Rs. 5 Crores
5	Digital Signal Processing	25	Professor ó 1 Asso. Professor -1 Associate Professor ó 1 Total ó 03	2	Classrooms ó 2 Seminar hall ó 1 Labs-2 (6000 sqft)	Rs. 5 Crores

The Faculty members will be trained in the following major areas:

1. Department of Civil Engineering:

Special Concrete, Polymer Concrete, Ultra-High Performance Concrete, Air Quality Monitoring Assessment and Prevention, Water Surface and Ground Water Quality Assessment and Remedial Measurements, Waste Water Engineering, Feasibility Studies of Different types of Waste Water, Application of Biotechnology to Remediate Polluted Soil, Soil Stabilization, Reinforced Soil Structure, Infilled Frame, Concrete Materials, Earthquake Resistant Structures, Isotope Hydrology, Remote Sensing and GIS Application in Irrigation, Dynamic Soil Structure Interaction, Seismic Earth Pressure Evaluation, Seismic Base Isolation of Structures, Newer Materials of Pavement Design for Performance Studies.

2. Department of Mechanical Engineering:

Development of various Composites, their Studies and Characterization - Metal Matrix Composites, Hybrid Composite Materials, Newer Materials and Characterization for Marine Applications., Surface Mechanics/Technology, Welding, Friction Stir Welding, Composite Materials, Use of Artificial Intelligence and Machine Vision in Manufacturing Applications, Finite Element Analysis, Use of Acoustic Emission in Monitoring of Manufacturing Processes, Cutting Tool Materials for Nanotechnology applications, Bio Materials, Smart Materials, Coating technology, Fracture and Fatigue Analysis, Soft body impacts, Flow Studies in Micro Channel, Flat and Curved Plates, Thermal Coatings on I.C. Engine Pistons and Studies on Fuel efficiency characteristics, Bio-Fuels, Application of Nanotechnology (Physics Department) in Electro optics, Sensing, Medicine (Drug Delivery), Spintronics and Memory Devices. Alternative materials for Orthopaedic implants, Skin implants, Artificial skin, Cardiac vascular implants, dental implants, Bio active coating on bio polymers.

3. Department of Electrical Engineering:

Multilevel Inverters for Electric Vehicle Application, Power Electronic Drives, VLSI in Nano Electronics, Soft Computing Techniques for Power Systems and Automation of Power Distribution System.

4. Department of Electronics and Communication Engineering:

Electro Magnetic Interference (EMI)/Electro Magnetic Compatibility conducted Emission and Conducted Immunity(EMC), Speech Signal Processing, VLSI Signal Processing, M-Commerce, Ad-hoc Wireless Networks, Power Electronics.

5. Department of Computer Science and Engineering

Wireless Sensor Networks (WSN), Security Issues in WSN, Challenges in QoS, Cognitive Network and its Security issues, Cloud Computing, Energy Efficiency, Text Mining, Web Mining, Semi structured Data Mining, Semantic Web, Spatial Mining, Privacy Preservation and Social Networks, Health Care, Spam Detection, Biometrics Data Analysis like Recognition of Face, Finger Print, Iris, Signature, ECG, Palm Print, Finger Knuckle and Hand Vein, Multimedia Image Processing, Steganography, Soft Computing.

4.7 Implementation of Academic and Non-Academic Reforms

(i) Academic Reforms:

The faculty members and students will be trained in the following areas:

- Innovations in teaching and student evaluation methodologies
- Design skills, communication skills, entrepreneurial skills, information processing, creative and innovative - thinking and leadership skills
- Industry oriented projects will be undertaken
- Elective courses in new frontier areas will be introduced
- Extensive use of audio visual systems
- Invited expert lectures from Industry and R&D organizations
- Visits to Industries to get practical knowledge
- Multi-level and multi-background entry credit exemptions

Improved student performance evaluation by changing the process of assessing students from the present marking system to grading system in conscience with the global standards. It will also change the system of syllabus framing from the current standards to cater the changing need of the industry federation and other external university bodies. Hence it will be a national need based syllabus rather than text book oriented syllabus.

- Each subject will have a lab component in which the students will be encouraged to implement their ideas. This will inculcate research oriented learning thereby creating leadership talents.
- Performance appraisal of faculty by students:
 - Evaluation of faculty performance on a periodic basis and to provide remedy from them to improve the skill of teaching faculty.
- Continuous motivation of faculty to achieve greater quality teaching, faculty incentive for continuing education, encouraging faculties in R&D activities.
- Accreditation of UG and PG program will be done by the end of RUSA term.

(ii) Non Academic Reforms

- Obtaining financial, academic, administrative and managerial autonomy to a reasonable level as this institution is owned and operated by Bangalore University and the State Government. The ultimate goal is to convert UVCE to a Deemed University.
- Establishment of funds to ensure developmental activities beyond the project period
- To generate revenue for self-financing training and teaching program
- To provide consultancy and research, innovations, patents commercialization of R&D and sharing of Hi-Tech equipment with industries
- To offer credit to students participating in State/National/International level sports.
- Introducing hobby clubs/technical clubs for students and staff members.

CHAPTER 5

MANAGEMENT OF THE INSTITUTION

5.1 Statutory Bodies:

UVCE shall have the following structure and committees to ensure proper management of Academic, Financial and General administrative affairs.

- (i) The Governing body, Board of Governors (BOG)*
- (ii) Academic Council*
- (iii) Faculty of Studies
- (iv) Board of Studies*
- (v) Finance Committee*
- (vi) Building and Construction Committee

* Statutory bodies of the Autonomous Institution.

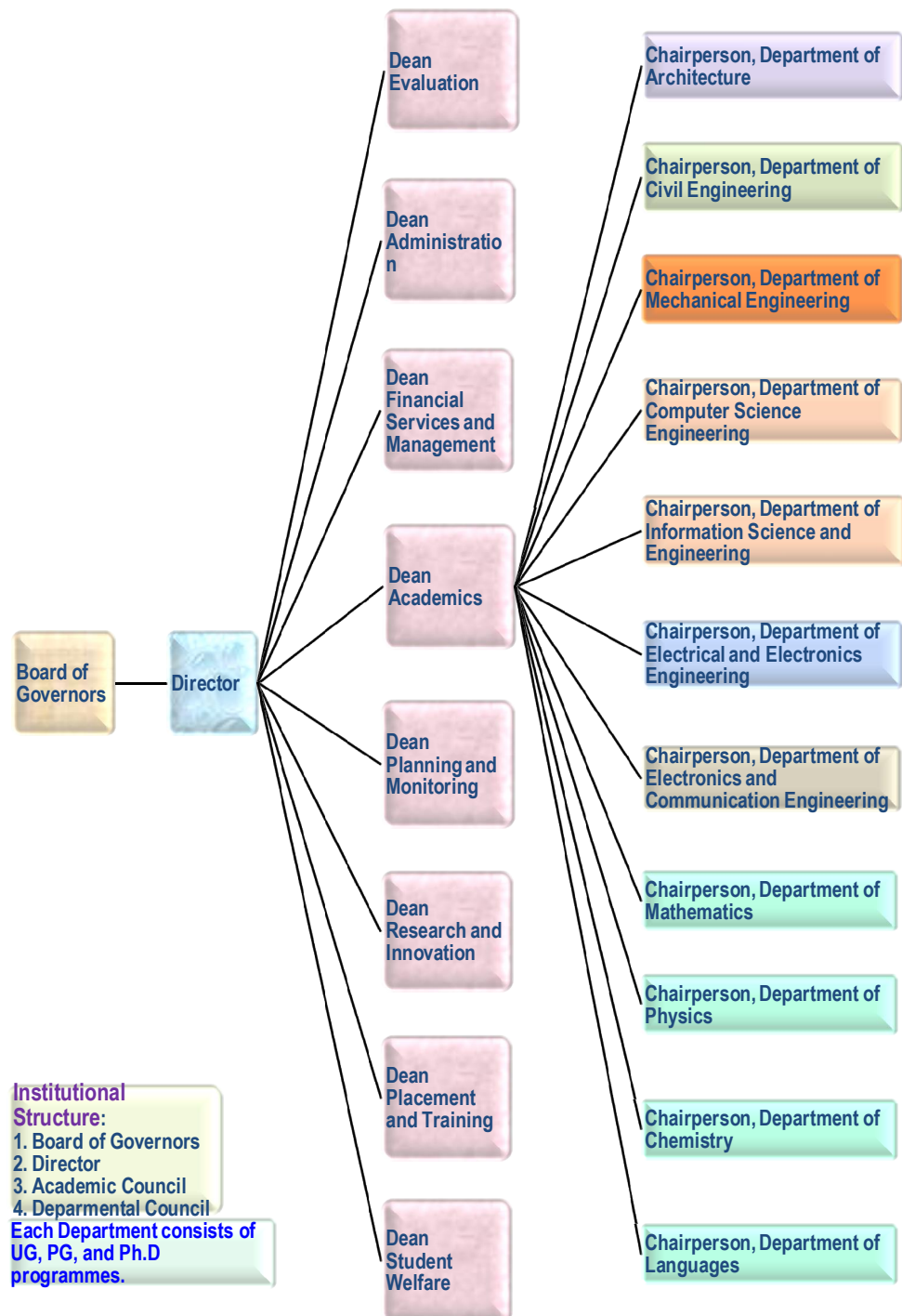
5.2 Officers of the Institution

The following shall be the officers of the UVCE, namely:-

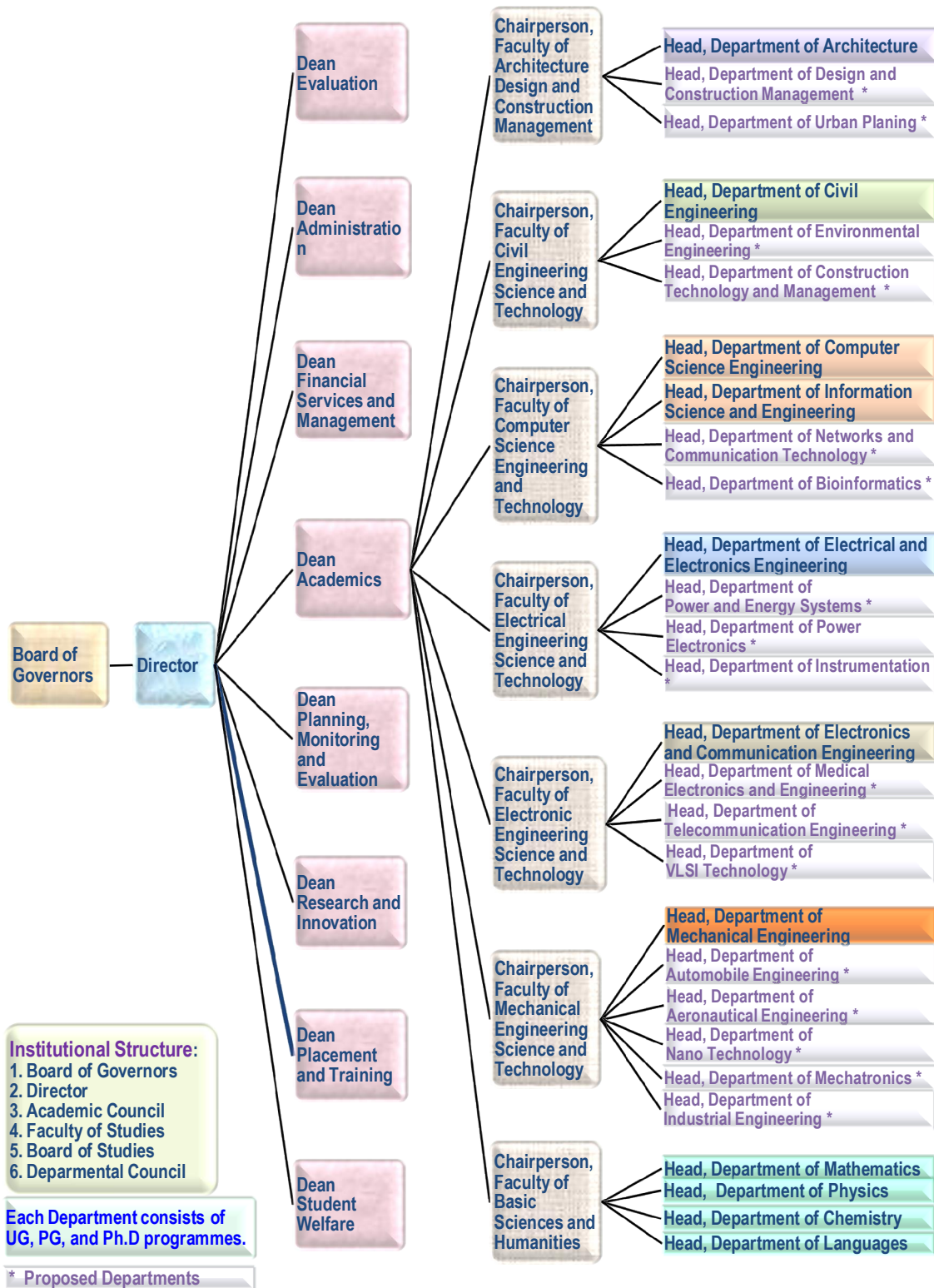
- (i) The Chairperson**, BOG
- (ii) The Director
- (iii) The Dean (Administration)
- (iv) The Dean (Evaluation)
- (v) The Dean, Financial Services and Management
- (vi) The Dean, Academics
- (vii) The Dean, Research and Innovation
- (viii) The Dean, Placement and Training
- (ix) The Dean, Planning and Monitoring
- (x) The Dean, Students welfare
- (xi) And such other officers of the Institution as the Chairman, BOG may, on the recommendation of the State Government from time to time, designate.

** Chairman and Chairperson are used synonymously as the case may be throughout this document.

5.3 Organisational Structure for the Existing Departments in University Visvesvaraya College of Engineering



5.4 Organisational Structure for the Proposed Departments in University Visvesvaraya College of Engineering



5.5 Board of Governors (BOG): Constitution and Functions

The Governing of the Autonomous Institution shall be done through the Board of Governors. The Chairperson of the Board of Governors shall be reputed Educationist/Scientific/Professional. He shall be appointed by the Government. The other members of the board of Governors shall be as shown in Table 1. The tenure of the Members of the Board of Governors is 2 years except for the UGC Nominee whose term will be a full 6 years. The Board of Governors shall meet at least twice a year.

Number	Category	Nature
Chairperson	Educationist, Scientist, Industrialist, Professional	Nominated by the Government
3 Members	Educationist, Scientist, Industrialist, Professional	Nominated by the University, Persons of proven academic interest with at least PG level qualification
2 Members	Professors of the Institution	Nominated by the Director based on seniority
1 Member	State Government Nominee	Nominated by the State Government
1 Member	University Nominee	Nominated by the UGC
1 Member	State Government Nominee	Nominated by the State government.
1 Member	Director of the Institution	Ex-Officio, Member Secretary

Table 1: Constitution of Board of Governors

5.5.1 Administrative and Managerial Matters:

- (i) While granting complete autonomy, the managerial and administrative changes are to be made as per the guidelines given by the Government of Karnataka and Ministry of Human Resource Development, Government of India. Accordingly, the Board of Governors shall be appointed, as indicated in Table 1. The tenure of the members appointed on the Board of Governors shall be two years. There shall be two committees of the Board of: (a) Finance Committee and (b) Building and Construction Committee.
- (ii) The functioning of an autonomous institution shall be done through the Board of Governors. The service conditions of all the regular teaching and non-teaching employees who have entered the service of the institute prior to functioning of the institution shall be

same as those of the Bangalore University employees. The existing Provident Fund Scheme, Pension Scheme and superannuation and other benefits shall be applicable to them and the Government shall take the responsibility for the same. Once the functioning of the institution is taken over by the BOG, the BOG shall decide the pattern of the staff service conditions of the employees and may be governed by the BOG of the Institution on par with the model of IITs and NITs. Accordingly, the BOG shall appoint the employees and they shall be considered as the employees of the institution.

- (iii) The current designation of the Head of the Institution as *Principal* is changed to *Director*.
- (iv) An autonomous institution shall have autonomy in the following respects:
 - (a) To decide the development programme of the institution
 - (b) To decide the staff pattern (except the approved posts) and the Human Resource Development policy.
 - (c) To decide the service conditions of the new employees
 - (d) To make purchases of materials and hire services as per the requirements.
 - (e) To hire the services such as, security, gardening, transport etc.
 - (f) To organize research, academic programmes, consultancy services, seminars, and collaboration with best institutions/universities/industries in the world. To implement continuous education programmes, and to provide services to industry and society.
 - (g) To take help of the reputed teachers from the other states/foreign countries and the experts from industries to improve the academic standards.
 - (h) To decide the policy of the generation and distribution of internal revenue.
- (v) Up to 2015-16, the tuition fees and other fees shall be the same as those in other Government or Government aided institutions. However, the Board of Governors shall have powers to make changes in the fees. The BOG has to take the approval of the Fee Regulatory Committee or any equivalent authority. The BOG shall have the powers to charge and collect fees for
 - (a) Tuition and Research;
 - (b) Admission to Examinations and convocations;
 - (c) Other services as the Institution may undertake;
 - (d) Affiliation and Inspection of Colleges;
 - (e) And such other purposes as may be prescribed by the Statutes;

- (vi) Fix the fees and other charges payable by the students of the college on the recommendations of the Finance Committee.
- (vii) To approve new programmes of study leading to degrees and/or diplomas. Perform such other functions and institution committees, as may be necessary and deemed fit for the proper development, and fulfil the objectives for which the Institution has been declared as autonomous.
- (viii) Shall have the power to manage the affairs of the Institution, in particular, to administer the funds and properties of the Institution.
- (ix) Without prejudice to the generality of the foregoing, the BOG shall have the following powers, namely:-
 - (a) To manage and regulate the finances and all other administrative matters of the Institution and for that purpose to appoint such agents as it may deem necessary and proper.
 - (b) To enter into, vary, carryout and cancel contracts on behalf of the Institution;
 - (c) To appoint examiners, moderators and if necessary to change or to remove them, to fix their fees, emoluments, travelling and other allowances;
 - (d) To make arrangements for the conduct of examinations prescribed by the Statutes, Ordinances or Regulations;
 - (e) To receive, acquire, hold, control and administer the properties of the Institution, both movable and immovable and to invest the funds of the Institution judiciously in appropriate schemes;
 - (f) To cause to be maintained proper accounts of the properties and funds of the Institution;
 - (g) To prepare the financial estimate of the Institution and to submit the same to the Academic Council.
 - (h) To administer and control the hostels, libraries, laboratories, museums maintained by the Institution;
 - (i) To regulate, supervise and control the residence and discipline of the students of the Institution within the campus and its annexes and to promote their health and well-being;
 - (j) To constitute and regulate the working of the Employment Bureau and the Bureau of Information.

- (k) To delegate such of its functions to the Director as may be prescribed by the Statutes.
- (l) To select a common seal for the Institution and to provide for its custody and use.
- (m) To arrange for the conduct of litigation by or against the Institution.
- (n) To create, abolish and transfer the posts of Professors, Associate Professors and Assistant Professors or any other posts of teachers required by the Institution on the recommendation of the Academic Council.
- (o) To Institute fellowships, travelling fellowships, scholarships, studentships, exhibitions, medals, prizes and certificates on the recommendation of the Academic Council.
- (p) To confer honorary degrees, titles or other academic distinctions on the recommendations of the Academic Council.
- (q) To enact, amend or repeal Statutes,
- (r) To confer the title of Professor Emeritus on the recommendation of the Academic Council.
- (s) To make Statutes for creation of posts.

5.6 The Director

- (i) The Director shall be a whole time officer of the Institution. The post of the Director shall be created and approved by the appropriate authorities.
- (ii) There shall be the following selection committee for the selection of the *Director*.

Chairperson	The Chairman of the Board of the Governors
Co-Chairperson	Principal Secretary/Secretary, Higher and Technical Education, Karnataka
Two Members	Director, Indian Institute of Science or Director, Indian Institute of Technology, or Equivalent reputed national Institutions
Convenor	Director, Technical Education, Karnataka

After granting the autonomy to the institution, the person currently working as the Principal can continue to remain as Director of the Institution until a new Director is appointed. However, after this he/she has to be selected by the selection committee in order to remain in the post. The tenure of the Director of the institution selected by the above committee shall be of 3 years.

- (iii) No person shall be appointed or hold office of the Director if he has attained the age of sixty five years.
- (iv) The Director shall, subject to the pleasure of the Government hold the office for a period of three years. He shall not be eligible for reappointment for a second term.
- (v) The Director shall not be removed from his office except by an order of the Government passed on the ground of will full omission or refusal to carry out the provisions of this Act or for abuse of the powers vested in him and on the advice tendered by the State Government on consideration of the report of an inquiry ordered by it.
- (vi) For the purposes of holding an inquiry under this section, the State Government shall appoint a person who is or has been a Judge of the High Court or the Supreme Court. The inquiry authority shall hold the inquiry after giving an opportunity to make representation by the Director and shall submit a report to the State Government on the action to be taken including penalty, if any, to be imposed, and the State Government decision is final.

5.6.1 Powers of the Director:-

- (i) The Director shall be the principal executive and academic officer of the Institution and shall exercise general control over the affairs of the Institution. He shall exercise all powers necessary for maintenance of discipline in the Institution.
- (ii) He shall be the ex-officio member secretary BOG, Chairman of the Academic council and the Finance Committee. He shall preside over the meetings of the authorities of the Institution.
- (iii) He shall ensure that all the provisions of this Act, the Statutes, the Ordinances, and the Regulations are observed and shall have all the powers necessary for that purpose.
- (iv) He may either himself or through any officer of the Institution authorised in writing by him, convene the meetings of the Academic Council, the BOG and the Finance Committee and shall perform all such acts as may be necessary to carry out and give effect to the decisions of these authorities.
- (v) In case of emergency which, in his opinion, requires immediate action, the Director, shall take such action as he deems necessary and shall at the earliest opportunity thereafter report the action taken to BOG or body which in the ordinary course would have dealt with the matter: Provided that if the action taken by the Director, is not approved by the Authority

or body concerned, the Chairman, BOG may refer the matter to the Government whose decision thereon shall be final.

- (vi) The Director shall exercise such other powers as may be prescribed by the Statutes, Ordinances and Regulations.

5.6.2 Arrangement of work during vacancy in the office of the Director:-

- (i) During the temporary absence of the Director by reason of leave, illness or any other cause, the Director may make such arrangements as he deems fit for carrying on the duties of the Director: Provided that pending the making of such arrangements, the Director may designate the senior most Dean available in the Institution to be in charge of the current duties of the Director for a period not exceeding one month or till arrangements are made by the Chairman BOG, whichever is earlier.
- (ii) During the period when a vacancy in the office of the Director remains unfilled, the senior most Dean available shall act as Director and the person so appointed shall have all the powers and shall be entitled to all the privileges of the Director and to such emoluments and allowances as may be determined by the BOG in accordance with the Statutes, if any, framed in this behalf.

5.7 Dean (Administration):-

- (i) The BOG shall appoint a professor of the institution as Dean Administration.
- (ii) The Dean shall be the whole time officer of the institution.
- (iii) The Dean (Administration) shall be ex-officio Member-Secretary of the Academic Council member of the Finance Committee.
- (iv) It shall be the duty of the Dean (Administration) -
- (a) To be the custodian of the records, the common seal and such other property of the Institution;
 - (b) To issue notices convening the meetings of the Academic Council, the Faculties, the Board of Studies, and any authority of the Institution and to keep minutes of all such meetings;
 - (c) To conduct the official correspondence of the authorities of which he shall be the Member-Secretary.
 - (d) To supply to the BOG and to the State Government copies of the agenda of the meetings of the authorities of the Institution as soon as they are issued and the minutes of the meeting within a month of holding of the meeting.

- (v) The Dean (Administration) shall exercise such other powers and perform such other duties as may be prescribed by the Statutes, Ordinances or Regulations and as may be allocated to him from time to time by the Director.
- (vi) The Dean (Administration) may be assisted by one or more Deans.

5.8 Dean (Evaluation) –

- (i) The BOG shall appoint a professor of the Institution as Dean (Evaluation). The Dean(Evaluation), shall be a whole time officer of the Institution.
- (ii) The Dean (Evaluation) shall be a Member of the Academic Council, Finance Committee and all the Faculties.
- (iii) The Dean (Evaluation) shall be in charge of the conduct of examinations and all other matters incidental thereto and ancillary therewith and shall perform such other duties as may be prescribed by the Statutes or Ordinances, or as may be allocated to him by the Director.
- (iv) The Dean (Evaluation) may be assisted by one or more Deputy Registrars (Evaluation) and Assistant Registrars (Evaluation).

5.9 Dean, Financial Services and Management-

- (i) The BOG shall appoint a professor of the Institution as the Dean, Financial Services and Management. The Dean, Financial Services and Management, shall be a whole time officer of the Institution.
- (ii) The Government may in consultation with the Chairman, BOG, appoint such other person as it deems fit to be the Dean, Financial Services and Management.
- (iii) The Dean Financial Services and Management shall, subject to the control of the Finance Committee, exercise such powers and perform such functions as may be prescribed by the Statutes, the Ordinances and the Regulations or as may be required from time to time by the Director. He shall be the ex-officio Member of the Academic Council, and the ex-officio Member-Secretary of the Finance Committee.

5.10 Dean, Student Welfare-

The Dean Student Welfare, a Professor, shall be a whole-time officer of the Institution and shall be appointed by the Director on the recommendation of the BOG. He shall exercise such powers and perform such functions as may be conferred or imposed on him by the Director or as may be prescribed by the Statutes. His term of office, emoluments and other conditions of service shall be such as may be prescribed by the Statutes.

5.11 Dean, Planning and Monitoring -

The Dean of Planning and Monitoring, a Professor, shall be a whole time officer of the Institution and shall be appointed by the Director on the recommendation of BOG. He shall possess such qualifications and exercise such powers and discharge such duties as may be prescribed by the BOG. His emoluments and terms and conditions of service shall be such as may be prescribed by the Statutes.

5.12 Dean, Placement and Training -

The Dean, Placement and Training, a Professor, shall be a whole time officer of the Institution and shall be appointed by the Director on the recommendation of BOG. He shall possess such qualifications and exercise such powers and discharge such duties as may be prescribed by the BOG. His emoluments and terms and conditions of service shall be such as may be prescribed by the Statutes.

5.13 Temporary vacancy in the office of the Dean Administration, the Dean (Evaluation), the Dean Financial Services and Management, the Dean Planning and Monitoring, the Dean Research and Innovation, the Dean Academics, the Dean Student Welfare and the Dean Placement and Training-

- (i) In the event of death, suspension or temporary absence of the Dean Administration, the Dean (Evaluation) or the Dean Financial Services and Management, the Dean Planning and Monitoring, the Dean Research and Innovation, the Dean Academics, the Dean Student Welfare, and the Dean Placement and Training, the Director may authorise any other suitable officer of the Institution to perform the duties of the Dean Administration, the Dean (Evaluation) or the Dean Financial Services and Management, the Dean Planning and

Monitoring, the Dean Research and Innovation, the Dean Academics, the Dean Student Welfare, and the Dean Placement and Training, as the case maybe.

- (ii) Pending appointment of a suitable officer to fill the vacancy in the office of the Dean Administration, the Dean (Evaluation) or the Dean Financial Services and Management, the Dean Planning and Monitoring, the Dean Research and Innovation, the Dean Academics, the Dean Student Welfare, and the Dean Placement and Training, the Director may in his discretion authorise any officer to perform the duties of such vacant post till appointment is made. The Director shall immediately report the action taken by him under this sub-section to the BOG.

5.14 Academic Council: Structure and Functions

5.14.1 Composition

The Academic Council shall consist of the following Persons / Officers:

Chairman	Director of the Institution
4 Members	Nominees of national/international reputed institutions (Nominations by the governing body)
1 Member	The Director of Technical Education or his nominee not below the rank of Joint Director
3 Members	Nominees by the University
	All Deans, All Professors and two Associate Professors and one Assistant Professor from each Department of the Institution, nominated by the Director by seniority on rotation for 2 years
1 Member	Librarian of the Institution
3 Members	One student each from the UG, PG and Full time Ph.D Programmes
Member Secretary	Dean (Administration)

5.14.2 Meeting

The Academic Council shall meet at least once in 3 months during an academic year. However the duration between two consecutive meetings shall not exceed three months.

5.14.3 The Powers / Duties of the Academic Council.

- (i) The Academic Council shall be the academic body of the institution and shall be subject to the provisions of this Act, the Statutes, Ordinances and Regulations, have the control and general regulation of, and be responsible for the maintenance of, the standards of instruction, education and examination of the institution;
- (ii) Without prejudice to the generality of the foregoing and subject to such conditions as may be specified by or under the provisions of this Act, the Academic Council shall exercise the following powers, namely:-
 - (a) To make proposal for issue of Ordinances, relating to academic matters;
 - (b) To make Regulations regarding the courses of study in so far as they are not covered by the Ordinances;
 - (c) To make Regulations regarding the scheme of examinations and conditions on which the students shall be admitted to the examinations, degrees, diplomas, certificates or other academic distinctions;
 - (d) To formulate schemes for promoting research within the Institution or for promoting other specialised studies;
 - (e) To make proposals for allocating subjects to the Faculties and to assign its own members to the Faculties;
 - (f) To determine the criteria for grant of exemptions relating to the admission of students to examinations;
 - (g) To make proposals for the institutions for creation, abolition and transfer of duties and responsibilities of the posts of the Professors, Associate Professors/Assistant Professors, and other posts of teachers required by the Institution and for prescribing the duties of such posts;
 - (h) To make proposals for the institution and award of fellowships, travelling fellowships, scholarships, studentships, and medals, prizes and certificates and exhibitions;
 - (i) To make Regulations prescribing equivalence of examinations, degrees.
 - (j) To propose honorary degrees, titles or other academic distinction.
 - (k) To propose the title of Professor Emeritus.
 - (l) To make Regulations for granting exemptions from approved courses of study in the Institution;

- (m) To provide for instruction, teaching and training in such branches of learning and courses of study as may be appropriate for research and for the advancement and dissemination of learning;
- (n) To consider the annual financial estimates;
- (o) To amend or repeal any regulation;
- (p) To nominate members to the various authorities of the Institution;
- (q) To exercise such other powers and to perform such other duties as may be conferred or imposed on it by this Act or the Statutes, Ordinances or Regulations, made there under.
- (r) To establish and maintain departments of research and specialised studies.
- (s) To perform the academic audit of the institution
- (t) To supervise the functioning of the library
- (u) Generally to advise the Institution in all academic matters.
- (v) All the proceedings shall be placed before the Board of Governors for approval.

5.14.4 Functioning of the Academic Council

- (i) There shall be a minimum of four meetings of the Academic Council in a year.
- (ii) The Chairman shall call an extraordinary meeting of the Academic Council either himself or by the written demands from the minimum of 20% members of the Academic Council.
- (iii) The minimum of 1/3 of the members of the Academic Council shall make the quorum.
- (iv) The Dean (Administration) shall give notice of minimum one week in writing along with agenda for convening a meeting.
- (v) The Chairman can call the emergency meeting with a notice of less duration for urgent items.
- (vi) The decision of the Chairman shall be final on any matter.
- (vii) The Dean (Administration) shall take the minutes of the meeting. Copies of the minutes of the meetings shall be forwarded to all the members. Any suggestion/corrections on this shall be placed before the next meeting and the finalized minutes of the meeting will be approved and signed by the Chairman. The minutes of the meeting shall be recorded in the book and shall be available for inspection to the members during office time.
- (viii) The Chairman shall take the decisions through the committee of Heads of the Departments and Professors, on the matters on which action is expected to be taken before the next Academic Council meeting.
- (ix) The Academic Council may constitute committees as per the requirements given below:

- (a) Planning, Monitoring and Evaluation Committee
 - (b) Grievance Appeal Committee
 - (c) Examination Committee
 - (d) Admission Committee
 - (e) Library Committee
 - (f) Student Welfare Committee
 - (g) Extra-Curricular Activities Committee
 - (h) Academic Audit Committee
 - (i) Nomination Committee
 - (j) Graduation and Post-Graduation Committee
 - (k) Departmental Graduate/Post Graduate committee
 - (l) Departmental faculty committee (faculty Committee)
 - (m) Academic Evaluation Committee and School (Teachers Advisory Committee)
 - (n) Institutional faculty (teachers) Committee
 - (o) Sponsored research and Central Facility Committee
 - (p) Scholarship Committee
 - (q) Academic Evaluation Committee
 - (r) Anti-Ragging committee
 - (s) Placement and Training committee
- (x) All the proceedings shall be placed before the Board of Governors for approval.

5.15. Faculty of Studies:-

1 Member	Chairman of the Faculty
1 Member	The Dean (Evaluation)
1 Member	The Chairman of the Board of Studies
	All the Professors and in the absence of Professors, Associate Professors in the faculty from each Department
2 Members	One Associate Professor and one Assistant Professor in each Board of studies nominated by the Director, by rotation in the order of seniority for a term of two years
5 Members	Professors of other Institutions for a term of two years
2 Members	Professors from other Universities in the State nominated by the Director, for a term of two years
	Such other persons as may be specified by the Statutes and BOG

- (i) The institution shall have the Faculty of Engineering, Science and Technology and such other subjects as may be prescribed by the Statutes from time to time.

- (ii) Each Faculty shall consist of such number of Departments of Studies as may be assigned to it by the Ordinance or statutes.
- (iii) The Chairman, Faculty of Studies shall be appointed by the Director for a term of two years, or for such other term as the BOG may determine from time to time.
- (iv) Each Faculty of Studies shall consist of the following members, namely:-
- (v) The Faculty of studies shall exercise such powers and perform such functions as may be prescribed by the Statutes and BOG.

5.15.1 Chairman, Faculty of Studies-

- (i) A Professor in each faculty according to seniority shall by rotation, act as Chairman of faculty for a period of two years: Provided that if there is no Professor, the senior most Associate Professor of faculty shall act as Chairman: Provided further that if in any faculty there is no Professor or Associate Professor, then the Director may in his discretion designate any other suitable Professor/Associate Professor/Assistant Professor to act as Chairman.
- (ii) The Chairman of each faculty shall be the Executive Officer of the faculty and shall preside over the meetings of the faculty.
- (iii) The Chairman of faculty shall exercise such other powers and discharge such other functions as may be prescribed by the Statutes or BOG.

5.16 Boards of Studies: Structure and Functions -

- (i) There shall be a Board of Studies for every subject or group of subjects as may be prescribed by the Ordinances: Provided that the BOG may constitute a separate Board of Studies for Under-graduate Studies and for Post - graduate studies.
Without prejudice to the provisions of sub-section (i) the constitution, functions and powers of the Board of Studies shall be as prescribed by the Statutes.
- (ii) The Board of Studies in each Department shall consist of the following members, namely:-
 - (a) All Professors;
 - (b) The Dean of Faculty;
 - (c) The Registrar (Evaluation);
 - (d) All Professors of the Department, nominated by the Director.
 - (e) Two Subject experts members appointed by the BOS.

- (iii) Each Board of Studies shall have a Chairman who shall also be the Chairman of the Departmental Council.
- (iv) Each Board of Studies shall have a Departmental Council consisting of,-
- All the Professors and Associate Professors;
 - The Dean of Faculty;
 - The senior most Assistant Professor in the Department.
- (v) The Chairman, Board of Studies (BOS) shall be in charge of the administration of the Department. The powers, duties and functions of the Departmental Council and of the Chairman shall be as prescribed by the Statutes.

5.17. The Finance Committee.-

There shall be a Finance Committee consisting of the following members, namely:-

Chairman	The Director of the Autonomous Institution
2 Members	Nominees of the Principal Secretary, Higher and Technical Education Department and Principal Secretary, Finance Department
2 Members	Repeated Chartered accountant/Cost accountant/Financial advisor of a reputed company or a Government nominee from the Audit Department
1 Member	A nominee of the Board of Governors
1 Member	Dean Administration
1 Member	Dean Evaluation
Member Secretary	Dean Financial Services and Management

- The Finance Committee shall meet at least once in three months.
- The Finance Committee shall perform the following functions, namely:-
 - To conduct the general scrutiny of accounts of the Institution, review the yearly audit reports and make recommendations thereon;
 - To scrutinise the annual budget estimates and make recommendations to the Academic Council and BOG;
 - To scrutinise all proposals of the Institution involving expenditure for which no provision is made in the budget or involving the expenditure in excess of the amount provided for in the budget including creation, up gradation and abolition of posts in the Institution;
 - Such other functions as may be prescribed by the Statutes;

- (iii) Notwithstanding anything contained in sub-section (ii), the Chairman, BOG may in case of urgency and for reasons to be recorded in writing, incur without the approval of the Finance Committee, any expenditure not exceeding fifty thousand rupees in any one case for which no provision is made in the budget or which is in excess of the provisions made in the budget:

Provided that such expenditure shall be placed before the Finance Committee for ratification at its immediate next quarterly meeting.

Provided further that if the incurring of expenditure by the Director is not satisfactory, the Finance Committee may refer it to the BOG, whose decision in the matter shall be final.

- (iv) The tuition and other fees of the students, internal revenue shall remain with the autonomous institution. The expenditure on the salaries of the posts created by the Institute, non-salary expenditure and other expenditure shall be incurred through this source.
- (v) The Government shall compensate for the amount due to the concessions given in the fees of the students arising out of the policies of the Government. This compensation shall be based on the recommendations of the Free Regulatory Committee or any equivalent authority appointed by the Government.
- (vi) The Government shall be responsible for giving the consolidated salary grant (Block Grant) of all the approved Teaching and Non-Teaching posts in the autonomous institution. This amount shall be enhanced by 8% every year. However, it is binding on the institution to use this amount only for the salaries. The Government shall take a review of the Block grant after 5 years and make the changes if necessary. The Block Grant will be disbursed by the Government of Karnataka.
- (vii) For the development of the institution it is essential that the teaching and non-teaching employees of the institution should have up-to-date knowledge in concerned areas/changing technologies. Therefore the institution should earmark specific amount in its annual budget for Human Resource Development. The Board of Governors should decide about its proportion.

- (viii) The following different funds/endowments should be created in the autonomous institution:
- (a) Corpus Fund or Endowment Fund.
 - (b) The fund required to replace obsolete, non-functional machinery by advanced machinery or for the depreciation of the machinery.
 - (c) Fund for the maintenance of machinery and facilities.
 - (d) Pension fund for the retired employees.
- (ix) It is essential that the autonomous institution should increase their income. The autonomous institution should not depend on the Government grant alone and should try to become financially independent by increasing their own income.
- (x) For smooth and speedy implementation of the programme, the audit of the expenditure of the Institution shall be done by the certified C.A/Government auditor, wherever required, the audit will be done by the normal procedure by the office of the Accountant General.
- (xi) In order to have transparency in the financial matters and to have financial discipline, accounts of expenditure should be maintained as per the prescribed procedure. It is binding on the institution to make these accounts of expenditure available to the Government for inspection.

5.18. Building and Construction Committee

Composition:

The Committee is responsible for preparing the estimate for construction and repair of buildings. All the proceedings of the Committee shall be placed before the BOG for approval.

Chairman	Director of Autonomous Institution
1 Member	Executive Engineer, Public Works Department, Government of Karnataka (Government Representative).
1 Member	Director, Engineering Services and Projects/Chief Engineer, Local self-Governing Institutions
2 Members	Reputed Architects
1 Member	A nominee of the Board
Member Secretary	Head of the Department /Professor, Civil Engineering

5.19. Planning and Monitoring Board-

- (i) There shall be a Planning and Monitoring Board to plan the academic courses, research programmes, interdisciplinary activities, interaction with outside agencies for training, extension and research, and to monitor from time to time the implementation of the programmes and activities formulated by it.
- (ii) The Planning and Monitoring Board shall consist of the following members, namely:-
 - (a) The Chairman;
 - (b) The Director;
 - (c) Dean Administration;
 - (d) Dean Evaluation;
 - (e) Two senior most Deans of the Faculties by rotation for a period of one year as recommended by the BOG;
 - (f) Two senior most Professors of whom one shall be from engineering, science and technology nominated by the BOG, for a term of two years;
 - (g) One expert who is an educationist with rich experience of teaching and Research and educational administration nominated by the State Government for a term of two years;
 - (h) One officer of the State Government in the Planning Department not below the rank of a Deputy Secretary or a Joint Director of Planning, nominated by the State Government;
 - (i) Two representatives from industry and trade ordinarily residing within the Institution area nominated by the State Government for a term of two years;
- (iii) The Planning and Monitoring Board shall meet at least once in three months. Every resolution of the Planning and Monitoring Board shall be placed before the Academic Council and Board of Governors for consideration and taking action thereon.

5.20. Placement and Training Board**Composition:**

The Board shall meet atleast four times in a year and review the performance of the Institution with respect to Placement and Training. The Dean, Placement and Training shall undertake the following activities;

- (i) To be responsible for promoting and coordinating Placement and Training activities for the UG, PG and Research Scholars.

- (ii) To promote and represent the Students at Institution level as required.
- (iii) To make active contribution to the Institutional objectives.
- (iv) To play Active role in Institutional activities.
- (v) To represent and promote the interests of the Institution.
- (vi) To ensure that appropriate strategies and polices are in place to enable the Student to be recruited in leading companies.
- (vii) To train the students in Technical, Aptitude, Soft Skills, Interviews and Mock Tests.
- (viii) To organize Technical Seminars, Workshops for students.
- (ix) To arrange practical projects and Internship for students.
- (x) To organize Summer courses and Industrial tours for students.
- (xi) To train the students for competitive exams, viz., IAS, KAS, TOEFEL, GRE, GATE etc.
- (xii) To chair the Placement and Training Committee and serve on or chair other Committees, Working Parties and Groups of the Faculty as required.
- (xiii) To work collaboratively with other Deans and Heads of Department to establish and maintain national and international recognition of the Institution as an excellent finishing school.
- (xiv) To undertake any other activities assigned from time to time by the Director.

Chairman	Director of Autonomous Institution
All	Heads of the Department of the Institution
2 Members	Experts from HRD and Industry
2 Members	Experts from other Institutions
1 Member	President, Federation of Karnataka Chambers of Commerce & Industry (FKCCI)
Member Secretary	Dean, Placement and Training

5.21. Research and Innovation Board

Composition:

Chairman	Director of Autonomous Institution
All	Heads of the Department of the Institution.
3 Members	Experts from Industry and Corporate
3 Members	Reputed National Research Institutions
Member Secretary	Dean, Research and Innovation

The Board shall at least meet four times in a year and review the performance of the Institution with respect to Research and Innovation. The Dean, Research and Innovation shall undertake the following activities;

- (a) To be responsible to the Dean for promoting and coordinating research and knowledge transfer activity within the Faculty.
- (b) To establish and maintain recognition of the Faculty as an international centre of excellence in research and knowledge transfer.
- (c) To promote and represent the Faculty at Institution level as required.
- (d) To make active contribution to the Institution corporate goal and strategic aims in research.
- (e) To play a full part in Institutional activities.
- (f) To represent and promote the interests of the Institution.
- (g) To ensure that appropriate strategies and policies are in place to enable the Faculty to recruit and retain excellent researchers.
- (h) To develop an active research culture that fosters the highest achievements, encourages originality and innovation and enriches the student learning experience.
- (i) In collaboration with the Research and Development Support Office to capture detailed information of all research undertaken in the Faculty and to identify funding and knowledge transfer opportunities.
- (j) To promote research links and engagement within the Faculty, across the Institution and with external organisations.
- (k) In collaboration with the Research and Development Support Office to evolve strategies to significantly grow the Faculty research income.
- (l) In collaboration with UVCE Ventures to ensure that systems are in place to maximise appropriate opportunities for the commercialisation of research.
- (m) To implement Institution-wide strategies and policies for research and to maximise the impact of research performed within the Faculty.
- (n) To identify new research opportunities that have potential for significant growth and to liaise with departments on associated grant and contract submissions.
- (o) To prepare the Faculty case for Institution investment in additional capital resources required to grow and develop the research capability.
- (p) To leverage internal peer review mechanisms, to strengthen the quality of the Faculty research base and to nurture environments that promote research at the interface of different disciplines.

- (q) To encourage academics to engage in multi-disciplinary research within the Faculty and, more broadly, across the Institution and externally with other organisations.
- (r) To disseminate and implement good research practice across the Faculty.
- (s) To increase external collaborative research and knowledge transfer activity regionally, nationally and internationally.
- (t) To ensure consideration of any issues referred to the Faculty Research Committee by relevant Institutional Committees.
- (u) To formulate Faculty responses to internal and external consultation papers relating to research.
- (v) To assist the Dean and the Heads of Departments in developing research action plans that align with the Institution Research Strategy and work with the Faculty Executive to deliver these plans.
- (w) To ensure that research activities of the Faculty are undertaken in accordance with the governance, policy and regulatory frameworks of the Institution.
- (x) To undertake any other activities assigned from time to time by the Director.

5.22. Grievance Appeal Committee

The Student Grievance and Appeals Committee is the highest internal mechanism for resolution of grievances by students of Institution.

5.22.1 The Grievance Appeal Committee shall consists of the following persons/ officers

Composition:

Chairman	Director of the Autonomous Institution
1 Member	Dean of the respective faculty.
3 Members	Senior Professors
1 Member	Student Consultative Committee

- (i) Student can appeal with the officer named on the application form.
- (ii) The grievance appeal committee must process the application within 20 working days of receipt of application.
- (iii) The grievance appeal committee must notify the student, in writing of date and venue of committee hearing.
- (iv) The decision of the Chairman is final.

5.22.2 Committee hearing

- (i) The hearing is held without undue formality; the rules of evidence and court procedures do not apply; the format for presentation of evidence and submissions is as determined by the chairman.
- (ii) The committee may inform itself of any matter relevant to the determination of the appeal by whatever means it chooses, provided the student has an opportunity to respond to all material taken into account in determining the outcome of the appeal.
- (iii) The hearing is held in closed session, except that an administrative officer may attend the hearing and take notes; and the student may be accompanied by a support person who is not legally qualified.
- (iv) The appeal is completed as quickly as possible subject to the requirements of procedural fairness. The student and witnesses may at the chairman's discretion appear or give evidence at the hearing by the use of technology.
- (v) Subject to the provision in clause (ii), a hearing may proceed in the absence of the student if the student does not attend after receiving notice of the hearing in accordance with this process.

5.22.3 Responsibilities of the committee members

- (i) Not to participate in any hearing where they have a direct interest.
- (ii) To act fairly and without bias.
- (iii) To examine the substantial merits of the case, without regard to legal technicalities or Forms.
- (iv) To base their decision on findings of fact that is in turn based on sound reasoning and relevant evidence.
- (v) To keep confidential all information provided during the grievance process.

5.22.4 Decision of the Committee

Once the facts have been established to the satisfaction of the committee, the committee shall determine the appropriate action required in light of those facts.

5.22.5 Notification

- (i) Notify the student in writing to the student committee's decision, the grounds on which it was made.
- (ii) Notify other relevant parties to the grievance of the committee decision.
- (iii) Notify other Institution officers whose responsibilities require them to know of the decision.
- (iv) Retain all records of the hearing and related documents on a confidential Institution file.

5.23. Examination Committee

The Dean (Evaluation) shall be in charge of the conduct of examinations and all other matters incidental thereto and ancillary therewith and shall perform such other duties as may be prescribed by the Statutes or Ordinances, or as may be allocated to him by the Director.

5.23.1. Obligation to Perform the Examination Work

- (i) Any person who is entrusted with the examination work relating to paper setting, invigilation, supervision, evaluation, conduct of practical examinations, printing of question papers and answer books, tabulation and preparation of marks cards and all such activities incidental thereto and connected therewith shall discharge such duties prudently and with utmost integrity for attainment of the academic standards.
- (ii) If any person who has been allotted the examination work under sub-section (i) is found guilty of breach of duties or involves in any misbehaviour will be chargeable for disciplinary action;

5.23.2. Restriction for Appearance in the Examinations

A student whose admission has become invalid or whose admission has not been approved by the Institution or who has been admitted to the institution or course of study in excess of the prescribed intake shall not be eligible to appear for the examination conducted by the Institution.

5.24. Admission Committee

The BOG shall constitute the Admission Committee. The composition and members of the Admission Committee shall be decided by the BOG.

5.24.1 Eligibility for admission of students- No student shall be eligible for admission to a course of study, a degree or diploma unless he possesses such qualifications as may be prescribed by Statutes from time to time.

5.25. Library Committee

The Library has to cater to the needs of variety of clientele such as school, research scholars, post graduate and under graduate students, institute administrators as well as specialists, industrial workers engaged in neighbourhood industries and non-teaching institute staff, therefore a wide range of subject fields are to be represented in the book stock with prime thrust for meeting the needs of students and faculty members. Besides this, for smooth functioning of the library and safe guarding the interest of all sections of the library users, formation of policies, rules and regulations and implementing the library policies in a judicious manner, infrastructure is needed for the library. To meet the all the above objectives, the Library is advised by a Library Committee with the following constitution and representatives.

5.25.1 Constitution and Functions

(i) The committee shall consist of the following members:

Chairman	Director of the Autonomous Institution
All	Heads of the Department of the Institution.
Two	Senior most Professors of the Institution by rotation for a period of two years.
Three	Student representative from UG, PG and Research scholar to be nominated by the Director for a period of 1 year.
Member Secretary (ex-officio)	Librarian, ex-officio

(ii) In addition to the composition specified in (i) above, the Director of the academic committee may make an additional nomination to the Committee.

(iii) The Committee shall meet at least four times in an academic year with 50% of its membership consisting a quorum.

(vi) The duties and functions of the Committee shall be as under:-

- (a) To consider policy matters regarding Central Library/Departmental libraries including the policy for procurement of books and journals and render advice to the Purchase Committee for Library procurements.

- (b) To look into day to day problems of the Library clientele, Library staff and send recommendations to the ECS/Senate, Board for the desired decision.
- (c) To supervise the allocation and utilization of funds for different departments for purchase of books and journals for the Central and Departmental libraries.
- (d) To maintain liaison between Central Library and various Academic Departments for the purchase of networking of Departmental libraries with the Central Library.
- (e) To consider and put forward the views of school members regarding books/journals selection, ordering process etc.
- (f) To consider and put forward the views of students and Research Scholars regarding their problems and solutions sought thereof.
- (g) The Department of council may establish the Department library.

5.26. Student Welfare Committee

The Dean, Student Welfare shall be a whole-time officer of the Institution and shall be appointed by the Director on the recommendation of the BOG. He shall exercise such powers and perform such functions as may be conferred or imposed on him by the Director as may be prescribed by the Statutes. His term of office, emoluments and other conditions of service shall be such as may be prescribed by the Statutes.

- (i) To regulate, supervise and control the residence and discipline of the students of the Institution within the campus and its annexes and to promote their health and well-being.
- (ii) To make proposals for the institution and award of fellowships, travelling fellowships, scholarships, studentships, or exhibitions.
- (iii) Subject to the provisions of this Act and the Statutes, the Ordinances may provide for all or any of the following matters, namely:-
 - (a) Admission of students to the Institution and their enrolment.
 - (b) Courses of study for all degrees, diplomas and certificates of the Institution.
 - (c) Degrees, diplomas and certificates and other requirements for the same and the measures to be taken relating to the granting and obtaining the same.
 - (d) Conditions of residence of the students of the Institution.
 - (e) Special arrangements, if any which may be made for the residence, discipline and teaching of women students and prescribing for them special course of study where necessary.
 - (f) Supervision and inspection of institution.
 - (g) Health and discipline of, and disciplinary proceedings against, students in the Institution

- (h) All other matters which by this Act or by the Statutes are to be or may be provided for by the Ordinance.
- (i) No Ordinance shall be made for amending any of the Regulations or the Statutes in force.

5.27. Academic Audit Committee

The Academic Audit Committee shall consist of the following members, namely:-

1 Chairman	Director of the Institution
5 Member	Director of Technical Education or his nominee not below the rank of Joint Director
All Deans	All Deans of the Institution.
2 Members	Eminent persons representing industry, commerce, banking or any other profession
4 Members	Professors of the department nominated by the Director
1 Member	Librarian
1 Member	The Dean of Planning, Monitoring and Evaluation Board;
3 Members	UG,PG and Research Scholar (full time) *
Member-Secretary	Dean(Administration)

* Provided that no student shall be eligible for nomination, unless his name appears on the rolls of the Institution.

CHAPTER 6

KEY INDICATORS OF THE INSTITUTION

Sl. No.	INDICATOR		
1. GOVERNANCE QUALITY INDEX			
1	% of Faculty position vacant	79 Total Faculty Vacant Positions from all departments in the whole Institution	186 Total Sanctioned Faculty Positions from all departments in the whole institution
2	% of Non-permanent Faculty	76 Total Non-Permanent Faculty	186 Total Sanctioned Faculty Positions from all departments in the whole institution
3	% of Non Teaching Staff to Teaching Staff	85 Total Non-Teaching Staff in the Institution	113 Total Permanent Teaching Staff in the Institution
4	Total Number of Undergraduate programmes	10 No. of UG Courses offered during 2014-15 in the Institution	
5	Total Number of Postgraduate programmes	24 No. of PG Courses offered during 2014-15 in the Institution	
6	Total Number of Doctoral Programmes	6 No. of Doctoral Courses offered during 2014-15 in the Institution	
7	Faculty Appointment Turn around/Cycle time in months	60 Months Turn around /Cycle time of faculty appointment	
8	Delay in Payment of Monthly salary payment of faculty	No Salary payment Delay in months	
2. ACADEMIC EXCELLENCE INDEX			
9	Delay in exam conduction and declaration of results	No Delay	
10	Plagiarism Check	Plagiarism check introduced	
11	Accreditation	A NAAC Score of college	
12	Teacher Student ratio	113 Total Number of Permanent Teachers in Institution	4332 Total Number of Students in Institution

13	% of Visiting professors	73 Total Number of Visiting faculty from R&D Institutions, Other Colleges and Industries	113 Total Number of Permanent Faculty Members in the Institution
14	% of graduates employed by convocation	1050 Total Number of Students who got degree in Final year	998 Total Number of students got placement among Final Year students
15	% Number of students receiving awards at National and International level	45 Number of students who got National and International Award	4332 Total Number of Students in the College
16	% of expenditure on Library, cyber library and laboratories per year	1.5 Crores Total Expenditure on Library Cyber Library and Laboratories in 2014-15	10.45 Crores Total Expenditure in College in 2014-15
17	Ratio of expenditure on teaching staff salaries to non-teaching staff salaries	7.65 Crores Expenditure on teaching staff salaries	2.06 Crores Expenditure on non-teaching staff salaries
18	% of faculty covered under pedagogical training	113 Number of Teachers covered under pedagogical Training	113 Actual number of Teachers working in the college
19	% of faculty involved in further education	20 Number of Teachers studying M Phil and PhD during 2014-15	113 Actual Number of Permanent Teachers working in College in 2014-15
20	Dropout rate	1050 Total Number of students admitted to all courses first year in the institution	1040 Total Number of students passed out from that batch after completion of course period.
21	No of foreign collaborations	--	--
22	Subscription to INFLIBNET	Yes	--
3. EQUITY INITIATIVE INDEX			
23	SC Student%	824 Total Number of SC students in the whole college in 2014-15	4332 Total Number of Students in the whole College in 2014-15
24	ST Student%	131 Total Number of ST students in the whole college in 2014-15	4332 Total Number of Students in the whole College in 2014-15
25	Gender Parity	2950 Total Number of Boys students in the whole college in 2014-15	1382 Total Number of Girl Students in the whole College in 2014-15

26	Urban to Rural Student population	3460 Total Number Urbanstudents in the whole college in 2014-15	872 Total Number of Rural Stdents in the whole college in 2014-15
27	Existence of CASH	Yes	--
28	Existence of Social Protection Cell	Yes	--
29	Language assistance programs for weak students	Yes	--
4. RESEARCH AND INNOVATION INDEX			
30	Per-faculty publications	230 Total Publications by all Teachers in 2014-15	113 Total Permanent Teaching Staff in the Institution in 2014-15
31	Cumulative Impact Factor of publication	2.5 Sum of all Impact factors of all research papers published by all techers of college during 2014-15	230 Total Publications of Research Papers by all Teachers of college during 2014-15
32	H Index		
33	% of staff involved as principal researcher	15 Number of Teachers in college who are Principal investigators in 2014-15	113 Number of permanenet faculty in college in 2014-15
34	% of research projects fully or more than 50% funded by external agencies, industries etc	10 Number of research projects funded by other than UGC in 2015-16	10 Total Number of Research Projects handled by teachers in 2015-16
35	Total no of patents granted	Nil Total Patentsgranted	92 Total number of Patents filed
36	% of faculty receiving national/international awards	20 Total Number of Teachers who won National/International award in 2014-15	
37	% of research income	83 Lakhs Total Reseach Grants received by all teachers in college in 2015-16	208 Lakhs Total Grants Received by College in 2014-15
38	Doctoral degrees awarded per academic staff	24 Total PhD Degrees awarded by College in 2014-15	
39	% doctoral degrees in total number of degrees awarded	2.4 Percentage of Doctral degree to the total degree awarded in the year 2014-15	
40	% expenditure on research and related facilities	1.5 Crores Total Expenditure on Research and facilities in the college in 2014-15	10.45 Crores Total Expenditure of college in 2014-15
41	Digitization of Masters and	Yes	--

	Doctoral thesis		
42	UPE/CPE	Yes	--
43	% of Income generated from non-grant sources	2.80 Crores External Revenue generated by college in 2014-15	10.49 Crores Total Grants of the College for 2014-15
5. STUDENT FACILITIES			
44	No of new professional development programs	10 Total new Professional programmes introduced in 2014-15 by college	--
45	Existence of Placement Cells and Placement Policy	Yes	--
46	% of expenditure on infrastructure maintenance and addition	1.5 crores Total Expenditure on Infrastructure maintenance and addition of infrastructure by college in 2014-15	15.55 crores Total Expenditure by college in 2014-15
47	Availability of hostel per out-station female student	200 Number of Hostel seats in College for female students in college in 2014-15	250 Numbe of outstation girls enrolled in all years in college in 2014-15
48	Availability of hostel per out-station male student	360 Number of Hostel seats in College for boy students in college in 2014-15	400 Numbe of outstation boys enrolled in all years in college in 2014-15
49	% of students on scholarship	2450 Total Number of students getting scholarship in the college in 2014-15	4332 Total Student strength in the college in 2014-15
50	Average scholarship amount per student	7.00 Crores Total Scholarship Amount paid to students during 2014-15	4332 Total Number of students in the college in 2014-15
51	Student Experience Surveys	Yes	--
52	Graduate Destination Surveys	Yes	--
	Infrastructure and Others - 11%		
53	% Income generated from training courses	1 Lakhs Total Income from Training Couyrses during 2014-15	10 lakhs Total Grants Received during 2014-15 by the college
54	% Income generated from consulting	1.91 Crores Total Income from consultancy services of teachers in college during 2014-15	10.49 Crores Total Grants Received during 2014-15by the college
55	Infrastructural sufficiency	60% Sufficiency	
56	Computer coverage	400 Number of computers in working condition in the college during 2014-15	4332 Number of students in college during 2014-15
57	Internet connectivity of Campus	Yes	--

6.1 Evaluation of Institution Development Proposals

The gains made under this funding are in terms of increased competence among staff, enhanced infrastructure in terms of purchase of state of art equipments, will be made use of to enhance the consultancy programmes to sustain the project activities. This in turn can attract more projects.

The departments will make attempts and ensure that the research activity and higher quality of education dissipation is sustained by sending the teachers to attend training programmes / workshops / conferences with the financial assistance from the University. Attempts will be made to retain the technical supporting staff with specified skills to operate state of art equipments purchased using the University funds.

Attempts will be made to ensure funding support to students enrolled in Post Graduate and Doctoral Programmes with assistantship from University funds. Project activity would be sustained through IRG from resources, Government funding and consultancy.

CHAPTER 7

MoUs, PROJECTS AND PATENTS

7.1 Centres of Excellence (CoE)

It is proposed to develop three Centres of Excellence in (i) Disaster Mitigation and Management, (ii) Signal Processing, (iii) Emerging Materials and Enhancement of Existing Centre of Excellence for Electromagnetic Compatibility and Power Quality in the Institution.

The meeting of the chairpersons was held in the month of November 2014. The chairpersons have discussed in detail, the plan of implementation in their respective Departmental councils. Further a number of brain storming sessions were held in December 2014. The nodal officers and members of nodal committees were constituted at the Department level.

The institution possesses highly experienced faculty and staff members with long standing experiences. Majority of faculty members have obtained their doctoral degrees from premier institutions like IITs/IISC/NITs while some of our teachers are panels of several boards of State and Central Government like ISRO, BEL, NAL, IISC, KPSC, KPWD, etc. for their expertise. Many have been awarded projects by National and State level organization like DST, UGC, AICTE, VGST, Government of Karnataka, NAL, ISRO, etc.. This institution and staff are well qualified and experienced.

This institution has successfully implemented Rs. 14 Crores TEQIP Phase ó I (Technical Education Quality Improvement Programme funded by World Bank for the period 2004 to 2008) project and is presently implementing Phase ó II of Rs. 12.5 Crores.

7.2 MoUs

Presently, Bangalore University is having MOUs with the following organizations relevant to Engineering:

1. Department of Mechanical Engineering,, Indian Institute of Science, Bangalore.

2. Indian Institute of Technology, Chennai, India.
3. Indian Institute of Technology, Hyderabad, India.
4. Florida International University, USA.
5. University of Taipei, Hong Kong, China.
6. Bavarian Centre for Business and University Cooperation, Germany.
7. Griffith University, Melbourne, Australia.

The faculty and staff will support the implementation this project by

- 1) Providing Training for young faculty
- 2) Conducting Seminars, Workshops and Conferences
- 3) By offering Pedagogical Training
- 4) By establishing Centres of Excellence in Signal Processing, Disaster Mitigation and Management, Emerging Materials
- 5) By setting up R&D labs in thrust areas
- 6) Increasing quality publications
- 7) Increasing Industry and R&D Consultancy services
- 8) By obtaining Patents
- 9) Increasing the non grant incomes
- 10) By scaling up Ph.D. enrolment of senior staff members
- 11) By Research collaboration at National and International level
- 12) By establishing Industry collaboration
- 13) By developing young faculty in subject domain

7.3 Number of Sponsored Research Projects completed in the institution in the last three Academic years

Sl. No.	Name	Dept	Subject	Funding Agency	Start (Status)	Amount Rs. In Lakhs
1	Dr. Amarnath M.S	Civil	Performance Studies National Rural Road Development Agencies	Ministry of Rural Development	2006 -2011 Completed	10.00
2	Dr. P. Deepa Shenoy	CSE	Setting up of a sensor network testbed	University Grants Commission	02 January 2010	5.81
3	Dr. H.K. Shivananda	Mech	Investigation of M pact Damage tolerance components	NRB	2010 Ongoing	12.40

4	Dr.B.M. Rajaprakash	Mech	Investigations on the performance of welded joints of similar and dissimilar metals produced by Friction Stir Welding for Aerospace application using Acoustic emission Technique	A R and DB, Ministry of Defence	2009 Ongoing	18.50
5	Dr. H.K. Shivananda	Mech	Experimental Investigation of failure modes in hybrid couyosrts	University Grants Commission	2008 ó 2011 Completed	3.91
6	Dr. A.S. Ravikumar	Civil	Sustainable Irrigation Water management and River basin governance: Implementing User driven Services	European Union, Spain	2010 Ongoing	100.00
7	Dr. M.Inayathulla	Civil	Modeling of Jakkur and Samigehalli lake water balance and groundwater surface water interaction using Isotope Technics	DST, CWRDM, Bangalore	2011 Ongoing	17.50
8	Dr. M.Inayathulla	Civil	EIA studies of rainwater harvesting structure at Malur, Kolar district	CWRDM, Bangalore	2011 Ongoing	5.00
9	Dr. K.V. Sharma	Mech	Development of Aluminium Corundum Metal Matrix components	University Grants Commission	1998 -2000 Completed	3.00
10	Dr. B.K. Muralidhara	Mech	Application of Fuzzy logic and soft computing to manufacturing	AICTE (TAPTEC)	1999 ó 2001 Completed	6.00
11	Dr. B.K. Muralidhara	Mech	Studies on collapsibility agents for CO ₂ sands.	Institute of Indian Foundrymen, National RandD Centre	1998- 1998 Completed	0.20
12	Dr. A.S. Ravikumar	Civil	Remote Sensing Based Analysis of Vegetation Succession/ Recovery in the Event of Fire Damage in Rajiv Gandhi National Park, Bandipura.	DST, New Delhi	2005 ó 2008 Completed	15.65

13	Dr. A.S. Ravikumar	Civil	Remote Sensing Based Analysis of Vegetation Succession/ Recovery in the Event of Fire Damage in Bhadra wild sanctuary	Moef, New Delhi	2005 ó 2008 Completed	9.75
14	Dr. A.S. Ravikumar	Civil	Isotopic investigation for the evaluation of groundwater recharge in Jnanabharathi campus, Bangalore	DST, CWRDM, New Delhi	2005 ó 2007 Completed	4.7
15	Dr. A.S. Ravikumar	Civil	Satellite remote sensing and geographic information system applications for water balance components	DST, New Delhi	2004 ó 2008 Completed 2	8.52
16	Dr. A.S. Ravikumar	Civil	Runoff model based on remotely sensed inputs	ISRO/ IISc Space Cell	1999 ó 2002 Completed	5.90
17	Dr. S. Gangadhar	Civil	Reinforced Soil Structures under dynamic loads	DST, New Delhi	2001- 2004 Completed	10.00
18	Dr. H N Ramesh	Civil	Utilization of Fly ash for Geotechnical applications	AICTE, New Delhi	2001-04 Completed	0.5
Total						237.34

7.4 List of Patents Filed

- (1) A Novel composition comprising Nano Ziconia and nano Silica Powder and a process for making the same, Application Number 1899 CHE / 2006, dated 02.11.2007, Inventors: A J K Prasad, Gopinath Garesa, Viresh K Basalalli, B K Muralidhara and K R Kannan.
- (2) ID ó DWT and 2D ó DWT Architecture with Enhanced Speed, Application Number 4187 / CHE / 2014, dated 27.08.2014, -Patent Pendingø World Bank assisted, Inventors : Satish S B, K B Raja, Venugopal K R.
- (3) Method and Apparatus for Displaying Signal Time of Traffic Control Lights Application Number 4565 / CHE / 2014, dated 19.09.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (4) Method and Apparatus for Viewing Fuel Metered Values in Automotive Fuel Stations Application Number 4566 / CHE / 2014, dated 19.09.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.

- (5) Method and Apparatus for Ergonomically Displaying Fuel Meter Values in Automotive Fuel Station Application Number 4567 / CHE / 2014, dated 19.09.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (6) Traffic Sensing Hoarding Application Number 5007 / CHE / 2014, dated 07.10.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (7) Method of Third Party Payment in ATMs Application Number 5008/CHE / 2014, dated 07.10.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (8) Stopping Aid for Two Wheelers Application Number 5011 / CHE / 2014, dated 07.10.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (9) Wireless Control of Locomotives Jumping Red Signal Application Number 5012/CHE/2014, dated 07.10.2014,-Patent Pending World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal KR.
- (10) Control of Locomotives Jumping Red Signal Through Image Processing Computer Application Number 5013 / CHE / 2014, dated 07.10.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (11) Teaching Aid for Teaching Concepts of Stacks in Computer Science Education Application Number 5014 / CHE / 2014, dated 07.10.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (12) Application for Answer Script Evaluation Application Number 5015/CHE / 2014, dated 07.10.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (13) Weighing Method and Apparatus on Bicycles for Weight Watchers Application Number 5019 / CHE / 2014, dated 07.10.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (14) Method for Ordering Fuel in Automotive Fuel Stations Application Number 5020/CHE/2014, dated 07.10.2014,-Patent Pending World Bank assisted, Inventors:Dinesh K Anvekar and Venugopal K R.
- (15) Glare reducing visor for inner rear view mirror in automobiles Application Number 5541/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (16) Adapter for left-right indicator in automobiles Application Number 5542/CHE/2014, dated 05.11.2014,-Patent Pending World Bank assisted, Inventors:Dinesh K Anvekar and Venugopal K R.

- (17) Outer rear view mirror glare reduction apparatus for automobiles Application Number 5543/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (18) Digital Book mark Application Number 5544/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (19) Electric Plug Ejecting Adapter Application Number 5545/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (20) Rain Drain for Rectangular Flat Tents Application Number 5546/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (21) Rain Shade for Cars Application Number 5547/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (22) Poking Pin for Water Dispensing Bottles Application Number 5548/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (23) Segmented Bottles Application Number 5549/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (24) Fizz Controlling Caps for Carbonized Beverage Bottles Application Number 5550/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R.
- (25) Two-way Control Switches with ON Indication Application Number 5551/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R.
- (26) Answer Booklet Collection Box Application Number 5552/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (27) Barcode meter display and machine reading Application Number 5553/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (28) Answer script evaluation slips Application Number 5554/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (29) Marks table flap for answer booklet Application Number 5555/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (30) Distributed locomotive horning Application Number 5556/CHE/2014, dated 05.11.2014, -Patent Pending World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.

- (31) Mirror apparatus for taking 'selfie' shots on smart phones Application Number 5557/CHE/2014, dated 05.11.2014, 'Patent Pending' World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (32) Answer booklet with slotted marks table Application Number 5558/CHE/2014, dated 05.11.2014, 'Patent Pending' World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (33) Refill bottle installing adapter Application Number 6154/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (34) Fingers wash box Application Number 6156/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (35) Hand gesture based calling and directing elevator cars Application Number 6155/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R.
- (36) Flap between building and car floors in elevators Application Number 6153/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R.
- (37) Electronic display on escalator handrail belts Application Number 6152/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R.
- (38) Prioritizing ambulances in traffic lights with flashing light Application Number 6151/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (39) Rain shade for outer rear view mirrors of automobiles Application Number 6150/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R.
- (40) Foot pedal calling switches for elevators Application Number 6149/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (41) Electronic menu for food items in restaurants Application Number 6148/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R.
- (42) Uniform probability pair of dices Application Number 6147/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (43) Razor handle with shave counter Application Number 6146/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (44) Hobby RC airplane control chair Application Number 6145/CHE/2014, dated 05.12.2014, 'Patent Pending' World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.

- (45) Tea cup with tea leaves Application Number 6144/CHE/2014, dated 05.12.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (46) Beeping hour glass Application Number 6143/CHE/2014, dated 05.12.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (47) Automatic ground floor selection in elevators Application Number 6142/CHE/2014, dated 05.12.2014, -Patent Pendingø World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R
- (48) Wireless tokens for customers Application Number 6158/CHE/2014, dated 05.12.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (49) Locomotive red signal warning through GPS Application Number 6139/CHE/2014, dated 05.12.2014, -Patent Pendingø World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R
- (50) Daytime disabling of electric power in solar water heaters Application Number 6141/CHE/2014, dated 05.12.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (51) Stairs climbing contraption Application Number 6140/CHE/2014, dated 05.12.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (52) Hygienic ear buds with color coding Application Number 6136/CHE/2014, dated 05.12.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (53) Airbag device for water safety Application Number 6138/CHE/2014, dated 05.12.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (54) Date and Identification of Tooth Brush Application Number 6272/CHE/2014, dated 12.12.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R
- (55) Water tight glove Application Number 6137/CHE/2014, dated 05.12.2014, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (56) Cake Cutting Apparatus Application Number 328/CHE/2015, dated 23.01.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (57) Ejecting Electric Plug Application Number 329/CHE/2015, dated 23.01.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (58) Patent Walker with Sliding Platform Application Number 330/CHE/2015, dated 23.01.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.

- (59) Coding-Decoding of Answer Scripts Application Number 331/CHE/2015, dated 23.01.2015, -Patent PendingøWorld Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (60) Compacting Apparatus for Bottles and Cans Application Number 333/CHE/2015, dated 23.01.2015, -Patent PendingøWorld Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (61) Advertisement Board with Two Colors Application Number 334/CHE/2015, dated 23.01.2015, -Patent PendingøWorld Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (62) Electric Plug Ejecting Socket Application Number 335/CHE/2015, dated 23.01.2015, -Patent PendingøWorld Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (63) Tamper-Proof Correctable without Erasure OMR Marking for Multiple Choice Questions Application Number 336/CHE/2015, dated 23.01.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (64) Tear-free Check Leaves Application Number 337/CHE/2015, dated 23.01.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (65) Reusable seven segment price tag Application Number 851/CHE/2015, dated 24.02.2015, -Patent PendingøWorld Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (66) Barcode valuation sheet for answer scripts Application Number 852/CHE/2015, dated 24.02.2015, -Patent PendingøWorld Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (67) Water saving tap Application Number 853/CHE/2015, dated 24.02.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (68) Airport pick-up identification system Application Number 854/CHE/2015, dated 24.02.2015, -Patent PendingøWorld Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (69) Staples with labels Application Number 855/CHE/2015, dated 24.02.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (70) Sliding lid dust bin Application Number 856/CHE/2015, dated 24.02.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (71) Outer rear view mirror movement linked with turn indicator in automobiles Application Number 857/CHE/2015, dated 24.02.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (72) Rubberstamp and pad for answer script valuation and digitization of marks Application Number 858/CHE/2015, dated 24.02.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (73) Flipping-flaps advertisement apparatus Application Number 859/CHE/2015, dated 24.02.2015, -Patent PendingøWorld Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.

- (74) Cash withdrawal from ATMs with bar-coded check leaves Application Number 860/CHE/2015, dated 24.02.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (75) Pressure cooker stove shut off apparatus Application Number 2030/CHE/2015 dated 21.04.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (76) Pre-ordering of passengers near gate before boarding an aircraft Application Number 2027/CHE/2015 dated 21.04.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (77) On device usage indication on USB flash drives Application Number 2028/CHE/2015 dated 21.04.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar, Venugopal K R and Jyotsna Anand.
- (78) Spectacles glass wiping sticks within temples Application Number 2029/CHE/2015 dated 21.04.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar, Venugopal K R and Jyotsna Anand.
- (79) Cot head side mosquito net Application Number 2031/CHE/2015 dated 21.04.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (80) Token system for marriage reception Application Number 2032/CHE/2015 dated 21.04.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (81) Cost meter for photocopying machines Application Number 2033/CHE/2015 dated 21.04.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (82) Hand drilling machine with attached drill chuck key Application Number 2034/CHE/2015 dated 21.04.2015, -Patent Pendingø World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R.
- (83) Wearable blinds for TV viewing Application Number 2568/CHE/2015 dated 22.05.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (84) Wood saving match sticks and holder Application Number 2566/CHE/2015 dated 22.05.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar, Venugopal K R and S Raghavendra.
- (85) Baggage Protection systems with RFID in Airports Application Number 2570/CHE/2015 dated 22.05.2015, -Patent Pendingø World Bank assisted, Inventors: Dinesh K Anvekar and Venugopal K R.
- (86) Resistance based multiple choice question sheets and evaluation methods Application Number 2567/CHE/2015 dated 22.05.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.

- (87) LPG level indicating cylinders Application Number 2569/CHE/2015 dated 22.05.2015, -Patent PendingøWorld Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (88) Secure password entry with hologram Application Number 2563/CHE/2015 dated 22.05.2015, -Patent Pendingø World Bank assisted, Inventors: Dinesh K Anvekar, Venugopal K R and Jayasmitha.
- (89) Confirmation of baggage loaded in an aircraft Application Number 2564/CHE/2015 dated 22.05.2015, -Patent PendingøWorld Bank assisted, Inventors:Dinesh K Anvekar and Venugopal K R.
- (90) Extraction of chillies from cooked food with magnetic chilli capsules Application Number 2565/CHE/2015 dated 22.05.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.
- (91) Fingerprint based coding and decoding of answer scripts Application Number 2562/CHE/2015 dated 22.05.2015, -Patent PendingøWorld Bank assisted, Inventors:Dinesh K Anvekar and Venugopal K R.
- (92) Sealing fans blades wiper Application Number 2561/CHE/2015 dated 22.05.2015, -Patent Pendingø World Bank assisted, Inventors : Dinesh K Anvekar and Venugopal K R.

7.5 Improving Interaction with Industry

(i) MoUs signed with Industries and R&D organizations. Presently eight MoUs' are signed and Industrial partner list is as given below:

Sl. No.	Industry Partner	Date of MOU
1	Pushkal Technologies Pvt. Ltd Bangalore	14.08.2013
2	K. P. T. Technologies Bangalore	26.08.2013
3	Kruthi Computer Sevices PVT. Ltd, Bangalore	20.11.2012
4	International Association of Plumbing and Mechanical Officials	June 2013
5	CADMAXX Solutions Training Division, Bangalore	20.11.2012
6	People soft India PVT. Ltd	01.07.2013
7	Indian Space Research Organization (ISRO), Bangalore	20.01.2013
8	National Research Development Corporation, New Delhi.	02.02.2013

(ii) Thirty Four Companies are interested for doing MOU with UVCE (listed below). Further UVCE will go for MOU with another 75 companies which are in the pipeline.

Sl. No.	Name of Industry / NGO / Govt. Research Organizations
1	Center for Water Resources Development and Management, (CWRDM)- Calicut, Kerala, India
2	Central Groundwater Board (CGWB), GoI, Bangalore
3	International Society of Waste Management, Air & Water (ISWMAW), Bangalore ó Chapter
4	City ManagersøAssociation , Karnataka (CMAK), Bangalore
5	Paryavaran Foundation for Research in Environment and Education,(pFree) Bangalore
6	Infosys Foundation , Bangalore
7	Sawaraj NGO, Bangalore
8	Greentech Consultancy and Research, Frazer Town Bangalore
9	Enzen Water Solutions , Bangalore (MNC Company)
10	International Association of Plumbing and Mechanical Officer- India (IAPMO- India)
11	Bosch, Koramanagala, India
12	Geberit-India, Michael.allenspach@geberit.com
13	Clean Water Solution , Bangalore
14	Farmland and Rainy, Bangalore and Chickmangalore
15	Bentlay and CAD Center, Bangalore.
16	CIDA- Construction Industry Development Academy, hanumantha Nagar, Bangalore
17	COILLERS India Pvt. Ltd., (US based organization)
18	Metro Corporation
19	Design ke y engineers
20	Santa Monica, Bannerhatta, Bangalore
21	National design and research forum (NDRF), Institute of Engineers, Bangalore
22	WTS Limited (India), R&D center:Shiqiaopu, Chongqing,China
23	Infogeo, Bangalore/
24	Star World International services(India) Pvt ltd

25	NBSSLUP (ICAR), Govt. of India, Hebbal, Bangalore-560024.
26	Karnataka Remote Sensing Center, Bangalore
27	Noki Technologies Pvt. Ltd., #12-13-557, Nagarjuna Nagar, Tamaka, Hyderabad 500 017
28	Tallyfox Social Technologies AG, Zurich, Switzerland.
29	Everything about water (eawater), A1/152, NebSarai, IGNOU Road, New Delhi-110068
30	National Institute of Hydrology, Roorkee
31	Honeywell technology solutions lab ltd.
32	FENFE Metallurgical, Kanakapura taluk
33	Growell CNC systems, Bangalore
34	North Dakota State University, Fargo, USA

(iii) Action Plan for Improving the Collaboration with Industry

Sl. No	Key Activities	Project Month											
		1-3	4-6	7-9	10-	13-	16-	19-	22-	25-	28-	31-	34-
1	Facilitating joint research work, consultancy involving Faculty, Students and Industry	■	■	■	■	■	■	■	■	■	■	■	■
2	Invite professionals from Industry to work as visiting faculty	■	■	■	■	■	■	■	■	■	■	■	■
3	Associate experts from Industry in curriculum development activity	■								■			
4	Provide opportunities for short term and long term continuing education for working professionals		■	■			■	■			■	■	
5	Create and promote revenue generative activities like lab testing, consultancy, product development including patents etc	■	■	■	■	■	■	■	■	■	■	■	■
6	Conduct interactive workshops, conferences etc in collaboration with members of Industry			■				■				■	

7.6 Enhancement of Research and Consultancy Activity

For quantitatively increasing and qualitatively improving research by the faculty individually, jointly and collaboratively, the following measures are suggested:

Sl. No	Key Activities	Project Months											
		1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36
1	Fiscal incentive at the rate of 5% of the total sponsored projects from agencies like DST, UGC, AICTE, DRDO, NRB, etc. for faculty getting industrial/R & D projects as and when they get it												
2	Encourage to get the industrial and government sponsored project funds from agencies like DST, UGC, AICTE, NRB, ARDB, etc and involve in collaborative projects												
3	Faculty will be provided with special equipments and consumables to carry out their research work leading for upgradation of their qualification to Ph.D. and attempting to get patents.												
4	Encourage and support faculty to publish their research work in refereed journals for which fiscal incentive of Rs. 5000/- per publication is proposed.												
5	Send faculty to various Labs in Advanced countries to do research in the thematic research areas.												
6	Encourage faculty to get exposed to frontline research in India and abroad by way of Post Doctoral fellowship.												

7.7. UVCE to be modeled as an Visvesvaraya Indian Institute of Technology (VIIT):

1. Land:
 - (i) Bangalore University, Jnanabharathi ó 1100 Acres
 - (ii) Chikkaballapur District (Muddenahalli) ó More than 1000 Acres
2. Water: Cauvery water is available at Jnanabharathi
3. Connectivity: (a) Jnanabharathi is 45 kms from Kempegowda International Airport and
 - i. Chikkaballapur (Muddenahalli) is 10 kilometers from Kempegowda International Airport
4. Industries: There are more than 5,000 Software Industries and Heavy Industries in Bangalore
5. IT Infrastructure: Bangalore is an Information Technology (IT) hub
6. Climate: Bangalore has a pleasant climate. Its low and high temperatures varies between 19 to 38 degrees

7. Human Resources: A number of Academic resources are available such as Indian Institute of Science (IISc), Institute of Social and Economic Change (ISEC), Indian Institute of Management Bangalore (IIMB), Indian Statistical Institute (ISI), International Institute of Information Technology Bangalore (IIITB)
8. National Research Institutions: A number of Research and Development (R & D) organizations are established in Bangalore such as DRDO, ISRO, etc. That is required for the growth of IIT
9. Brand: Bangalore has established its brand name globally for its Quality in Education
10. Culture: Bangalore is cosmopolitan and most favoured destination for tourists all over the world.
11. University Visvesvaraya College of Engineering (UVCE) is the century old college that can be modelled on the lines of erstwhile University College of Engineering Roorkee (Presently IIT Roorkee) and Bengal College of Engineering and Science (Presently Indian Institute of Engineering, Science and Technology, IEST)
12. UVCE has its campus both at K R Circle and Jnanabharathi. The K R circle campus along with Central College has 100 acres of land and Jnanabharathi with 1100 acres of land. UVCE can be a Satellite Campus for the IIT which can be started either at Jnanabharathi or at Chikkaballapur
13. UVCE can be modelled on the lines of Indian Institute of Technology Banaras Hindu University (IIT-BHU) where 400 acres of land is earmarked for IIT-BHU from the larger campus of 1300 acres of Banaras Hindu University
14. UVCE has 4500 students with 6 Ph.D programmes, 24 Postgraduate programmes and 7 Undergraduate programmes. It is very comfortable to start an IIT from this point
15. Chikkaballapur district (Muddenahalli), birthplace of Bharata Ratna Sir M Visvesvaraya has enough land and closer to the International Airport can be considered for an IIT. It has the same advantage as an IIT at Jnanabharathi campus
16. A satellite campus of the IIT, Bangalore can be established at the city central college campus which has 100 acres on the model of IIT Delhi which has a second campus at Gurgaon.
17. The IIT can be named after Sir. M Visvesvaraya, only Engineer to have been awarded Bharatha Ratna till date. The IIT Bangalore can be named as Sir. M Visvesvaraya Indian Institute of Technology Bangalore - VIITB

7.8. UVCE to be modeled as Visvesvaraya Indian Institutes of Engineering Science and Technology (VIEEST)

Indian Institutes of Engineering Science and Technology (IEST) are a group of academic institutions in India for Research and Education in Engineering. These were originally proposed by the Government of India in 2007 to meet the increasing demand for technological and scientific workforce in the industrial and service sectors of India as well as the growing need for qualified personnel in research and development.

It was decided that the institutes under the banner of IEST were to be created by upgrading existing Engineering Colleges or Universities under the various State governments of India through an act of the Parliament of India, instead of establishing completely new institutes. After upgrading, these institutes would also be granted the status of "Institutes of National Importance".

The first institute to be upgraded to IEST was Bengal Engineering and Science University, Shibpur, which was hitherto a University under the Government of West Bengal. Three more universities are in the pipeline to be upgraded to IEST in the coming years.

Sl. No	College Name	Year	Area (acres)
1.	Bengal Engineering and Science University, West Bengal	1856	123
2.	Osmania University College of Engineering and Osmania University College of Technology, Hyderabad, Telangana	1929	200
3.	Andra University College of Engineering, Visakhapatnam, Andhra Pradesh	1955	150
4.	Cochin University of Science and Technology, <u>Kochi (Cochin), Kerala.</u>	1971	180

a) Central College of Bangalore (1858) spread across 65 acres is one of the oldest colleges in science in India. This college originally affiliated to Madras University was part of the Mysore State. In 1916, it became a constituent college of Mysore University. In 1964, Central College was transferred to the new Bangalore University. Central College and UVCE along with Government Arts and Science College, Government R C College of Commerce & Management, Maharani Arts, Science and Commerce, Smt.VHD Central Institute of Home Science can be established as IEST.

b) Government Arts College was established in the year 1886. It has an area of 5 acres. The college offers 3 UG and 5 PG courses with an intake of 1570 in UG and 150 PG in respectively. There are a total of 65 teaching faculty with 36 assistant professors and 28 associate professors.

c) University Visvesvaraya College of Engineering (UVCE) College initially started as School of Mechanical Engineering in 1913. University Visvesvaraya College of Engineering (UVCE) was the Fifth Engineering College in the Country established in the year 1917, under the name Government Engineering College, by Bharat Ratna Sir M. Visvesvaraya, and was affiliated to University of Mysore. UVCE offer 07 Full-time UG Programmes, 24 Full-time PG Programmes and 03 Part-time UG Programmes. UVCE has an area of 15.0 acres at K R Circle housing 3500 UG, 800 PG and 175 teaching faculty out of which 27 are professors, 42 are associate professors and 33 are assistant professors.

d) Government Science College was started on 21st April 1921 and has an area of 3.27 acres. It offers 1 UG course with an intake of 1135 students and 5 PG courses with an intake of 130. The institution has 51 associate professors and 44 assistant professors totalling to a faculty strength of 96.

e) Government Sri Krishnarajendra Silver Jubilee Technological Institute affiliated to Visvesvaraya Technological University, Belgaum, Karnataka State, was founded in the year 1938 and is spread across an area of 3.5 acres. The institution offers 5 UG courses and 1 PG course with an student strength of 906 and 20 respectively. The institution has 42 teaching faculty out of which 02 are professors, 14 are associate professors and 25 are assistant professors. It was established by Sir Mirza Ismail and Sir M. Visvesvaraya.

f) Maharani's Science College was established in 1938 with an area of 11 acres by the erstwhile Maharaja of Mysore. It offers 12 UG courses with 700 students and 5 PG courses with 105 student. The institution has 48 associate professors and 60 assistant professors with a total faculty strength of 109. It has a Girls Hostel of capacity 250.

g) Government R C College of Commerce and Management was set up in the year 1948 as an intermediate college. It metamorphosed into a degree college in the year 1952 simultaneously moving to the present magnificent stone building. It is the first Commerce College run by the

Government of Karnataka and only one of its kind. The College offers B. Com., BBM, M.Com and MBA courses. The college offers 2 UG and 3 PG courses with an intake of 1336 and 154 respectively and a total of 69 teaching faculty out of which 11 are associate professors and 57 are assistant professors.

h) Smt.VHD Central Institute of Home Science, Bangalore is premier women's Colleges in Karnataka, founded in 1951 and in 1961 Smt. VHD Central Institute of Home Science came into existence. The institution is spread across an area of 4.3 acres housing 5 UG and 2 PG courses with an intake of 700 and 100 respectively. It has a total of 108 teaching faculty out of which 46 are associate professors and 62 assistant professors.

i) Maharani's Arts Commerce and Management College was started in the 1975 with an area of 4 acres. It offers 3 UG courses with an intake of 3300 and 5 PG courses with an intake of 300. It has 51 associate professors and 209 assistant professors with a total faculty strength of 260. This college offers the B.A. and B.Com program. It has a Girls Hostel of capacity 260.

7.9 New Courses to be established in this Education Hub in collaboration with UVCE

7.9.1 Pharmaceutical chemistry:

Pharmaceutical chemistry is the study of drug design to optimize pharmacokinetics and pharmacodynamics. It is intersection of chemistry and pharmacy involved with designing, synthesizing and developing pharmaceutical drugs. It is a highly interdisciplinary science combining organic chemistry with biochemistry, computational chemistry, pharmacology, pharmacognosy, molecular biology, statistics, and physical chemistry.

7.9.2 Nanoscience :

Nanoscience is the study of structures and materials on the scale of nanometers. Nanostructures can be created by reacting chemicals in liquids and gases to generate nanofibers, nanocrystals and quantum dots, some as small as one nanometer wide. Research is going on to build three-dimensional structures at the nanoscale called nano-electro-mechanical systems, or NEMS, which might be used like microscopic robots to carry out tasks too small for humans to do themselves. NEMS could carry out surgery on a single cell or act as mechanical actuators to move around individual molecules. Physics, chemistry, biology and materials science use nanoscience principles for advanced applications in energy, medicine, information storage, computing and elsewhere.

7.9.3 Nanobiology

This discipline merges biological research with various fields of nanotechnology. Nanobiology enhances nanodevices, nanoparticles, and nanoscale phenomena that occurs within the discipline of nanotechnology. The most important objective of nanobiology include applying nanotools to relevant medical/biological problems and refining these applications.

7.9.4 Material Science:

Material Science is Emerged from chemistry, mineralogy and engineering during the Enlightenment. It incorporates elements of physics and chemistry, and is at the forefront of nanoscience and nanotechnology research is more widely known as a specific field of science and engineering

7.9.5 Space Sciences

Space Science is the study of everything in outer space which includes studying issues related to space travel and space exploration (including space medicine), space archaeology and science performed in outer space

- a) **Astrophysics** : Includes study of galaxies, stars, planets, extrasolar planets, the interstellar medium and the cosmic microwave background. *astrophysicists* typically apply many disciplines of physics, including mechanics, electromagnetism, statistical mechanics, thermodynamics, quantum mechanics, relativity, nuclear and particle physics, and atomic and molecular physics.
- b) **Rocket Science** : The Rocket science requires a wide range of knowledge of physics, aerodynamics, mathematics, propulsion dynamics, and other types of science and math.
- c) **Remote Sensing** : includes the acquisition of information about an object or phenomenon without making physical contact with the object. Passive remote sensors include film photography, infrared, charge-coupled devices, and radiometers. RADAR and LiDAR are examples of active remote sensing where the time delay between emission and return is measured, establishing the location, speed and direction of an object.
- d) **Earth science** or **Geoscience** is a special branch of planetary science with both reductionist and holistic approaches to Earth sciences. The formal discipline of Earth sciences may include the study of the atmosphere, hydrosphere, oceans and biosphere, as well as the solid earth. Earth scientists will use tools from physics, chemistry, biology, chronology, and mathematics to build a quantitative understanding of how the Earth system works, and how it evolved to its current state.

7.9.6 Life Sciences

The **life sciences** comprise the fields of molecular biology and biotechnology have led to a burgeoning of specializations and interdisciplinary fields. They have applications in health, agriculture, medicine, and the pharmaceutical and food science industries.

- a) **Exobiology or astrobiology:** is the study of life elsewhere in the Universe. Exobiology is also speculation about extra terrestrial life. Exobiology assumes that this life is be non-supernatural and existing in the physical context of our Universe, as Earth life does. The primary goal of exobiological research is to reach a better understanding of the processes leading to the origin, evolution and distribution of life on Earth or elsewhere in the universe.
- b) **Environmental science** is a multidisciplinary academic field that integrates physical, biological and information sciences (including but not limited to ecology, biology, physics, chemistry, zoology, mineralogy, oceanology, limnology, soil science, geology, atmospheric science, geography and geodesy) to the study of the environment, and the solution of environmental problems.
- c) **Genomics** is a discipline in genetics that applies recombinant DNA, DNA sequencing methods, and bioinformatics to sequence, assemble, and analyze the function and structure of genomes (the *complete* set of DNA within a single cell of an organism).
- d) **Proteomics** is the large-scale study of proteins, particularly their structures and functions.
- e) **Bioinformatics:** is an interdisciplinary field that develops methods and software tools for understanding biological data. Bioinformatics combines computer science, statistics, mathematics and engineering to study and process biological data.
- f) **Chemical biology:** Chemical biology is one of many interfacial sciences that are characteristic of a general trend away from older, reductionist fields toward those whose goals are to achieve a description of scientific holism.
- g) **Biophysics** is bridge between biology and physics. Molecular biophysics typically addresses biological questions similar to those in biochemistry and molecular biology, but more quantitatively.

Biochemistry (Biological chemistry) has become so successful. Much of biochemistry deals with the structures, functions and interactions of biological macromolecules, such as proteins, nucleic acids, carbohydrates and lipids.

7.9.7 Health Sciences :

The Basics of Health Science : Health science encompasses a variety of sub-disciplines, all of which relate to the application of science to health. Both traditional, Western and alternative medicine can be considered health sciences.

- a) **Bioengineering:** Bioengineering or Biomedical engineering is the biological or medical application of engineering principles or engineering equipment.
- b) **Neuroscience:** Neuroscience is the scientific study of the nervous system. However, it is currently an interdisciplinary science that collaborates with other fields such as chemistry, computer science, engineering, linguistics, mathematics, medicine, genetics, and allied disciplines including philosophy, physics, and psychology.

7.9.8 Department of Mathematics

- a) **Statistics** is the study of the collection, analysis, interpretation, presentation and organization of data. It deals with all aspects of data including the planning of data collection in terms of the design of surveys and experiments.
- b) **Mathematical statistics** is the application of mathematics to statistics. Mathematical techniques which are used for this include mathematical analysis, linear algebra, stochastic analysis, differential equations, and measure-theoretic probability theory.
- c) **Biomathematics:** Mathematical models are important tools in basic scientific research in many areas of biology, including physiology, ecology, evolution, toxicology, immunology, natural resource management, and conservation biology. Thus, mathematical biology encompasses all of biology and virtually all of the mathematical sciences, including statistics, operations research, and scientific computing.

CHAPTER 8

CENTRE OF EXCELLENCE (CoE) IN SIGNAL PROCESSING

A Center of Excellence (CoE) in signal processing envisages dedicated research and education in the signal processing aspects of electromagnetics, Sensor networks, Biometrics and Acoustics. It will form a team of multidisciplinary researchers with a common objective of achieving excellence in signal processing application, aided with a common laboratory facility. The multidisciplinary researchers are drawn from Electronics and communication Engineering, Computer science engineering, Mechanical engineering and Electrical engineering streams. This center is aimed to offer doctoral program, postgraduate degree program and research facilities to scientists, research scholars and practicing engineers. It will also cater to the needs of projects of under graduate and post graduate students.

Among the proposed four areas, Electromagnetic, Sensor networks, Biometrics and Acoustics. Electromagnetics is envisaged to foster research, education, understanding and awareness of Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC) issues in electronic equipments. This COE will offer testing facilities in conducted emission, radiated emission, conducted-susceptibility and radiated-susceptibility of electronic equipment. As the electronic radiation from mobile towers, high tension power lines in densely populated cities are of regional and national importance today, this COE proposes to measure the radiation in the cities like Bengaluru to start with and create data bank of radiations and obtain geographical radiation patterns. This data can be used by researches, policy makers, educationists and students.

The COE will create facility for measurement of emissions from mobile handsets which can be utilized by manufacturers and researches for compliance of EMI regulations. There are many electronic industries present in and around Bengaluru which are exporting their products to Europe/US where their products should comply to EMI/EMC regulations. For this there is a need for an EMI testing facility, expertise and human resources, so as to make their products EMI compliant at the design stage itself. The scenario is same at the national level.

Although, there are such EMI labs in BEL, LRDE, ISRO, ETDC and IISc, they are either in-house labs catering to their own needs or for certifying purposes. However, there are no laboratories at the university level to conduct research, create expertise, human resources and to offer pre-compliance testing to industries. This COE is proposed to cater to these needs. As one of the principal investigators of this COE has already obtained his PhD in EMI/EMC from I.I.Sc and is guiding two doctoral students in the same area, it will be an inherent strength of the institution to establish this COE. The thirty four publications in this area speaks of the available expertise.

The biometrics are future national security system to track individuals for border crossing records to eliminate terrorism, patient tracking in medical informatics and the personalization of social services. The multiple biometric traits of each person are required through biometric sensors. The effective features of each traits are extracted and features of multiple traits are fused to derive single feature set for each person. The database of Indian population are created. The identification/verification are based on effective classifiers. To authenticate a person, the features are extracted and compared with features in the database using classifiers through wireless sensor networks. There are specific sensors such as pressure, accelerometer thermal microphone etc, to monitor condition at different location such as temperature, humidity, vehicular movement, lightning condition , soil conditions, noise levels etc.

The current potential applications of sensor networks include military applications, environmental applications, health application and home application. The sensors are dropped in city areas to collect signals on density of vehicles in traffic and also information on pollution. The sensors are dropped in rural areas to collect signal on type of insects which are dangerous to standing crops. The signals collected from city and rural areas through wireless sensor networks are processed to decide action plan. The Mechanical Engineering is also involved in R and D work involving image processing, pertaining to quality control of natural processing. The COE will facilitate with their research in the area of signal processing issues related to Mechanical Engineering applications

8.1 SWOT analysis.

Strengths:

- The strengths in the area of Electromagnetics covering priority areas like Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC), Sensor Networks, Biometrics, Acoustics, are that the principal investigators have obtained PhD in the areas of Electromagnetic Conductance Susceptibility, Sensor Networks, Biometrics, Acoustics. There are already 3 PhD scholars working in the area of Electromagnetic Interference (EMI), 17 in the area of Sensor Networks, 5 in the area of Biometrics and 1 in the area of Acoustics. They are working in the areas of Electrostatic Discharge (ESD) of ICs, area of PCB emission, routing, Quality of Service and Security issues in Sensor Network, Finger print, Iris recognition, Face recognition, palmprint, Signature, ECG and FPGA based Biometric authentication systems.
- The participating faculties in this CoE have obtained PhD in the field of peripheral subjects related to this CoE such as in the field of Power Electronics, Routing, QoS and Security, Image Processing, Speech Processing. They have already guided PhD scholars and have obtained research competency in their respective areas which is useful for this COE.
- The Laboratory facilities and softwares for signal processing in the areas of Electromagnetics, Sensor networks, Biometrics, Acoustics are already in this institution which can be used for design and fabrication of equipment on which further investigation can be carried out in this COE.

Weaknesses:

- Although the principal investigators have dedicated research in the fields of EMI / EMC, Sensor Networks, Biometrics, Acoustics. Some of the participating faculty in this COE have not done research exclusively in these areas.
- There are no laboratory facilities currently to conduct experiments, research in the fields of EMI / EMC, Sensor networks, Biometrics, Acoustics. The Ph.D candidates who are currently working in these areas are using the laboratory facilities of National Research laboratories like

LRDE for EMI / EMC, IISc, Bangalore for Sensor Networks however if the laboratory facilities are provided in this Institutions it would have attracted more number of doctoral students.

Opportunities:

- Currently there are EMI / EMC labs in LRDE, BEL, ISRO, IISc, ETDC etc. in and around Bangalore. But, these laboratories are used for in-house requirements in LRDE, BEL, ISRO, while, ETDC is a certifying agency under Government of India, IISc uses its labs exclusively for its Research and Development activities, Hence there are no such 1 laboratory facilities for University students, there is no need for a COE in signal processing aspects of EMI / EMC, Sensor networks, Biometrics, Acoustics, providing lab facilities for Doctoral, PG and UG Students under the umbrella of universities.
- This can cater to the needs of Education, Research and Development, Training, for its students, faculty and the consultancy needs of industry in the areas of Signal Processing. The COE can have the Software Tools which can predict EMI / EMC which can be extensively used for societal needs and around Bangalore.
- This COE will have an opportunity to utilize the expertise from the Research and Development organizations located in and around Bangalore like LRDE, BEL, IISc, ETDC, ISRO and private Research and Development organizations.

Threats:

- The infrastructure facilities for expanding the CoE's activities may be limited. The maintenances and calibration of equipments and dearth of faculty members after the tenure of TEQIP-II are some of the threats.
- The fund flow from the Bangalore University budget and from Government of Karnataka are also considered to be a challenge.

However, these threats can be overcome by obtaining funds from central government funding agencies like DST, AICTE, MHRD, UGC etc., from generating internal revenues from this CoE by offering training and Consultancy program. The other avenue available is by increasing the fees for PG and Doctoral students. However, these measures can be implemented after obtaining necessary statutory approval from Bangalore University.

8.2 Existing expertise in the area and names of participating Faculty.

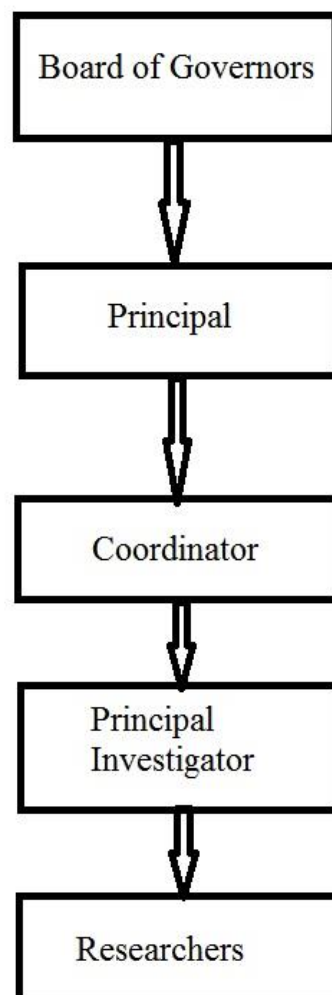
Sl No.	Areas of expertise	Participating faculty	PhD in the area	No. of publications (including Conference)	Doctoral strength	Master projects	Level of engagement
1.	Electromagnetics	Dr. M L Sudheer Dr. A Sreenivasa Murthy Dr. E G Shivakumar	EMI / EMC Signal Processing Power Electronics	42	03	10	10 Hrs/ Week
2.	Sensor Networks	Dr. Venugopal K R Dr. S H Manjula Dr. Thriveni J	Optical Networks Sensor Networks Adhoc Networks	110	17	50	20 Hrs / Week
3.	Acoustics	Dr. B M Rajprakash	Mechanical (AI in FMS) Material Processing	04	01	06	10 Hrs/ Week
4.	Biometrics / Image Processing	Dr. K B Raja Dr. P Deepa Shenoy Dr. K Suresh Babu	Image Processing Data Mining Image Processing	112	13	35	20 Hrs/ Week

8.3 Specific objectives of the Center of Excellence.

- To develop a team of multidisciplinary researchers with a shared facility to achieve competence in solving signal processing problems related to EMI / EMC, sensor networks, Biometrics and Acoustics.
- Since the spectrum allocation for communication is a natural and societal constraint, the EMI issues, in this will be an important issue to be addressed. This CoE will study these aspects.
- The multidisciplinary researchers in our institution from Electronics and Communication Engineering, Electrical Engineering, Mechanical Engineering and Computer Science and Engineering streams will collaborate to solve signal processing problems in thematic areas.
- This CoE will enhance the research culture in the institution and to boost collaborative research along with industries. As the Sensor networks, Biometrics and EMI / EMC issues are emerging areas, the signal processing aspects in this will cater to the needs of research in them. It will trigger R and D culture like publications, patents, innovations etc.
- It will increase the enrolment of doctoral students, post-graduate students, in addition to that projected in IDP (150) for the entire institution.
- As there is a high percentage of faculty holding Ph.D degrees, i.e about 73%, the collaborating departments will pool in their intellectual and physical resources from the fields of power electronics, Robotics, Material Sciences, Information Technology and speech signal processing. It will trigger collaboration with National and International academic and research institutions to facilitate technology transfer and increase the quality of research in these areas.
- To form a team of interdisciplinary researchers with shared facility for achieving excellence in signal processing aspects of Electromagnetic inference/electromagnetic compatibility (EMI/EMC)

1. Sensor network
 2. Biometrics
 3. Acoustics emissions
- And to offer data to policy makers and potential users for solving real life problems
 - To enhance the doctoral and masters enrollement in the above mentioned area.

8.4 Administrative/management and implementation structure



8.5 Details on engagement of various departments in the institution for CoE activities.

Sl No	Areas of expertise	Name of the Faculty	Department	Activity
1.	Electromagnetics	Dr. M L Sudheer Dr. A Sreenivasa Murthy Dr. E G Shivakumar	Electronics and Communication Engineering Electronics and Communication Engineering Electrical and Electronics Engineering	EMI/ EMC Speech EMI in Power Electronic Equipment
2.	Sensor Networks	Dr. Venugopal K R Dr. S H Manjula Dr. Thriveni J	Computer Science and Engineering	Issues related to Routing, optimization techniques, security, QoS, Security in sensor Networks
3.	Acoustics	Dr. B M Rajprakash	Mechanical Engineering	For Monitoring friction, defective welding process and failures.
4.	Biometrics / Image Processing	Dr. K B Raja Dr. P Deepa Shenoy Dr. K Suresh Babu	Electronics and Communication Engineering Computer Science and Engineering Electronics and Communication Engineering	Data bases for Iris, finger print, face and palm print, Heart beat, Finger Knuckle, Hand veins and ear is generated for analysis and biometric security analysis.

8.6 Two most important Principal investigators from the institution to participate in the CoE.

Sl. No.	Name	Institution / Industry
1	Dr. K B Raja.	Dept. of Computer Science and Engineering, University Visvesvaraya College of Engineering
2	Dr. M. L. Sudheer	Dept. of Electronics and Communication Engineering, University Visvesvaraya College of Engineering

8.7 Three most important researchers from the private sector / knowledge user partners participating in the CoE.

Sl. No.	Name	University / Industry
1	Prof. L. M. Patnaik	Honorary Professor in IISc, Bangalore
2	Prof. S. S. Iyengar	Director and Ryder Professor at Florida International University's School of Computing and Information Sciences in Miami, FL.
3	Dr. Geetha Manjunath	Senior Research Scientist, Xerox Research Inc, India
4	Dr. Nalini Venkata Subramanian	Professor, Dept. of CSE, University of California, Irvine, US
4	Dr. Parthasarathy	Intel, Bangalore
5	Dr. D C Pandey	Scientist H, LRDE, C V Raman Nagar, Bangalore

8.8 Five other institutional faculty / researchers participating in the CoE.

Sl. No.	Name	Other Institution Faculty / Researcher
1	Dr. Chandrasekaran K	Professor, Dept. of Computer Science and Engineering, NIT-K, Surathkal
2	Dr. Vibha L.	Professor, Dept. of Computer Science and Engineering, BNMIT, Bangalore
3	Dr. D. N. Sujatha	Professor, Master of Computer Applications, BMSCE, Bangalore.
4	Dr. Anita Kanavalli	Professor, Dept. of Computer Science and Engineering, MSRIT, Bangalore
5	Dr. M K Gunasekaran	Professor, CEDT, IISc, Bangalore

8.9 Action plan for the proposed research areas.

Sl. No.	Research Area	Brief Literature Survey	Results to be achieved
1	EMI / EMC	Currently the Electro radiations emitted from mobile towers are exceeding safety limits	Creation of a data bank of radiations from mobile towers
		Similarly radiations from high tension power lines are exceeding safety limits	Creation of a databank of radiation from high tension power lines
		The specific absorption rates (SAR) of mobile handsets have to be measured	Classification of mobile handset based on their SAR.
		Conducted and radiated emission and susceptibility of daily use electronic consumer equipment need to be	To provide design methodologies for electronic equipment taking into account its electromagnetic

		brought under the safe limit prescribed by International Standards	compatibility, so as to be compliant with radiation standards. Patents to be filed
2	Biometrics and Sensor Networks	Existing literature on Biometric and wireless sensor networks are reviewed	Existing techniques are implemented to familiarize with the technology
		Biometrics features are extracted using spatial, transform domain and hybrid domain	Biometric features
		The features of test biometric are compared with database using distance formulae and classifiers	Validation of a person
		The biometric data is communicated through effective wireless sensor network	Secure Identification / Verification of human being.
		The Real time products are developed for community services	Product

8.10 Collaborative arrangements made/under discussion with industries and research institutions / organizations within India and abroad.

- Collaborative arrangement are being worked out with LRDE, BANGALORE for measurement of emissions from mobile towers, mobile handsets.
- Consultative arrangements are in progress with IISc and private agencies designing new methods protecting electronic equipment from transients.
- The biometric traits are used to authenticate a person and database is created for Indian population. The final real time product can be developed in collaborations with government of India and private biometric industries.
- The validated scores of biometric authentication are communicated through wireless network

8.11 Action plan for communication to policy makers and potential users of research findings and use of CoE facilities for solving real life problems.

- During the first year of inception of COE, a database of electromagnetic radiation from TV tower, high tension electric power lines running inside the city will be obtained and the plot of radiations of Bangalore city will be completed, which will be

communicated to policy makers of state and central government, so as to help them to formulate radiation safe limits. The same will be communicated to CSIR labs like DRDO, LRDE etc.,

- The current research products and patents filed will be communicated to state and central government organization.
- During 2015-2016, the COE will offer its lab facilities for measuring electromagnetic radiation from mobiles and consumer electronic goods as per a standards and the data bank will be created, which will be communicated to the potential users of such equipments and to their manufacturers.
- From 2016-2017 the electromagnetic conducted emissions and susceptibility, radiated emission and susceptibility of switched mode power supplies will be measured and redesign methodologies for them will be suggested for emission to remain within safe limits; this will enable the electronics manufacturer to design the equipment for exports.
- The research findings will be communicated to researchers and manufacturers of electronic equipments. These findings will help the government to frame laws for safe radiations.

8.12 Action plan for technology transfer, commercialization of research, or other ways of using the R&D results for economic and social benefit.

- During the first year of its inception the EMI/EMC group will make measurements of Electromagnetic radiation near and around mobile towers, high tension power lines inside the city, which will enable us to create a database; this database can be utilised by other researchers in this area, which can indirectly help commercialising of research. A database of biometric traits of human being is created in the first year. In real time applications, sensors are deployed to measure the density of vehicle air pollution etc.,

- In the second year, Electromagnetic radiation from mobiles, consumers, electronic goods will be investigated and funding will be shared with the manufacturers. This enables the manufacturers to redesign so as to be within the statutory safe limits of radiation. Efficient algorithms are developed for different biometric traits as well as multimodal biometric traits for efficient recognition rate and with reduced time complexity.
 - Efficient algorithms are developed to analyse the statistics of vehicles, degree of pollution to help the society.

- In third year, the EMI /EMC aspects of electronics equipment comparing their Electromagnetic susceptibility and Electromagnetic emission will be investigated and their finding will be shared with other researchers and manufacturers so as to economize their design. The aspects of Electromagnetic pollution if any will be investigated for social benefits.
 - The commercialised biometric system is developed with collaboration of private and public sectors.
 - Real time wireless sensor networks are developed with specific sensors for particular applications are developed and commercialized.

- In the fourth year, patents will be filed in the areas of EMI/EMC, Sensor Network, Biometric.

8.13 Action plan for scaling-up PhD and Masters enrolment in the thematic area.

1. In the first year of implementation of this COE, about 10 out of 34 research scholars will complete work in this area. About 15 more PhD scholars can be registered thereby scaling up the PhD enrolment to 39 exclusively in this CoE.

2. It is proposed to start a new Masters course in Signal processing with strength of 18 intake during the year 2016-17.

3. Establishment of new laboratories and partial requirement of laboratories for the proposed new courses.

- M.E in Nano Technology
- M.E in Space Technology
- M.E in Digital Electronics
- M.E in VLSI and Embedded System Design
- M.E in Datamining and warehousing

and increasing the enrolment from 18 to 25 during the year 2016-17.

4. The CoE will introduce three elective courses to undergraduate students like

- EMI/EMC in Electronic equipment
- Electromagnetic radiation hazards
- Design concepts for Electromagnetic compatibility.

This would enhance the knowledge of UG students who will keep abreast of the latest technologies.

8.14 Budget for establishing Centre of Excellence.

Project Budget

Sl. No	Activities	Project Life Allocation	Financial year (Rs.in Crore)		
			2016-17	2017-18	2018-19
1	Improvement in research and development facilities through:				
	(i) Establishment of new laboratories for applicable thematic research	2.05	1.05	1.0	-
	(ii) Establishment of knowledge resource center (Library) in the thematic area	0.50	0.25	0.25	-
	(iii) Procurement of furniture	0.05	0.025	0.025	-
	(iv) Minor Civil Works	0.15	0.1	0.05	-
2	Providing Teaching and Research Assistantships for enrolment in Masters and Doctoral programmes in topics linked to economic or societal needs in the thematic areas	0.5	0.2	0.2	0.1
3	Collaboration with Industry for applicable research and product development	0.25	0.1	0.1	0.05

4	National/International collaboration for Research and Development activities with academic institutions and RandD organizations	0.5	0.2	0.2	0.1
5	Enhancing research competence of faculty and knowledge sharing in thematic areas, both within India and abroad	0.5	0.2	0.2	0.1
6	Incremental Operating Cost	0.5	0.1	0.2	0.2
TOTAL		5.0	2.225	2.225	0.55

8.15 List of Equipments, Equipment with estimated Budget

Sl.No	Equipments for	Budget (in Lakhs)
1	Electromagnetics	100.0
2	Sensor Networks	41.9
3	Acoustics	5.0
4	Biometrics / Image Processing	36.7
5	General	16.9
Total		200.5

8.16 Procurement plan for Goods and Consultant Services

Package No.	Sl. No	Activities	Description of Works/ Goods	Estimated Cost (Rs in Lakhs)
1	2	3	4	5
	1	To meet a range of demanding performance and energy efficiency requirements for compute-intensive communications applications.	Rack server 2.40GHz/6-core/12MB/80W) Processor /8MB shared L3 cache/ 16 GB RAM/ Dual port Gigabit Server adapter/ RAID Controller/ 2x 600 GB SAS HDD/ Hot swappable dual power supply / 3 years 24x7 support/ Windows server 2008 standard	3,15,000 * 2 = 6.3
	2	To meet requirement of compute-intensive communications applications	Networking for 30 Systems All 30 System	2,50,000*01 =2.5
	3	To meet requirement of applications	Desktop Intel H57 Chipset, Intel Core i5-650 Processor (3.2GHz 1333MHz FSB 4MB L2 Cache) 73W, 4 GB PC3-10600 1333 MHz DDR3 SDRAM DIMM(2x2 Gb RAM), 500GB 7200RPM SATA HDD, Multiburner, Intel Integrated Graphics, Intel Gigabit ethernet,	50,000*20 = 10

4		Network Storage with 12 slot for HDD, 12 TB raw capacity, RAID 5/6 support, 4x Gigabit ports, support for IP-SAN and NASNo	320,000 * 1 = 3.2
5		Firewall UTM appliance with Firewall, VPN, Multilink Management, Bandwidth Management and Reporting. Software license for Gateway Anti Virus, Anti Spam, Web and Application Filter, Intrusion Prevention System	280,000 * 1 = 2.8
6	To engage faculty, students and other end users in information inquiry, creative processes and the exchange of knowledge and ideas.	Projector 1920 * 1080 pixel resolution, 3000i, 1 constant, 4000 runners, brightness, Ethernet, vib, 2 * 10W speaker	1,15,000 * 2 = 3.3
7		UPS 30KVA 3-Phase In 1-Phase Out 360V.	2,70,000 * 1 = 2.7
8	To setup the Lab facility to do Conducted Emission Measurement	Spectrum Analyzer Rands FSH8 Frequency range from 9 kHz to 8 GHz High sensitivity (< 6141 dBm (1 Hz), with preamplifier < 6161 dBm (1 Hz)) Low measurement uncertainty (< 1 dB) Internal tracking generator and VSWR bridge with built-in DC voltage supply (bias) Two-port network analyzer Easy-to-replace Li-ion battery for up to 4.5 h of operation Measurement applications for LTE FDD, TD-LTE, cdma2000@ 1xEV-DO	17
9	To setup the Lab facility to do Conducted Emission Measurement	LISN Rands ENV 216 Frequency range : 9kHz - 30 MHz Power-handling capacity : 16 A, constant current Impedance: 50 uH + 5 á // 50 á 150 kHz high pass filter, switch-selectable Built-in 10 dB attenuator and pulse limiter Remote control with TTL levels Air-core design and artificial hand Simulated impedance (50 H + 5) 50 in line with CISPR 16-1-2 Amd. 2 2006 V-network in line with CISPR, EN, VDE, ANSI, FCC Part 15 and MIL-STD-461 D, E and F Calibrated in line with CISPR 16-1-2 and ANSIC63.4	5
10	To setup the Laboratory to do radiated Emission Measurement	Passive Probe (E and H near field measurements) with addon preamplifier Rands HZ-15 Frequency range: 30 MHz to 3GHz Input impedance 1.5 k ±2% 9 pF Set of five probes with electrically shielded prob Used for measuring high frequency fields on pri	3

	11	To setup the Laboratory to do radiated Emission Measurement	UPA 6192 Precompliance antenna 30 to 2000 MHz 30 MHz to 2000 MHz 200 W power handling Robust and lightweight Optimized for precompliance testing of immunity and emission Supplied with tripod Frequency range: 30 MHz to 2000 MHz Antenna Factor (typical) 30 MHz: 20 dB/m 60 MHz: 8 dB/m 300 MHz: 14 dB/m 500 MHz: 18 dB/m 1000 MHz: 24 dB/m 2000 MHz: 30 dB/m Typical gain (over isotropic): 6 dB (above 150 MHz) Impedance (nominal): 50 VSWR (typical above 100 MHz): 1.5:1 Beam width (typical) E plane: 100° at 30 MHz 70° 200 MHz to 2000 MHz H plane: 150° 200 MHz to 2000 MHz Connector: N type female Maximum continuous power: 200 W Size (L x W x H in m): approx. 0.92 X 1.26 x 0.6 (see drawing) Weight: approx. 2 kg Height variation with tripod CTP 6098: 1.2 to 2.0 m	5
	12		Amplifier	1
	13		Anechoic Chamber	2
	14		Antenna + Antenna Mast	2
	15		Attenuators	1
	16	To setup the Lab facility to do Conducted	Common Mode Disturbance Tester(61000-4-16)	2
	17	Susceptibility Measurement	Conducted Immunity RF Test System(61000-4-16)	4
	18		Coupling Decoupling Networks	2
	19		Damped Oscillatory Wave Tester(61000-4-10/18)	2
	20		Directional Couplers	2
	21		EFT Tester(61000-4-4)	4
	22		Electric Field Probe	2
	23		Electric Field Sensors	2
	24		EMI Receivers	8
	25		ESD Tester(61000-4-2)	4

	26	To setup the Lab facility to do Radiated Susceptibility Measurement	GTEM Cells	2
	27	To setup the Lab facility for voltage disturbance setting	Harmonic/Flicker Test Systems(61000-3-2/3)	2
	28	To setup the Lab facility to do Conducted Emission Measurement	LISN	2
	29	To setup the Lab facility to conduct measurements	Power Magnetic Field Tester(61000-4-8)	4
	30	To setup the Lab facility for voltage disturbance setting	Protection Device Test Systems	2
	31	To setup the Laboratory to do radiated Emission Measurement	Radiated Immunity Test System(61000-4-3)	4
	32	To setup the Lab facility to conduct measurements	RF Power Meter	2
	33	To setup the Lab facility to do Conducted Susceptibility Measurement	Shielded Camera	2
	34	To setup the Lab facility to do Conducted Emission Measurement	Signal Generators	2
	35	To setup the Lab facility for voltage disturbance setting	Surge Protection Filters	1
	36	To setup the Lab facility for voltage disturbance setting	Surge/Telecom/Ring Wave Tester(61000-4-5/12)	2
	37	To setup the Laboratory to do radiated Emission Measurement	TEM Cells	2
	38	To setup the Lab facility to do Conducted Emission Measurement	Test Tables	1
	39	To setup the Lab facility for voltage disturbance setting	Voltage Dips/Interrupts Tester(61000-4-11/29)	2
	40	To setup the Lab facility to do Conducted Emission Measurement	Waveguides	2

	41	To support Research students and PG students in sensor networking area	WSN Classroom Kit 2.4 GHz IRIS 50 Nos. IRIS processor/radio boards (XM2110) 35 Nos. Prototype/Data Acquisition boards with light and temperature (MDA100CB) 15 Nos. USB PC Interface Boards (MIB520CB) 10 Nos. MoteView/MoteWorks Support Tools	11,50,000 * 1 = 11.5
	42		Outdoor Long Range Wireless Monitoring System 2.4 GHz, 4 eKo long range Wireless Sensor Nodes, 1 eKo Gateway with web server, 1 eKo long range base unit, 4 Soil Moisture potential sensors, 4 ambient temperature and humidity sensors	4,70,000 * 1 = 4.7
	43	To support Research students and PG students in sensor networking area	MTS420CC IRIS/MICA2/MICAZ sensor board Light, Temperature, Humidity, Barometric pressure, seismic, GPS	38,500 * 20 = 7.7
	44	Research students For research students who are working on Wireless Sensor Networks	MTS310CB IRIS/MICA2/MICAZ Sensor Board Light, temperature, acoustic, acoustic actuator, seismic, magnetometer sensor	24,000 * 20 = 4.8
	45		WiEyebT5 a. Pack of five (5) complete wireless sensor nodes includes Five (5) WiEye sensor board, Five (5) TelosB node with connectors soldered onto the board, en (10) AA batteries b. One TelosB TPR2400CA	2,38,000 * 1 = 2.8
	46	To analyze the results obtained from the test conducted on Sensor Networks	Network Analyzer Perytons 4 Channel Network Analyzer, 4 X USB dongles by integration Monitoring Statistics and open source Rules Definition tools for perytons analyzers	7,70,000 * 1 = 7.7 2,70,000 * 1 = 2.7
Sub Total				41.9
	47		Multichannel Acoustic Signal detector and Accessories	5
Sub Total				5
	48		High End Camera compatible with all 1080p capable HDX systems with software version 3.0.1 or later. Includes 10m cable and required power supply adaptor. NA/UK/Eur/Aus/Swpwr cord.	2,35,000 * 2 = 4.7
	49		Digital Scanners Flatbed scanner	1,80,000 * 1 = 1.8
	50		Plasma Display 60" Full HD Plasma Monitor	3,20,000 * 1 = 3.2
	51		DSP Processor TI 6713	0.75
	52		Dual Iris Scanner	0.5
	53		Single Iris Scanner	0.2
	54		Single Fingerprint Scanner (Optical)	0.25

	55		Dual Fingerprint Scanner	1.5
	56		Ten Fingerprint Scanner	1.5
	57		Palm print Scanner	1.5
	58		Video Camera	1.0
		Establishment of knowledge Resource Center / Software	Library	37
			EMI/EMC Software	10
			Vertex 5 FPGA Kit	1.5
			Xilinx Software for 25 users	1.5
		Infrastructure for COE	Furniture	5.0
		Infrastructure for COE	Minor Civil works	15

8.17 Action plan on how the institution will ensure that the CoE research activities would be sustained.

Funds for the year 2015-2016 will be obtained from the funding agencies of the state government like VGST-Vision Group of Science and Technology, KSCST for maintenance and calibration of equipment. Bangalore University will be requested to fill the vacancies of teaching and non teaching faculty, so as to ensure the smooth functioning of CoE.

During 2016-2017 and onwards proposal will be submitted to central government funding agencies like AICTE, UGC, DST, NSF etc., for expanding the CoE facilities, so as to cover wider area of research, the University will be requested to enhance the fees for enrolment of post graduate and Doctoral students which would fund the recurring expanses of CoE.

Internal Revenue Generation (IRG) from training and consultancy will be carried to attain self sustenance of the CoE.

8.18 Enhancement of Existing Electromagnetic Compatibility and Power Quality Laboratory

A Centre of Excellence for Electromagnetic Compatibility (EMC) and Power Quality is being established with a grant of Rs. 60 Lakhs, for a 3-year period from 2013 to 2016 with Rs. 20 Lakh annually, which is being funded by Vision Group on Science and Technology, Govt. of Karnataka. This centre has been planned to make a study of the occurrence of Electromagnetic Interference (EMI) in electronic and electrical equipment and to develop their mitigation techniques. The centre proposes to study radiated, conducted emissions and immunity by setting-up of labs to make measurements conforming to international standards. Currently the grant being received is not sufficient to build the Labs for measuring radiated emissions and immunity. Hence, additional grants are required for setting-up these labs in order to establish a full-fledged EMI/EMC lab.

Sl.no	Activities	Description of Equipment	Cost of Equipment (in lakhs)
1	Setting up of Anechoic Chambers	Polyurethane material	30
2	Radiated emission measurement	Radiated emission measurement equipment (30MHz ó 10 GHz)	20
3	Accessories for radiated emission measurements	Probes for measuring radiated emissions (30MHz ó 10 GHz)	10
4	Measurement of conducted emission and conducted susceptibility	Vectored network analyzer	40
		Total	100

Chapter 9

CENTRE OF EXCELLENCE IN DISASTER MITIGATION AND MANAGEMENT

There are basically two types of disasters namely natural and anthropogenic. Natural disasters are due to nature like earthquake, landslide, drought, floods, tsunami and cyclone while anthropogenic disasters are due to human activities like road, rail, air and industrial accidents. India is seventh largest country in the world and is highly prone to both natural and anthropogenic disasters. The geological and geographical setup of the country makes it highly susceptible to disaster. North western part is prone to drought and desertification while coastal regions are prone to tsunamis and cyclones.

In other words, the country is susceptible to all types of disaster i.e. earthquakes, droughts floods, cyclones, tsunamis, landslides, avalanches, desertification, forest fires and industrial, vehicle accidents (road, rail, air). In other words, 90% disaster occurs in developing countries. In India, 70% area is drought prone, 60% earthquake prone, 12% flood prone and 8% cyclone prone. These percentage figures show the need of trained manpower that can assist at the time of disaster as well as in planning of schemes, monitoring and management of disaster. Earthquake results due to internal forces of the earth and their adjustments.

India is divided into four seismological zones based on the proneness to earthquake. Zone four represents the highest proneness to the earthquake. Landslides occur as a result of the movement of rock masses due to gravity, loss of friction, earthquakes, rainfall and manmade jerking motion. The hilly areas are more prone to landslides. The proposed CoE for Disaster Mitigation and Management will cater to needs of the following area of specialisations namely, Earthquake engineering, Structural engineering, Water resources engineering and Geotechnical engineering for creating the preparedness towards the disaster mitigation and management for sustenance of the society.

(i) *Microzonation and Liquefaction*

Performance of structures during earthquakes depends on foundation performance which is interlinked with ground conditions of the site and the ground motion experienced by the foundation. Ground motions exhibit the properties of a random process and, as such, generate complex transient vibrations in structures. The response of structures is essentially a function of the regional seismicity, the nature of source mechanism, geology and local soil conditions.

Local site conditions such as soft sediments of considerable depth strongly affect the amplitude of ground motions. The ground-motion amplification can cause subsequent ground failures such as liquefaction, structural failures or landslides due to excessive ground shaking. Therefore, identification of soil deposits susceptible to ground-motion amplification and potential for liquefaction is an important task for accurate risk assessment and loss estimation in earthquake prone areas. In order to evaluate earthquake risk of any region, it becomes imperative for the development of seismic microzonation maps of that region. These microzonation maps would provide general guidelines for integrated planning of urban areas and in positioning the types of new structures that are most suited to an area.

Further, the maps would also provide the information on the relative damage potential of the existing structures in a region. This becomes essential towards earthquake resistant design of new structures and retrofitting of old and vulnerable buildings. Seismic microzonation essentially involves the prediction of response of soil layers under earthquake excitation and thus to estimate the ground-motion parameters such as peak ground acceleration, response spectra, amplification factor and frequency content at the ground surface.

For seismic microzonation of a region, seismic hazard analysis is an important step. Geotechnical site characterization and evaluation of site response during earthquakes are essential phases of seismic microzonation with respect to ground-shaking intensity, attenuation and amplification rating. Therefore, in the light of earthquake risk evaluation, there is an immediate need for seismic microzonation of built areas and fast expanding areas of mega cities located in earthquake prone areas.

The recent 2001 Bhuj earthquake that struck India has caused almost a total devastation of several hundred buildings in villages and cities. Liquefaction triggered by this earthquake caused major damage to structures resting on loose to medium dense sands. This earthquake provides grave illustrations of the importance of understanding the seismic response of such saturated soil deposits.

Further, several destructive earthquakes in the past have also demonstrated that the amplification of ground motion and associated damage to structures due to local site conditions is a significant consideration in earthquake hazard studies. Hence, the assessment of local site effects on seismic ground motions is of great importance in earthquake engineering practice.

(ii) *Structural Health Monitoring & Control of Structures*

The Structures designed using provision of then codes of practice, the design life of structures might have exhausted or whose properties might have changed over the years, posing significant hazards due to over loads on the structure or high occupancy in the buildings according to the current codes of practice. The strength of structure deteriorates with time due to corrosion, or other environmental causes. It is difficult to assess or predict the behaviour of the structures accurately.

The Structural System identification is a most attractive non-destructive evaluation method and plays a lead role in Structural health assessment of these existing structures. It helps to identify rate of degradation of the system and helps in developing appropriate repair and rehabilitation strategy. It is a challenging area of study in Civil Engineering and currently recognized as an effective means of protecting structures from earthquake forces by way of passive, active and semi-active control methods, for mitigating earthquake hazards. Base Isolation of structure is one of the most popular methods of protecting structures. The CoE aims to carry out experimental investigations on active, semi active and passive control of structures using Laminated Rubber Bearings (LRB), New Zealand Rubber Bearings (NZ), Friction Pendulum Systems (FPS) and Pure Friction Systems (P-F). Further, it is proposed to evaluate the effectiveness of Magneto-Rheological Fluid (M-R fluid dampers) on the study of the control of structures.

(iii) Water Resources Engineering

Drought results due to low rainfall. Drought is mainly of three types-metrological, hydrological and agriculture. The major droughts in the twentieth century were 1941, 1951, 1979, 1982 and 1987. Heavy rainfall in short duration results in floods especially in clay soil, depressed areas and less outlet flow. India is the second most flood affected country where it is common during the monsoon season. Severe floods occur almost every year causing loss of life, damage to property, health problems and mortality of people.

The following areas of research / training / technology transfer from the water resources engineering have been planned from the proposed CoE. Remote Sensing, Geographic Information System, Global Positioning System, Urban Water Management, System Design / Resources Management, Natural and human induced hydrological process, Climate change and its effect on human beings, Urban sprawling, Rejuvenation of water bodies for sustainable urban water resources-Recharge, estimation; Isotope techniques, Life line structures, Socio Economic growth and development, Strategies for sustainability of natural resources, Rainwater harvesting and artificial recharging, Transfer of technology to the end user through public/people participation, Involvement of stakeholders and end users, Techno legal and social aspects of water resources, Training of Trainers for effective implementation purposes.

9.1 SWOT analysis.**Strength:**

The participating faculty for CoE have Ph D degree in the relevant areas of research and have proven records of advanced research with high expertise in different areas of specialisations under the thematic area of the proposed CoE. Presently the participating faculty have continued research by acquiring sufficient funds from centrally funded institutions. *Further the Department of Civil Engineering has established a Master of Engineering degree programme in Earthquake Engineering with an intake of 18 students in the year 2008 with minimum infrastructure.* The participating faculty are also actively engaged in teaching & research in Earthquake Engineering.

Weakness:

Recently, advanced procedures/techniques are evolved in the field of engineering to meet the challenges to cater to the needs of society. But this component requires sufficient funds to develop clear cut solutions to the complex problems by means of extended research. Therefore for possible implementation of any scheme, fund flow is a criterion. Currently, there are insufficient funds to establish fully equipped laboratory with advanced instruments / facilities to focus on research in thematic areas.

Opportunities:

CoE provides basic infrastructural facilities to carryout advanced research, training and transfer of technology in the region. The advanced tools such as remote sensing (RS), geographic information system (GIS) and global positioning system (GPS) plays a vital role in integrating all areas of specialisations in thematic map preparation, digital database creation, data management, analysis and output generation for decision making purposes for societal needs. Through CoE, it is possible to establish Post Graduate courses and research programs in Infrastructural Engineering and Disaster management. Further, encouragement can be extended to the faculty and students of the department to involve in the dissemination of knowledge to the end users.

Threats:

CoE research activities with mobilised manpower and knowledge resources should continue even after the tenure of the project period. This requires continued flow of sufficient funds to meet the requirements. Therefore mobilisation of funds may be the crisis. Since the CoE is well equipped, it is possible for continued research by obtaining the sponsored research projects from the centrally funded institutes like DST, MHRD, UGC, MOEF, AICTE, etc. Also, revenue to the centre may be generated through consultancy services, fees generated from the post graduate and research programmes. There is always scope to mobilise funds through commercialization of developed products from the CoE by industry institute collaboration. These aspects will overcome the possible threats.

There are basically two types of disasters namely natural and anthropogenic. Natural disasters are due to nature like earthquake, landslide, drought, floods, tsunami and cyclone

while anthropogenic disasters are due to human activities like road, rail, air and industrial accidents. India is seventh largest country in the world and is highly prone to both natural and anthropogenic disasters.

The geological and geographical setup of the country makes it highly susceptible to disaster. North western part is prone to drought and desertification while coastal regions are prone to tsunamis and cyclones. In other wards, the country is susceptible to all types of disaster i.e. earthquakes, droughts floods, cyclones, tsunamis, landslides, avalanches, desertification, forest fires and industrial, vehicle accidents (road, rail, air). In other wards, 90% disaster occurs in developing countries. In India, 70% area is drought prone, 60% earthquake prone, 12% flood prone and 8% cyclone prone. These percentage figures show the need of trained manpower that can assist at the time of disaster as well as in planning of schemes, monitoring and management of disaster.

Earthquake results due to internal forces of the earth and their adjustments. India is divided into four seismological zones based on the proneness to earthquake. Zone four represents the highest proneness to the earthquake. Landslides occur as a result of the movement of rock masses due to gravity, loss of friction, earthquakes, rainfall and man made jerking motion. The hilly areas are more prone to landslides.

9.2 Existing expertise in the area and names of participating faculty with level of engagement.

The information of faculties having expertise in the areas of Earthquake Engineering, Structural Engineering, Geo-Technical Engineering, Remote Sensing and Disaster management is furnished in the self-appraisal form. It is possible to spare about 25% of the total work load. The following table gives the names of the participating faculty.

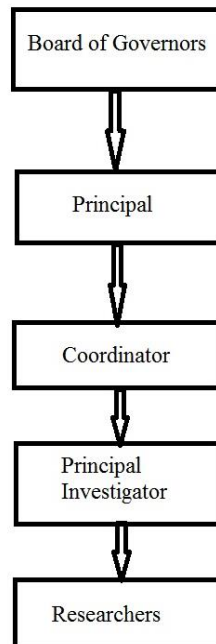
Sl. No	Participating Faculty	Area (s) of specialisation / Expertise	No. of Publications	Doctoral Strength	PG Dissertations Guided
1	Dr. V. Devaraj	Structural Earthquake Engg./ Structural Reliability	36	04	80
2	Dr. L. Govindaraju	Earthquake Engg./ Geotechnical Earthquake Engg./Geotechnical Engg.	40	-	20
3	Dr. A.S. Ravikumar	Remote Sensing & GIS	30	03	16
4	Dr. Venugopal K.R.	Sensor Materials/ Computer Science & Engg.	110	08	568

9.3 Specific objectives of the Center of Excellence.

The specific objectives are as listed below:

- a. Establish a state of the art centre for disaster mitigation and management in the university to solve the real word problems.
- b. Build a research program in the Department of Civil Engineering to cater the needs at the regional and national level.
- c. Prepare the thematic maps of all the natural resources and man made structures
- d. Digital database creation using GIS platform
- e. Collection of attribute data
- f. Create man power and Education in disaster management.
- g. Strengthen the Earthquake Engineering laboratory
- h. Development of database to contribute to field investigation
- i. Establish a system for post earthquake investigation
- j. Development of educational manuals and database for e-governing

9.4 Detailed administrative/management and implementation structure



9.5 Details on engagement of various departments in the institution for CoE activities.

Department of Mechanical Engineering

1. Dr. B. M. Rajaprakash
2. Dr. C. K. Umesh
3. Dr. Paul Vizhian S
4. Dr. B.K.Muralidhara

Department of Electrical Engineering

1. Dr. T.S. Prasanna
2. Dr. V. Sathyanagakumar

Department of Electronics & Communication

1. Dr. M.L.Sudheer
2. Dr. K.B. Raja

Department of Computer Science & Engineering

1. Dr. K. R. Venugopal
2. Dr. P. Deepa Shenoy

Experts:

1. Dr. G.S.Dwarakish, NITK, Surathkal
2. Dr. S.V.Dinesh, SIT, Tumkur
3. Dr. R. Ramesh Babu, Additional Director, CPRI, Bangalore
4. Dr. M. Manju Prasad, Senior Scientist, NAL, Bangalore
5. Dr. K. Muthumani, Assistant Director, SERC, Bangalore

(* We have discussed with the researchers and we are in the process of obtaining CVs and MOUs)

9.6 Action plan for the proposed research areas.

- i. Collection of spatial and non spatial data
- ii. Database creation
- iii. Data analysis
- iv. Decision making
- v. Transfer of technology to the end users

9.7 Collaborative arrangements made/under discussion with industries and research institutions / organizations within India and abroad.

The following organisations/institutions have been consulted for collaborative research and we are in the process of obtaining letter of commitment for collaboration.

In India

- a. Indian Institute of Science
- b. Indian Institute of Technology, Kanpur and Roorkee
- c. National Institute of technology Karnataka and Calicut
- d. Structural Engineering Research Centre, Chennai
- e. Central Power Research Institute, Bangalore

- f. Regional Remote Sensing Service Centre, Bangalore
- g. Karnataka State Remote Sensing Applications centre, Bangalore
- h. Central Ground Water Board, Bangalore
- i. Central water Commission, Bangalore
- j. National Law School of India University, Bangalore
- k. Central Water and Power Research Station, Pune
- l. Water Resources Development Organisation, Bangalore
- m. Bangalore water Supply and Sewerage Board, Bangalore
- n. Bruhat Bangalore Mahanagara Palike, Bangalore

Foreign Universities

- a. Universidad de Castilla ó La Mancha, Albacete, Spain
- b. Karlsruhe University, Germany
- c. Kiel University, Kiel, Germany
- d. University of Wollongog, Australia
- e. Komomoto University, Japan
- f. University of Surrey, UK

9.8 Action plan for communication to policy makers and potential users of research findings and use of CoE facilities for solving real life problems.

The action plan mainly consists of GIS Outputs after data Analysis-Overlay, integration and Query. The outputs will in the form of figures, charts, tables, graphs and reports. The GIS outputs will be placed before the decision maker for policy implementation.

9.9 Action plan for technology transfer, commercialization of research, or other ways of using the R&D results for economic and social benefit.

- a. Training of trainers(TOTs)
- b. Patents

9.10 Action plan for scaling-up PhD & Masters enrolment in the thematic area, and describe other plans for how this CoE will improve quality of education in the institutions, including UG education.

The CoE will start new Post Graduate programmes in the thematic area as below.

- Masters Degree programme in Infrastructure Engineering
- Masters Degree programme in Disaster Management
- Masters Degree programme in Reliability Engineering

Presently the Department of Civil Engineering has a subject of Earthquake Engineering at UG level. Hence there are opportunities to involve UG students for research activities in thematic area.

9.11 Budget for establishing Centre of Excellence

Sl. No	Activities	Project Life Allocation	Financial year (Rs in crores)		
			2016-17	2017-18	2018-19
1	Improvement in research and development facilities through				
	(i) Establishment of new laboratories for applicable thematic research		1.5	0.5	0.3
	(ii) Establishment of knowledge resource centre (Library) in the thematic areas		0.15	0.10	-
	(iii) Procurement of furniture		0.5	-	-
	(iv) Minor Civil works		0.10	0.05	
2	Providing Teaching and Research Assistantships for enrolment in Master and Doctoral programmes in topics linked to economic or societal needs in the thematic		0.2	0.2	0.2
3	Collaboration with Industry for applicable research and product development		0.05	0.1	0.1
4	National/International collaboration for Research and Development activities with academic institutions and R&D organizations		0.1	0.2	0.2
5	Enhancing research competence of faculty and knowledge sharing in thematic areas, both within India and abroad		0.1	0.2	0.2
6	Incremental Operation cost		0.2	0.2	0.1
	TOTAL		2.35	1.55	1.1

9.12 Procurement plan for Goods and Consultant Services as per Tables.

We will be providing the procurement plan for Goods and Consultant Services after getting approval from appropriate bodies. The list of equipments for CoE is presented.

Sl.no	Name of Equipment	Qty	Price (Rs)
1. Earthquake Engineering laboratory			
1	Resonant Column Equipment	1	48,00,000/-
2	Vibration Measurement & Analysis Systems	1	92000/-
3	Vibration test rig for measurement and Analysis	1	2,00,000/-
4	Active Vibration control systems	1	2,18,500/-
5	Bi-00-300 Shake Table test system	1	1,44,30,988/-
6	Horizontal Shake Table with eccentric Cam	1	3,35,000/-
7	Cyclic cum static Tri axial-Test system	1	28,00,000/-
8	Multi channel Analysis of Surface Wave system (MASW)	1	25,00,000/-
2. Water Resource Engineering			
1	Meteorological Station Mobile type	1	7,00,000/-
2	Stream gauging setup(current meter)	1	8,00,000/-
3	Pipe Network Health detection setup	1	12,00,000/-
4	Lysimeter, Infiltration set up	1	5,00,000/-
5	Neutron Probe	1	8,00,000/-
6	Remote Sensing Data	1	20,00,000/-
7	Resistivity Meter with Aquifer mapping	1	12,00,000/-
8	Atomic Absorption spectrometer	1	6,00,000/-
9	Remote Sensing Software (Multi Users)	1	15,00,000/-

Sl.no	Name of Equipment	Qty	Price (Rs)
10	Geographic Information System Software (Multi-Users)	1	20,00,000/-
11	Ground Truth Radiometer	1	6,00,000/-
3. High Performance Materials Testing Laboratory			
1	Compressive Testing Machine-5000kN	1	5,00,000/-
2	Universal Testing machine 3000 kN (Strain Controlled)	1	23,00,000/-
4. Structural Health Monitoring Laboratory			
1	NDT Equipment with Accessories	1	5,50,000/-
2	Equipments for Durability Studies	1	14,00,000/-
5. Structural Evaluation for Retrofitting and Rehabilitations			
1	Rebound Hammer (PROCEQ, Switzerland)	1	1,00,000/-
2	Cover meter testing Apparatus	1	5,00,000/-
3	Half-Cell Potential measurement testing apparatus	1	1,00,000/-
4	Extraction of Concrete cores samples testing apparatus	1	50,000/-

9.13 Action plan on how the institution will ensure that the CoE research activities would be sustained.

It is possible for continued research by obtaining the sponsored research projects from the centrally funded institutes like DST, MHRD, UGC, MOEF, AICTE, etc. Further, CoE will obtain grants from State Government and Central Government. Also, revenue to the centre may be generated through consultancy services, fees generated from the post graduate and research programmes. There is always scope to mobilise funds through commercialization of developed products from the CoE by industry institute collaboration. These aspects will overcome the possible threats.

CHAPTER 10

CENTRE OF EXCELLENCE IN EMERGING MATERIALS

It is proposed that the Center of Excellence in emerging materials involves Research and Development in the following four areas of material research, (i) Bio-Materials, (ii) Smart Materials, (iii) Composite Materials and (iv) Nano Materials

BIO-MATERIALS

Bio materials are a class of materials that are used as substitutes, replacement or to augment the functioning of any part of human organic body. One of the most important requirements is that they must be pharmacologically inert. The selection of the material for the replacement of body parts must be done systematically and must follow well established protocol. These emerging materials are widely used in the field of medicine.

The challenges involved in the development of biomaterials are to reduce the rate of rejection by the parent body. This center of Excellence concentrates on the evaluation of mechanical properties of materials such as strength analysis (tension, compression, bending, impact, hardness, and fatigue), microstructural studies, corrosion studies, wear study coupled with numerical modelling to reduce the test matrix. These materials can be at the initial level simulated for functionability and then possible prototype can be built for field trials and commercialization.

SMART MATERIALS

Smart materials are a class of materials whose properties depend on stimuli from external factors such as stress temperature, moisture, pH value, electrical and magnetic fields. The center of excellence proposed confines itself to the identification of field of application of smart materials, identifying the process of development of smart material. Potential area of application are aerospace, marine, automotive, medical equipment application, rotating machine application, consumer goods application, computer and other electronic devices, civil engineering etc.

COMPOSITE MATERIALS

Composite materials are new generation of materials developed to meet the demands of rapid growth of technological changes of the industry. Composite materials are engineering materials

made from two or more constituent materials that remain separate and distinct on a microscopic level forming a single component.

There is always an urge for an engineer to find an alternative to the conventional materials, keeping in view, the combination of properties expected from the new material. The greatest advantage accruing from the development of composite materials are strength and stiffness, combined with lightness. This is achieved by choosing an appropriate combination of reinforcement and matrix materials, manufacture can produce properties that exactly fit to the requirements for a specific purpose.

The constituent of composite materials can be generally identified microscopically. Most composites have been created to improve mechanical characteristics such as stiffness, ambient, toughness and high temperature strength, wear resistance and also aesthetic properties.

NANO MATERIALS

Nano materials is an emerging area of material research where in any one of the dimension is in the order of Nano meters. The study of the materials and its morphological parameters are also on Nano scale. The Nano materials usually results in special or unexpected properties. It must be noted that the term Nano materials are sometimes used even for smaller materials. It should also be noted that closed form solutions for Nano materials do not obey Newtonian mechanics and instead quantum mechanics is used. It should also be noted that it is possible to bring hybrid materials by synthesizing Nano materials with composites. Potential area of applications are Phosphors for High Definition TV, Low cost Flat Panel Displays, Tougher and Harder Cutting tools, Elimination of Pollutants, High Energy Density Batteries, Automobiles with greater Fuel efficiency and Aerospace components with enhanced Performance Characteristics

- The Department has highly qualified and experienced staff in this field of specialization.
- The Department offers four post graduate course including course on Advanced Material Technology, apart from M Sc. (Engineering) and Ph. D by research.
- The Department has 23 faculty members with 19 faculty members having Ph. D degrees, and others four are in the process of completing their Ph. D in next one year.
- The Department is actively involved in Industry-Institute interaction programs and has carried out several training programs for engineers from public sector enterprises.

10.1 SWOT analysis.

Strengths:

The participating faculty is highly qualified in thematic area of research with expertise in, Smart materials, Bio materials, Composite materials, Semi-conductors, Sensor materials and Material processing as proposed in CoE. They are actively engaged in teaching and continued research work, and produced many Ph.D in the thematic area.

Weakness:

The Emerging materials like smart materials, composite sensor materials which requires expertise and knowledge that are evolved in the field of thematic areas of Mechanical Engineering. The emerging materials technology is very complex and requires highly sophisticated laboratory equipments which require sufficient funds for possible implementation of this scheme, fund flow is criterion. At present, there is a dearth of funds which is insufficient to establish a fully equipped laboratory.

Opportunities:

By establishing the CoE, The multi-disciplinary expertise in the field of smart materials, composite sensor material etc. results in useful output for controlling navigation of flights, delivery of medicines, control of structures. The Medical application Bio-material replaces conventional materials. Semi-conductor materials for signal processing, image processing etc. and hence through this CoE the acquired knowledge can be disseminated to the students, researchers and other end users.

Threats:

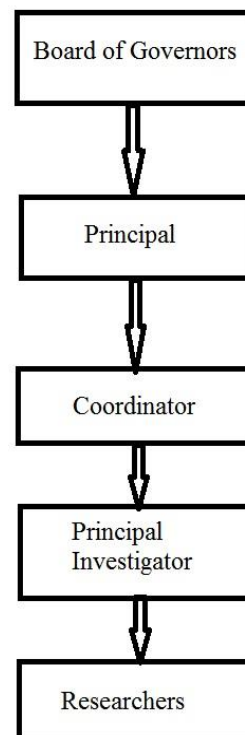
CoE shall continue even after the tenure period for sustenance. This requires fund flow. The mobilization of funds is the threat. Hence it is possible to continue the research obtaining sponsored research from DST, MHRD, UGC, MOEF, AICTE. It is also possible to generate fees and funds through PG, research and consultations. These above aspects will mitigate the threats.

10.2 Existing expertise in the area and names of participating Faculty.

Sl no.	Area Of Expertise	Participating Faculty	Ph D In The Area	No. Of Publications	Doctoral Students	PG Students
1.	BIO MATERIALS	Dr. Hanumantharaju H G Dr. P Deepa Shenoy	Mechanical Engg. Computer Sc. and Engg. Specialization Bio materials	5 35	- 2	12 50
2.	COMPOSITE MATERIALS	Dr. H K Shivanand	Mechanical Engg. Specialization Composite materials	15	10	12
3.	SMART MATERIALS	Dr. Chandrasekhar Bendigeri	Mechanical Engg. Specialization Smart materials	3	-	4
4.	SENSOR MATERIALS	Dr. Venugopal K R	Computer Science and Engineering	112	6	70

10.3 Specific objectives of the Centre of Excellence.

- To initiate research programmes in the area of Emerging Materials and characterize the specific mechanical properties of the materials and also develop new processes and investigate the applications with an interdisciplinary aim in mind.
- Identifying and sharing the expertise in current trends of technological advancement in the field of Emerging Materials.
- To develop scientific based research of strategic and commercial importance to Government and Industries.

10.4 Detailed administrative / management and implementation structure.**10.5 Details on engagement of various Departments in the Institution for COE activities:**Department of Electronics and Communications Engineering:

1. Dr. M L Sudheer
2. Dr. K B Raja
3. Dr. K Suresh Babu
4. Dr. A Srinivasa Murthy

Department of Computer Science and Engineering:

1. Dr. Venugopal K R
2. Dr. P Deepa Shenoy

Department of Electrical and Electronics Engineering

1. Dr. E G Shivakumar

Department of Civil Engineering

1. Dr. H Sharada Bai
2. Dr. Sadath Ali Khan Zai

Department of Mechanical Engineering

1. Dr. B K Muralidhara
2. Dr. P Vijayakumar
3. Dr. K V Sharma
4. Dr. N Lakshmanaswamy
5. Dr. B M Rajaprakash
6. Dr. G Harish
7. Dr. Shivarudraiah
8. Dr. H C Chittappa
9. Dr. H N Vidyasagar
10. Dr. R Saravanan
11. Dr. D K Ramesh
12. Dr. S Paul Vizhian
13. Dr. S Ranganatha
14. Dr. Shantharaja M

10.6 Action Plan for the proposed Research areas.

- (i) Procurement of research equipments
- (ii) Identifying the process parameters
- (iii) Commencement of analysis
- (iv) Collection of result data
- (v) Interpretation of the data

10.7 Collaborative arrangements made / under discussions with Industries and Research Institutions / Organizations within in India or abroad

- 1) Indian Institute of Science, Bangalore
- 2) National Aerospace Laboratories, Bangalore
- 3) Hindustan Aeronautics Limited, Bangalore

- 4) Gas Turbine Research Establishments, Bangalore
- 5) Central Power Research Institute, Bangalore
- 6) BMS College of Engineering, Bangalore
- 7) RV College of Engineering, Bangalore
- 8) MS Ramaiah Institute of Technology, Bangalore
- 9) Siddaganga Institute of Technology, Tumkur
- 10) Dr. Ambedkar Institute of Technology, Bangalore

10.8 Action plan for communication to policy makers and potential users of Research findings and use of COE facilities for solving real life problems.

- Periodic communications in form of Technical Reports and PPT presentations will be made at the level of Principal Investigator to the following agencies:
- Government and quasi-Government organization like Departments formed by Govt. of India, Govt. of Karnataka and various funding agencies.

Potential users of Research are:

Private and Public Sector Industries, Medium and Small Scale Industries and also Artisans at the rural level.

10.9 Action Plan for Technology Transfer, Commercialization of Research, or other ways of using the R&D results for Economic and Social benefits

The action plan envisaged for the above heads are as follows:

- **Technology transfer:**

The results obtained from the Center of Excellence are first validated by peer approval. Then, the findings are then sent to the various Government agencies like, National Aeronautical Laboratories, DRDO and autonomous institutions like IITs, NIT-K, CFI and state universities for their potential use.

The results obtained from the Center of Excellence are published in International and National Journals, presented in International and National Conferences, posted in public domain websites.

- **Commercialization of Research:**

The results obtained from the Center of Excellence are first registered under Intellectual Property Rights. Patents that emerge out of these findings are also registered. A separate cell is then created for interaction with industries for commercialization of the research con-comitants.

The results obtained from the Center of Excellence are given to Ministry of Rural Development and Social Welfare for potential use in Economic and Social benefits. The relevant Results will also be distributed to Non-Governmental organizations and points-persons in SAARC and BRIC countries.

10.10 Action plan for scaling-up PhD and Masters enrolment in the thematic area.

The establishment of CoE will result in the ready availability of machine and other associated research resources to the students who till now had to go to different organizations for the machines. The Department of Mechanical Engineering has a proven track record of teachers guiding students for their Ph.dø. Now, with the establishment of the CoE and its associated up-scaling of resources the enrolment of students at the Mastersøand Doctoral levels will only increase

10.11 Project Budget for Sub-component**Note: For details of permissible and non-permissible expenditures, please see Table**

Sl. No.	Activities	Project Life Allocation	Financial year (Rs.in Crore)		
			2016-17	2017-18	2018-19
1	Improvement in research and development facilities through:				
	(v) Establishment of new laboratories for applicable thematic research	2.05	1.05	1.0	----
	(vi) Establishment of knowledge resource centre (Library) in the thematic area	0.5	0.25	0.25	-----
	(vii) Procurement of furniture	0.05	0.025	0.025	----
	(viii) Minor Civil Works	0.15	0.1	0.05	----
2	Providing Teaching and Research Assistantships for enrolment in Masters and Doctoral programmes in topics linked to economic or societal needs in the thematic areas	0.5	0.2	0.2	0.1
3	Collaboration with Industry for applicable research and product development	0.25	0.1	0.1	0.05
4	National/International collaboration for Research and Development activities with academic institutions and R&D organizations	0.5	0.2	0.2	0.1
5	Enhancing research competence of faculty and knowledge sharing in thematic areas, both within India and abroad	0.5	0.2	0.2	0.1
6	Incremental Operating Cost	0.5	0.1	0.2	0.2
	TOTAL	5.0	2.225	2.225	0.55

10.12 Procurement Plan for Goods and Consultant Services as per Tables. We will provide the Procurement Plan for Goods and Consultant Services later.

Table
Procurement Plan for Works and Goods*

SI No	Activities	Description of Works/Goods	Estimated Cost(Rs in Lakhs)
1	Optimization of M/C parameters, determination of machinability forces, cryogenic machining of materials	CNC Machining center	40
		CNC Turning Center	20
2	Calculation of tool life, cutting force, tool tip temperature.	lathe tool dynamometer	25
		3D surface roughness measurement equipment	8
3	Characterizations of mechanical fatigue, bending, flexural strength inter laminar shear strength.	INSTRN 100KN Capacity Servo Hydraulic M/C(for Dynamic testing,fracture analysis with testing software)	70
		50KN Vertical Biaxial Test System	70
4	Forging, polymer and FRP structural preparation, Coining, extrusion.	200 tons hydraulic press	6
5	Life prediction, S-N cycles	Corrosion testing equipment	8
		Fatigue testing equipment (rotary type)	15
		Bio compatibility testing equipment	30
6		INSTRAN machine	30
		Computerized Furnace impact testing machine	10
		Electric resistance	1
7	Phase transformation, charecterization of nano particals, determination of crystalinity, identification of elements.	Bench top X-Ray diffraction	20
		Total	353

10.13 Action plan on how the institution will ensure that the CoE research activities would be sustained.

Funds for the year 2015-2016 will be obtained from the funding agencies of the state government like VGST-Vision Group of Science and Technology, KSCST for maintenance and calibration of equipment. Bangalore University will be requested to fill the vacancies of teaching and non teaching faculty, so as to ensure the smooth functioning of CoE.

During 2016-2017 and onwards proposal will be submitted to central government funding agencies like AICTE, UGC, DST, NSF etc., for expanding the CoE facilities so as to cover wider area of research. The university will be requested to enhance the fees for enrolment of post graduate and Doctoral students which would fund the recurring expanses of CoE.

Internal revenue generation (IRG) from training and consultancy will be carried to attain self sustainance of the CoE.

CHAPTER 11

CENTENARY BUILDINGS

11.1 Building Estimates

(I) Building Estimation Budget for 12th and 13th Five year plans : University Visvesvaraya College of Engineering

Sl. no	Description	Area in Sqm	Cost per Sqm (Rs)	Amount (Rs in Lakhs)	Sub Total (Rs in Crores)	Requirements	% of Area	Remarks
A	MECHANICAL BLOCK					Class rooms	22	Basement: Parking area, storage and Generators. Ground Floor: Charimen Chamber, Seminar Halls, Conference Halls, Labs and workshops. First Floor: Drawing Halls, Computer Centers, Labs. Second Floor: Class Rooms and lab's. Third & Fourth Floor: Class Rooms & Drawing halls. Amenities: In each floor one Boys toilet and Girls Toilet
1	Basement Floor	5468	13500	738	81.4	Labs/workshops	25	
2	Ground Floor	4361	15000	654		Seminar/ conference halls	10	
3	First Floor	3971	15250	605		Staff Rooms	7	
4	Second Floor	3971	15500	615		Chairmans	3	
5	Third Floor	3971	15750	625		Chambers	10	
6	Fourth Floor	3941	16000	630		Amenities	15	
7	Fifth Floor	4736	16250	769		Circulations area	3	
8	Sixth Floor	3824	16500	630		Computer Centers	5	
9	Seventh Floor	3824	16750	640		Drawing Halls		
10	Eighth Floor	3824	17000	650				
11	Ninth Floor	3824	17250	659				
12	Tenth Floor	3824	17500	669				
	TOTAL	49541	192250	7889				
	INTERIORS / EQUIPMENTS			250				
	GRAND TOTAL			8139				

B	VISVESVARAYA CENTENARY BUILDING							
1	Ground Floor (STILT)	1050	15000	157		Class rooms	15	Ground Floor: Parking area, storage and Generators. First Floor: Charimen Chamber, Seminar Halls, Conference Halls, Labs and workshops. Second Floor: Drawing Halls,
2	First Floor	2302	15250	351		Labs	15	
3	Second Floor	2302	15500	356		Seminar/conference halls	12	
4	Third Floor	1008	15750	158		Auditorium	5	
5	Fourth Floor	1008	16000	161		Staff Rooms	7	
6	Fifth Floor	1008	16250	163		Principal Chamber	3	
7	Sixth Floor	1008	16500	166		Admin Office	10	
						Placement Center	5	

8	Seventh Floor	1008	16750	168		Amenities	10	Computer Centers, Labs. Third Floor: Class Rooms and lab's. Fourth to Tenth Floor: Class Rooms & Drawing halls. Amenities: In each floor one Boys toilet and Girls Toilet	
9	Eighth Floor	1008	17000	171	27.05	Circulations Area	15		
10	Ninth Floor	1008	17250	173		computer center	3		
11	Tenth Floor	1008	17500	176					
	TOTAL	13718	178750	2205					
	INTERIORS / EQUIPMENTS			500					
	GRAND TOTAL			2705					
C	BOYS HOSTEL BLOCK					Rooms	40		Ground Floor: Parking, Strage, Hostel Office First Floor: Warden Chamber, Sports Rooms, Library, Rooms. Second Floor: Computer Center, Rooms Third Floor: T.V. Rooms., Rooms Fourth & Fifth: T.V.Rooms, Rooms. Amenities: In each floor adequate rest rooms.
1	Ground Floor	2903	15000	435		TV.Rooms	5		
2	First Floor	2678	15250	408		Common Room	5		
3	Second Floor	2903	15500	450		Sports Rooms	5		
4	Third Floor	2920	15750	459	55.8	Hostel Office	3		
5	Fourth Floor	2920	16000	467		Warden Chamber	2		
6	Fifth Floor	2920	16250	474		Library	5		
7	Sixth Floor	2920	16500	481		Computer center	5		
8	Seventh Floor	2920	16750	489		Amenities	15		
9	Eighth Floor	2920	17000	496		Circulations Area	15		
10	Ninth Floor	2920	17250	503					
11	Tenth Floor	2920	17500	510					
	TOTAL	31845	178750	5177					
	INTERIORS / EQUIPMENTS			400					
	GRAND TOTAL			5577					

C(a)	DINING HALL - BOYS HOSTEL				4.89	Dining Area	30	Ground Floor: Parking/ Workers Room. First Floor: Kitchen, Managers Room & Utility. Second & Third: Dining and Pantry Amenities: In each floor one toilet block
1	Basement Floor	698	13500	94		Kitchen	15	
2	Ground Floor	701	15250	106		Pantry	20	
3	First Floor	657	15500	101		Utility Area	5	
4	Second Floor	548	15700	86		Store Room	10	
						Workers Room	15	
						Manager Chamber	05	
	TOTAL	2604	59950	388		Circulations Area	15	
	INTERIORS / EQUIPMENTS			100	Aminities	10		
	GRAND TOTAL			488				

C(b)	SPORTS BLOCK - BOYS HOSTEL				4.41	Gymnasium	15	Ground Floor: Parking/ Physical Directors Room, Sports Equipment Room, First & Second Floor: Gymnasium, Indoor Games, Amenities: In each floor one toilet block
1	Ground Floor	712	15000	106		Indoor Games	40	
2	First Floor	703	15250	107		Store Room	5	
3	Second Floor	497	15500	77		Physical Director Room	5	
	TOTAL	1912	45750	291		Sports Equipment Room	10	
	INTERIORS / EQUIPMENTS			150		Circulations Area	15	
	GRAND TOTAL			441		Aminities	10	

D	GIRLS HOSTEL BLOCK				3.4	Rooms	40	Second Floor: Computer Center, Rooms Third Floor: T.V. Rooms., Rooms Amenities: In each floor adequate rest rooms.
1	Second Floor	1000	15500	155		TV.Rooms	5	
2	Third Floor	1000	15750	157		Common Room	5	
3	TOTAL	11032	242650	312		computer center	5	
4	INTERIORS/ EQUIPMENTS			25		Amenities	15	
5	GRAND TOTAL			337		Circulations Area	15	

E	CIVIL ENGINEERING BUILDING				29	Class rooms Seminar/conference halls Auditorium Staff Rooms Amenities Circulating Area Computer Center	30 15 20 5 10 15 5	First Floor: Class Rooms, Computer Centers, Labs, Class Rooms Amenities: In each floor one Boys toilet and Girls Toilet
1	First Floor	6040	15250	921				
2	Second Floor	6040	15500	936				
3	Third Floor	6040	15750	951				
	TOTAL	18120	46500	2808				
	INTERIORS/ EQUIPMENTS			100				
	GRAND TOTAL			2908				

F	ARCHITECTURE BUILDING				5.7	Class rooms Seminar/conference halls Auditorium Staff Rooms Amenities Circulating Area Computer Center	30 15 20 5 10 15 5	First Floor: Class Rooms, Computer Centers, Labs, Class Rooms, Amenities: In each floor one Boys toilet and Girls Toilet
1	First Floor	1000	15500	155				
2	Second Floor	1000	15750	157				
3	Third Floor	1000	16000	160				
	TOTAL	3000	15500	472				
	INTERIORS/ EQUIPMENTS			100				
	GRAND TOTAL			572				

G	LECTURE COMPLEX				5.1	Class rooms Seminar/conference halls Auditorium Staff Rooms Amenities Circulating Area Computer Center	30 15 20 5 10 15 5	First Floor to Third Floor: Class Rooms, Computer Centers, Labs, Class Rooms, Amenities: In each floor one Boys toilet and Girls Toilet
1	First Floor	901	15000	135				
2	Second Floor	901	15250	137				
3	Third Floor	901	15500	139				
	TOTAL	1802	30250	412				
	INTERIORS/ EQUIPMENTS			100				
	GRAND TOTAL			512				

H	LIBRARY BLOCK				5.4	Class Rooms Seminar/conference halls Auditorium Staff Rooms Amenities Circulating Area Computer Center	30 15 20 5 10 15 5	First Floor to Third Floor: Class Rooms, Computer Centers, Labs, Class Rooms, Amenities: In each floor one Boys toilet and Girls Toilet
1	Second Floor	957	15000	143				
2	Third Floor	957	15250	145				
3	Fourth Floor	957	15500	148				
	TOTAL	1914	30250	437				
	INTERIORS/ EQUIPMENTS			100				
	GRAND TOTAL			537				

	RESTORATION OF HERITAGE BUILDING	500	5
	REPAIR OF EXISTING STRUCTURES	300	3
	GRAND TOTAL OF ALL PROJECTS		230.2





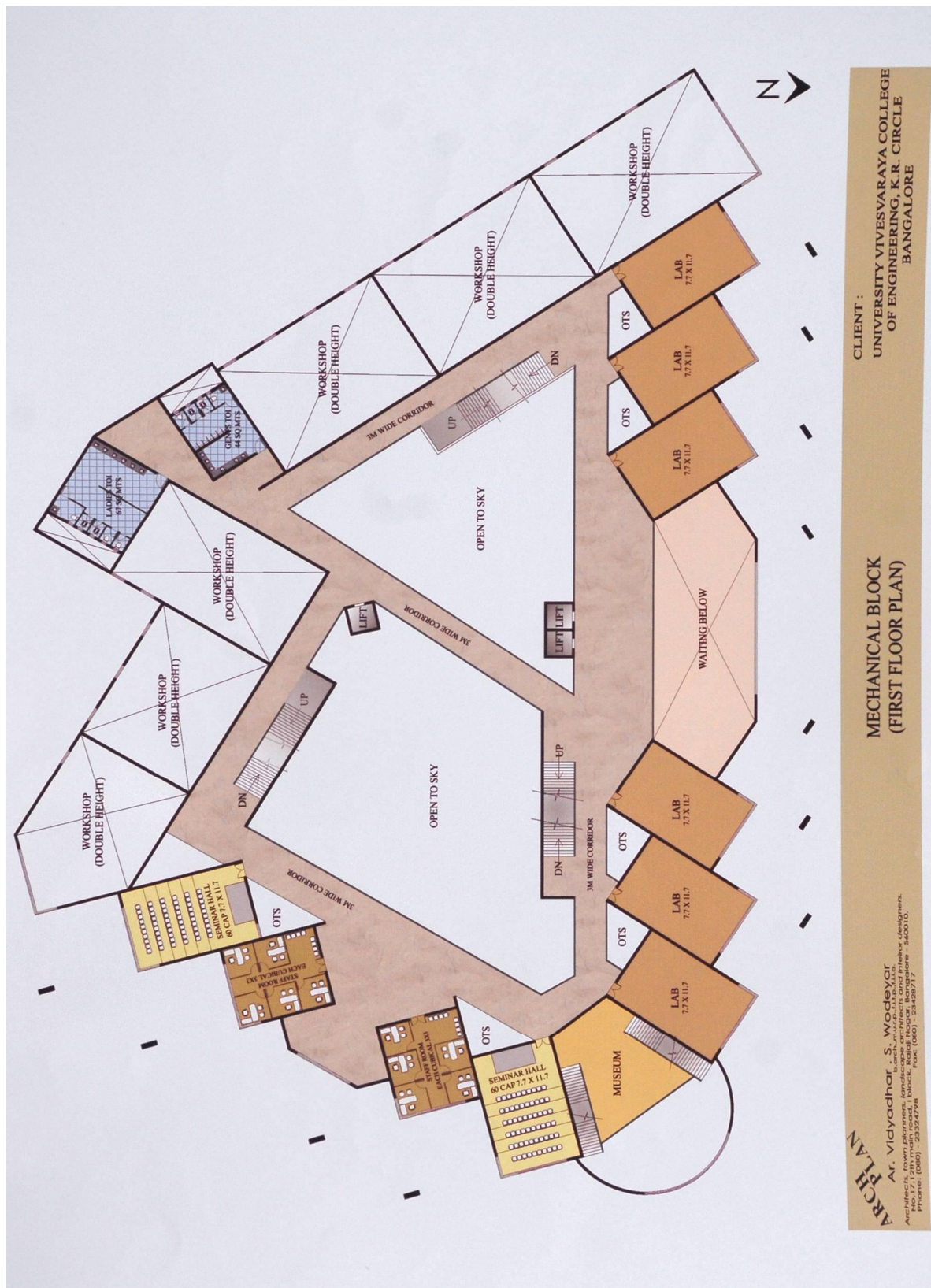


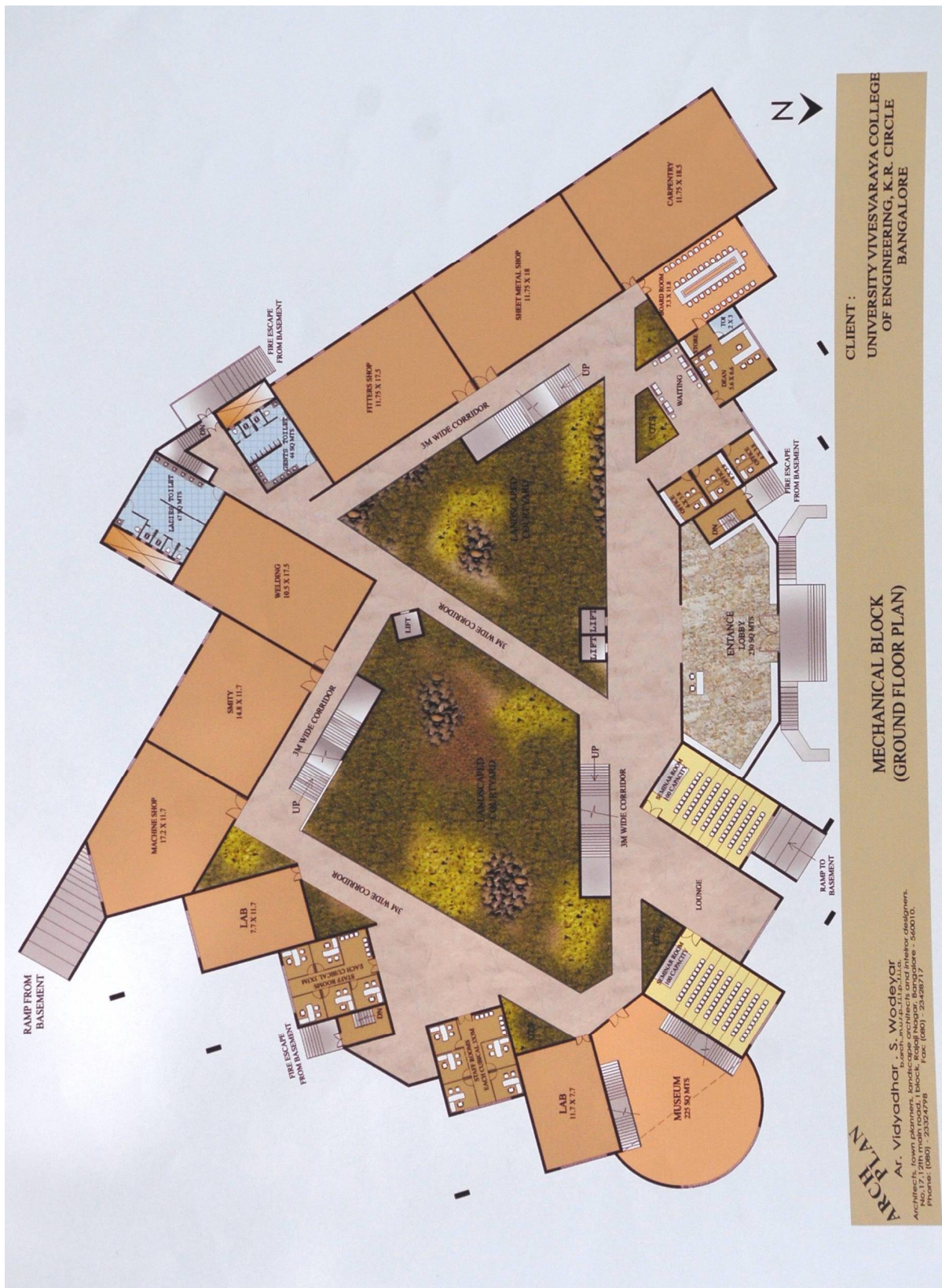
ARCH PLAN
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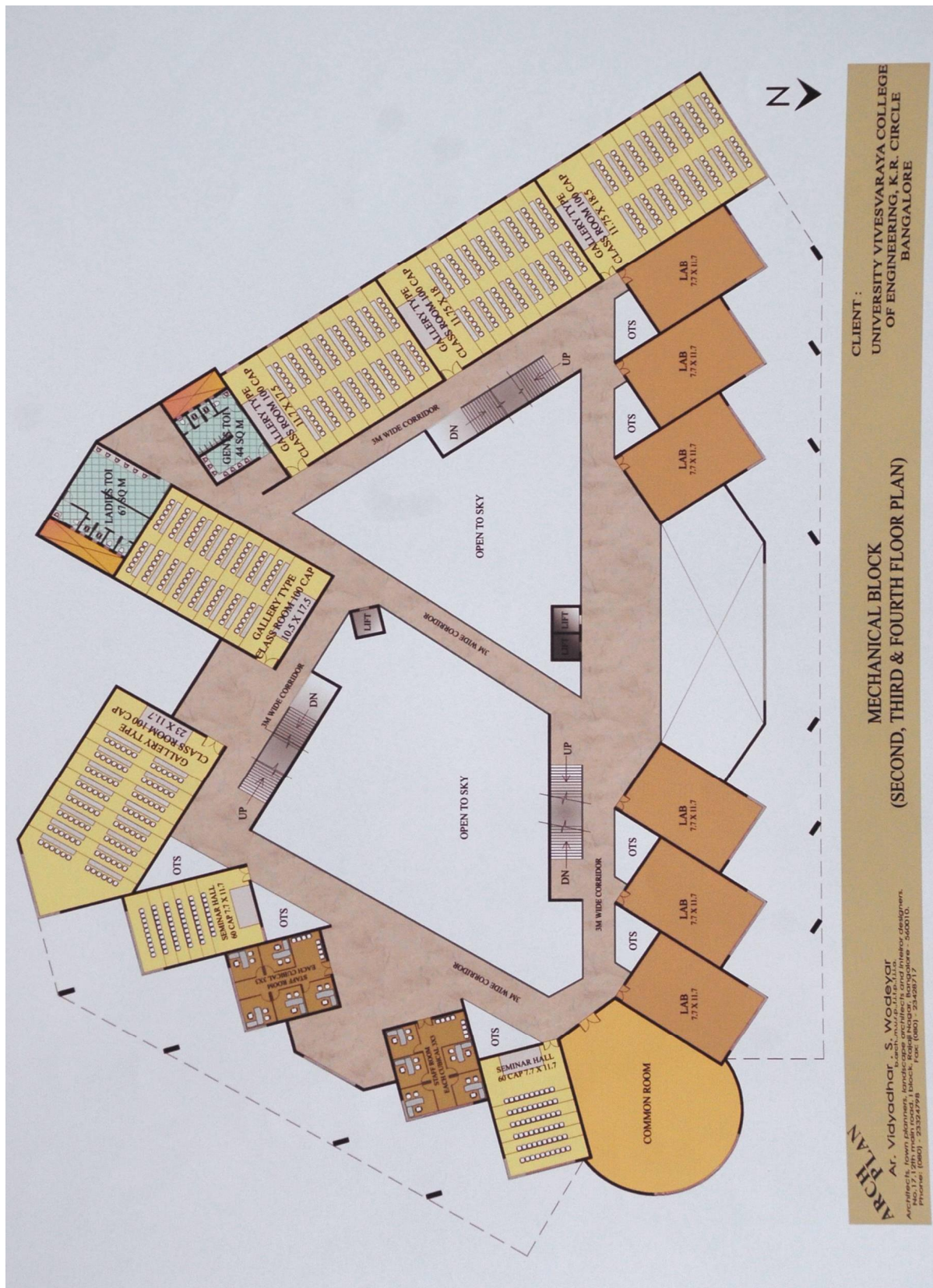
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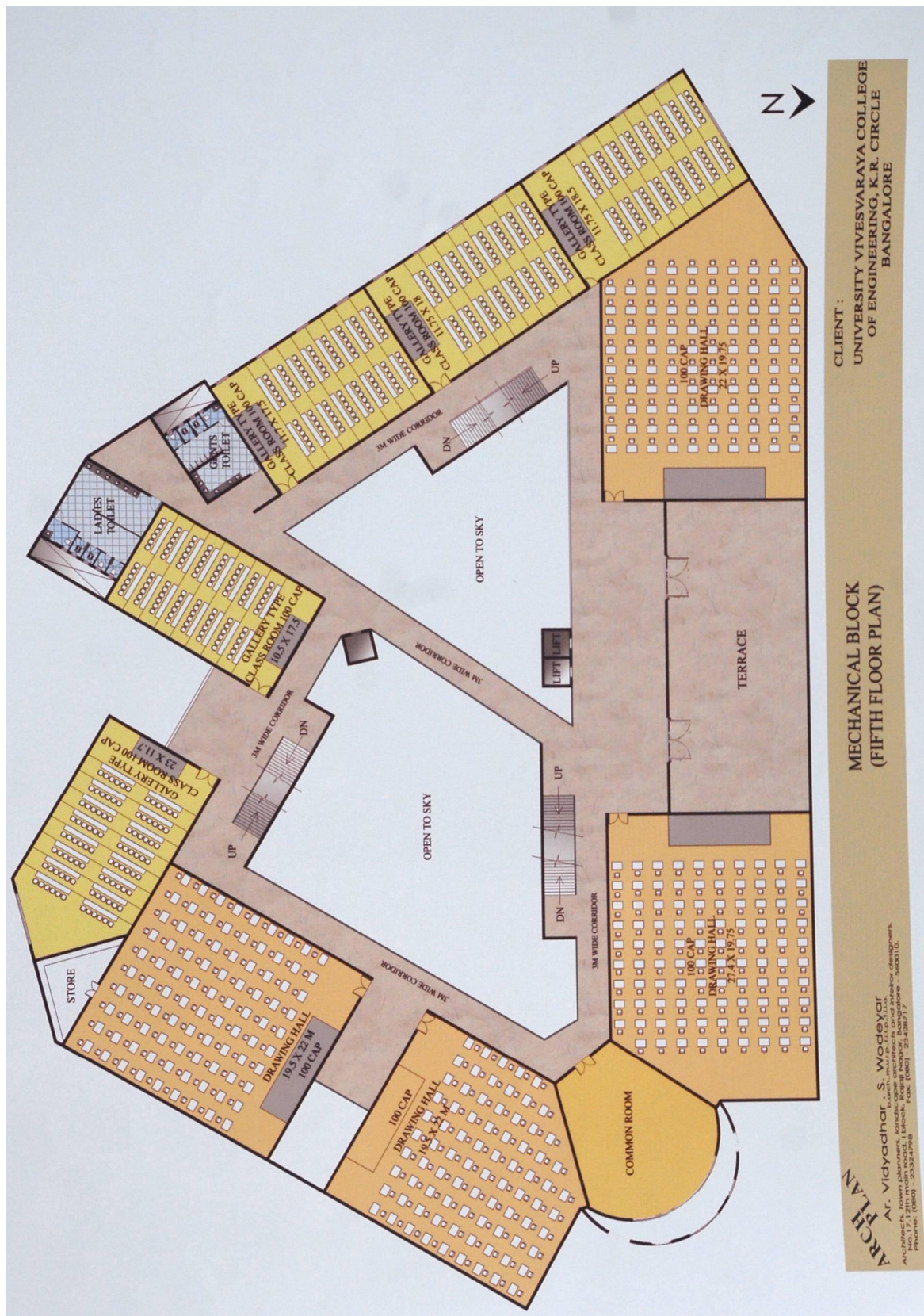
MECHANICAL BLOCK- SITE PLAN

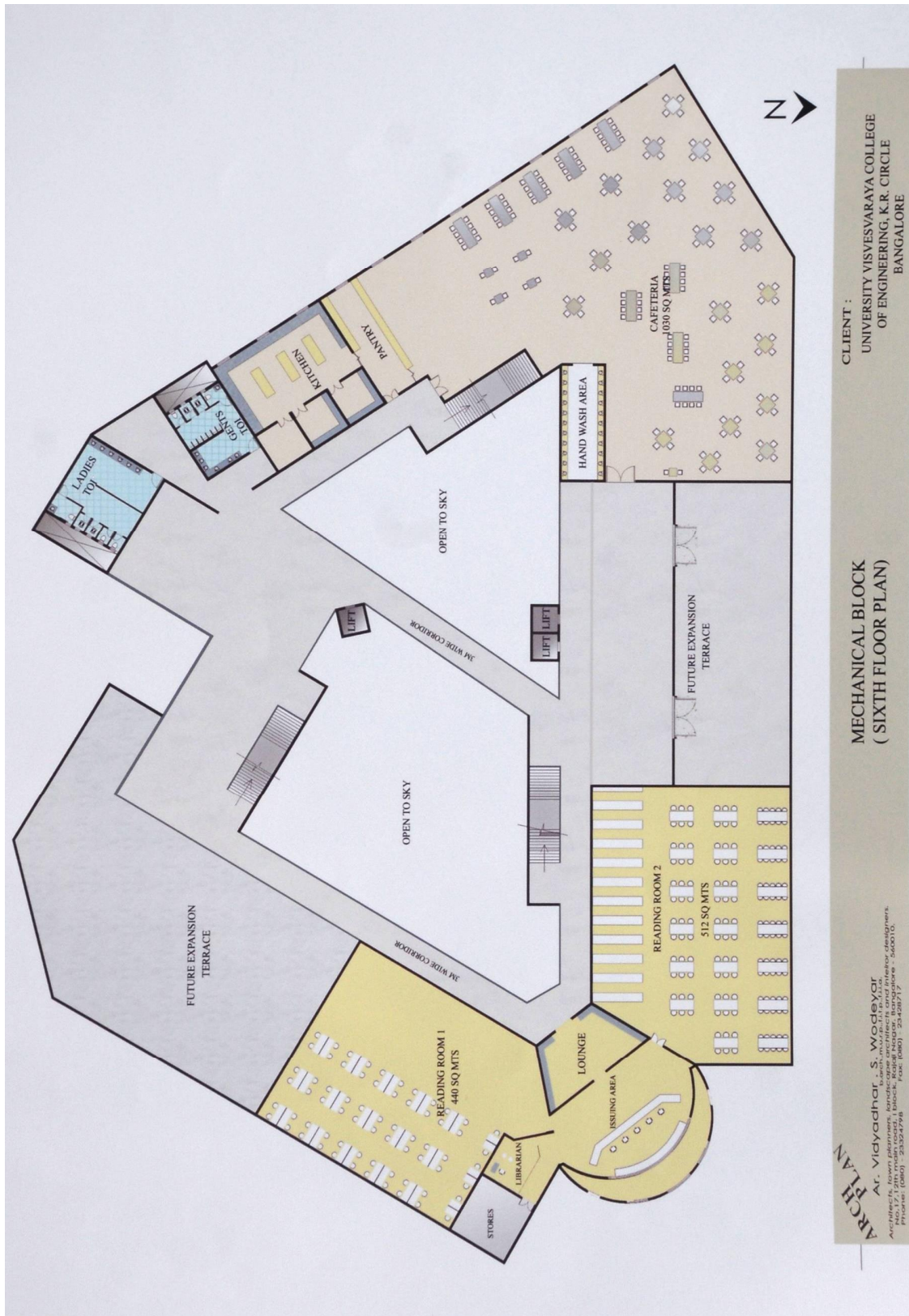


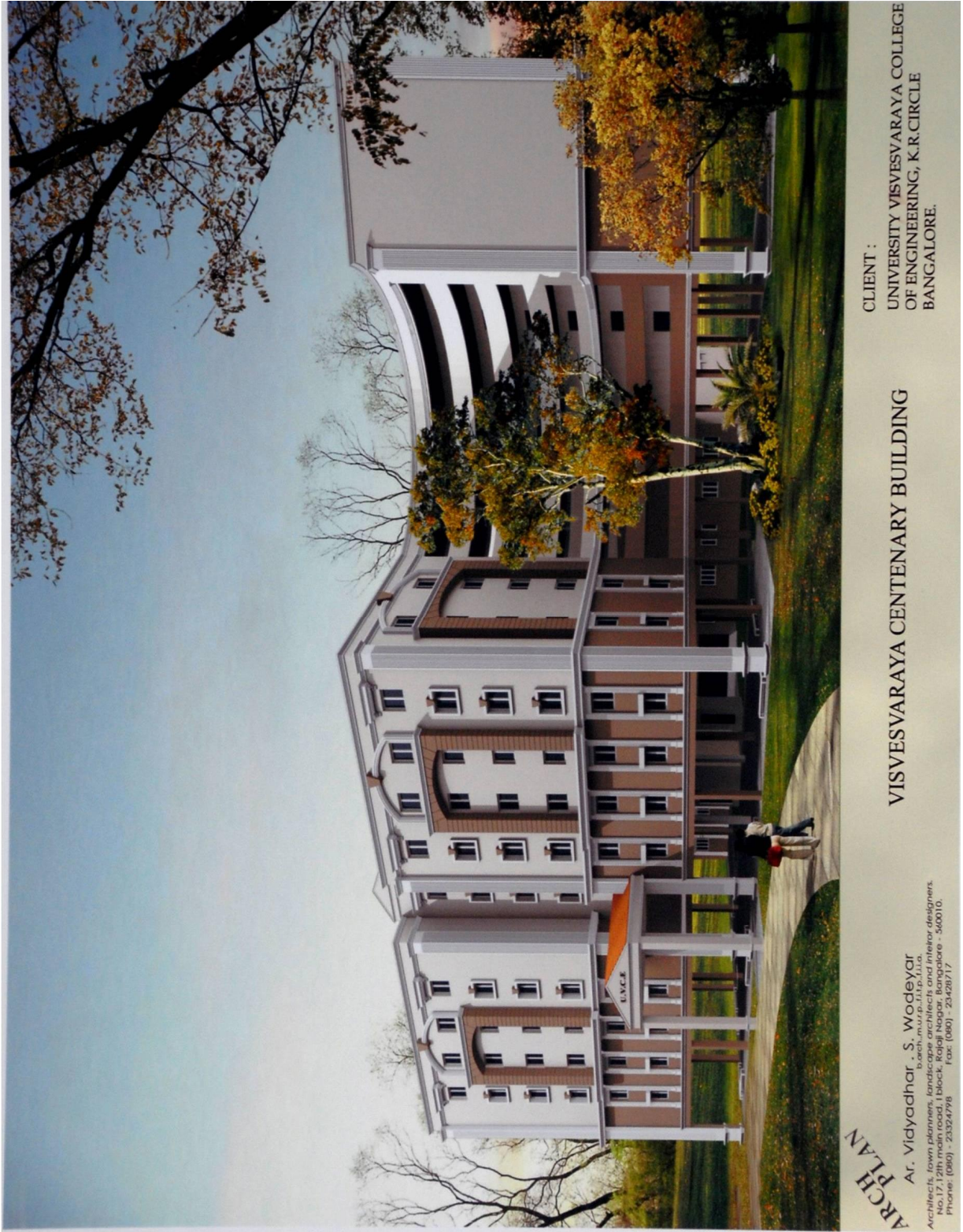










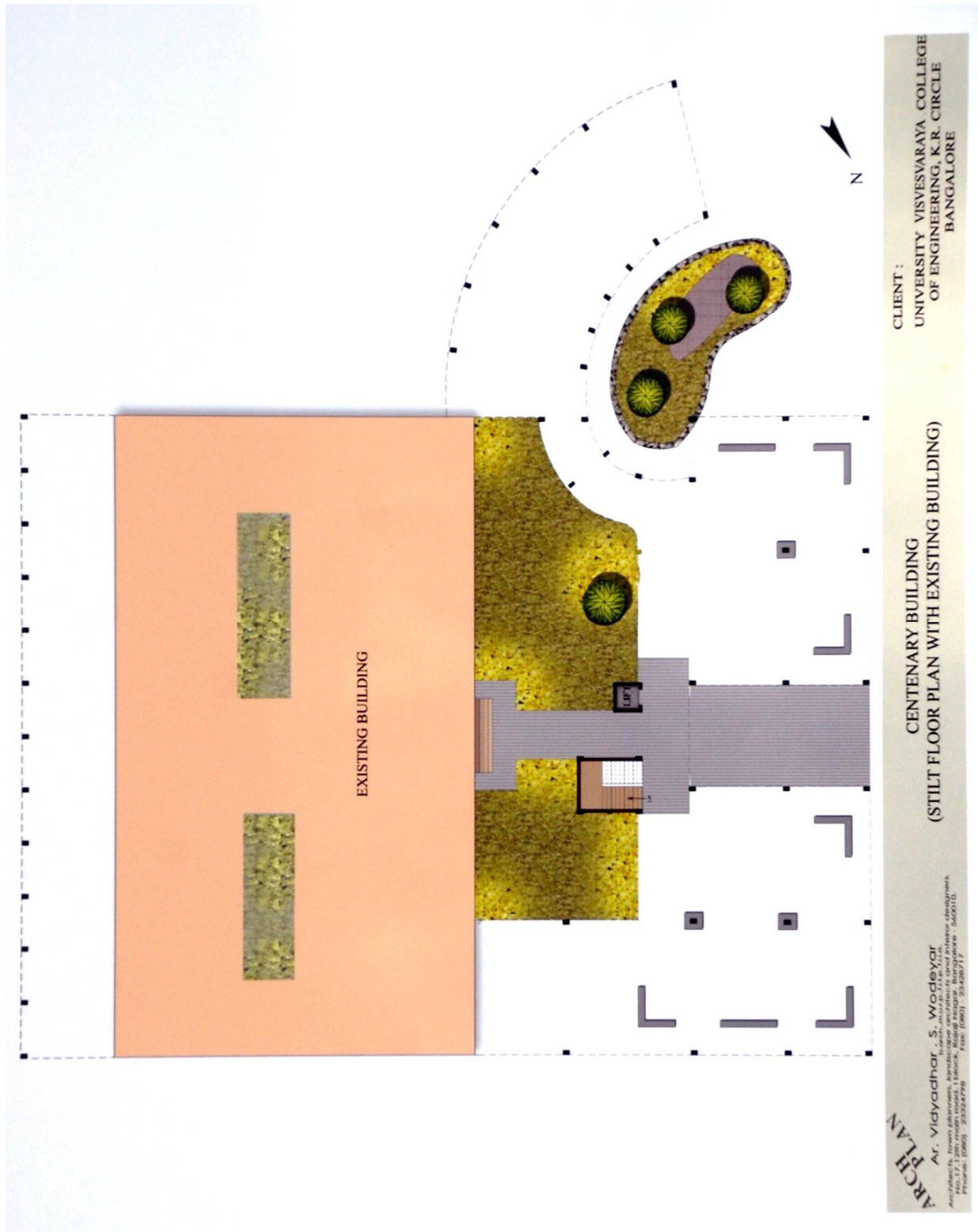


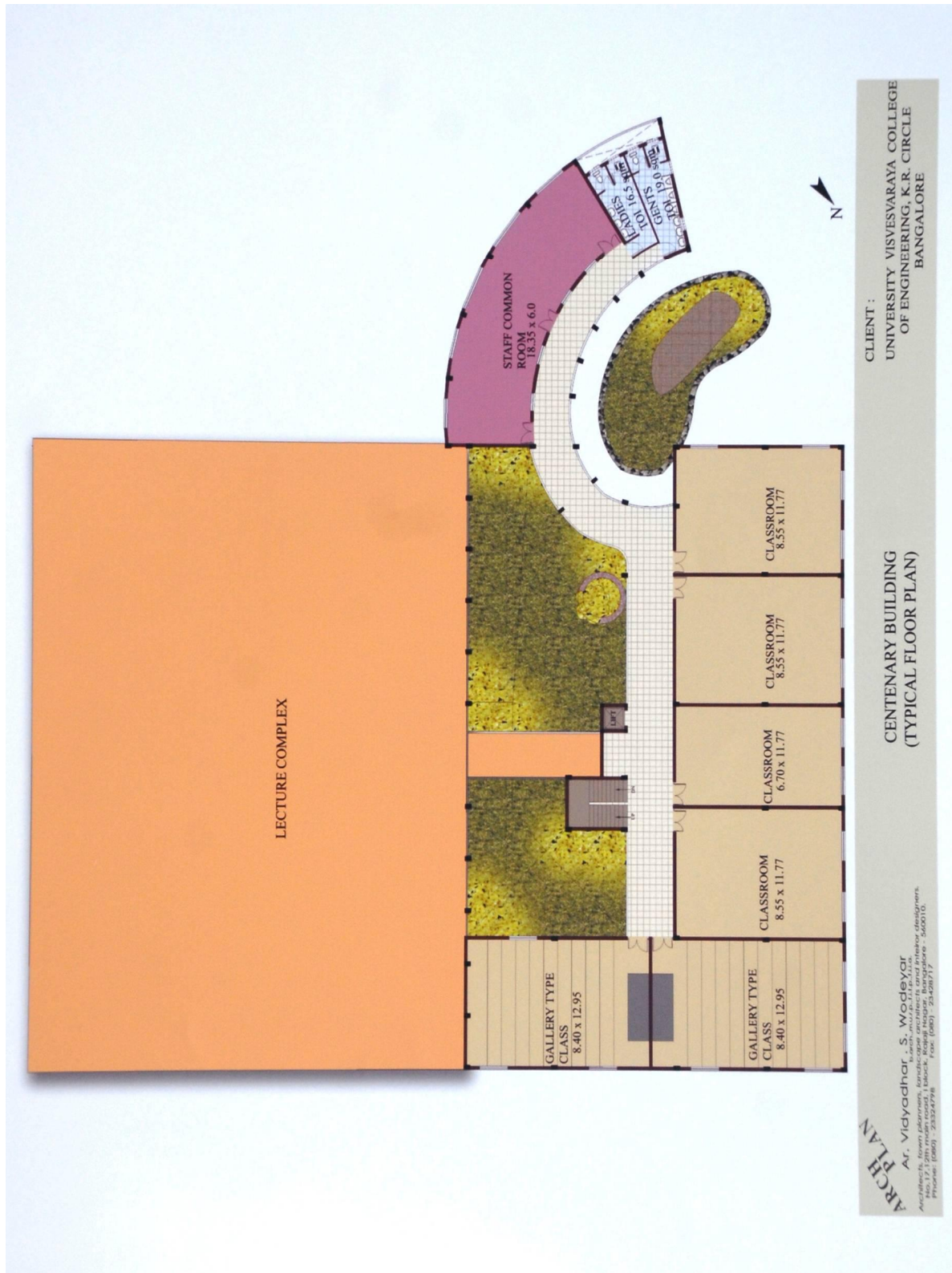


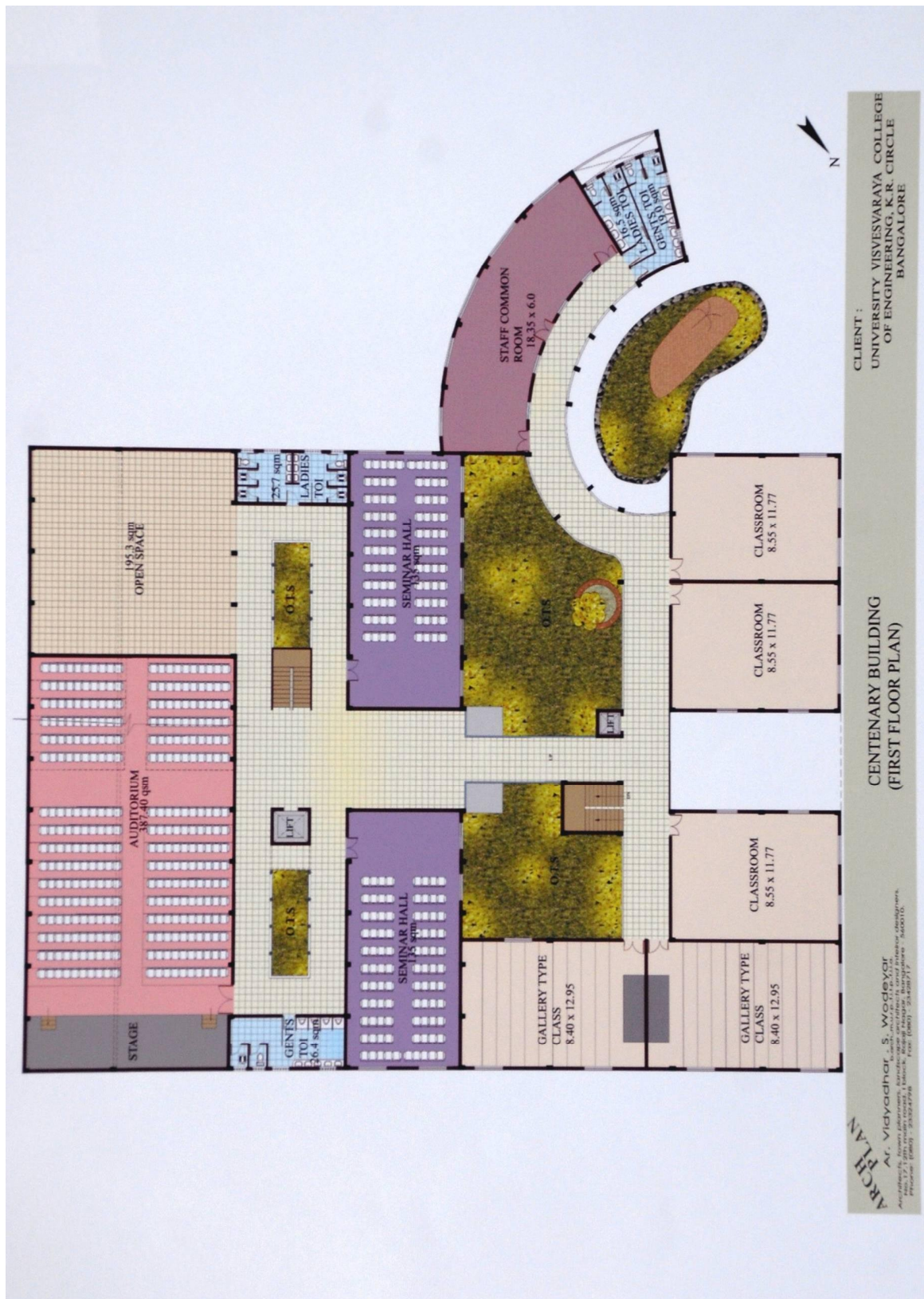
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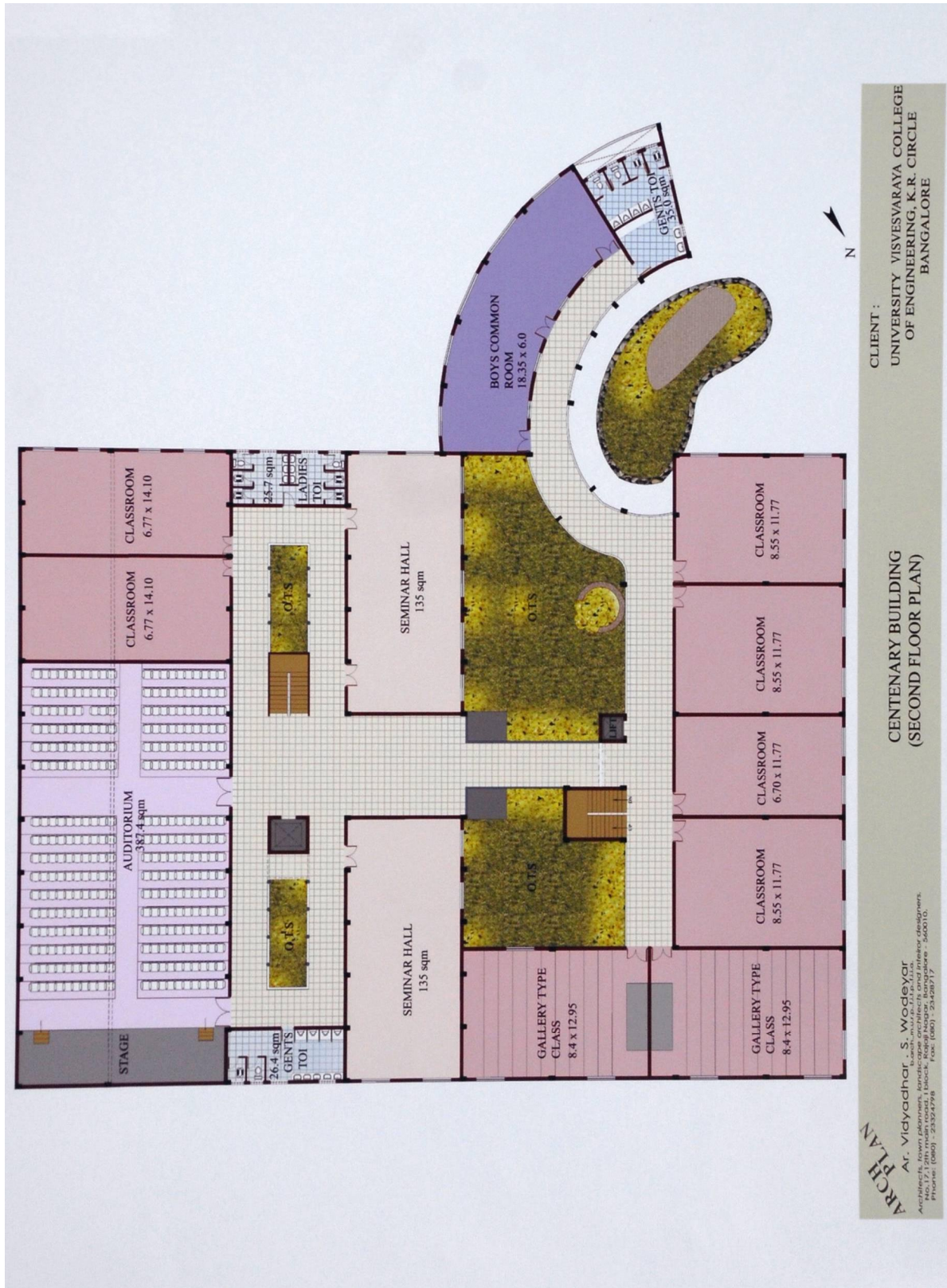
VISVESVARAYA CENTENARY BUILDING
NORTH SIDE VIEW

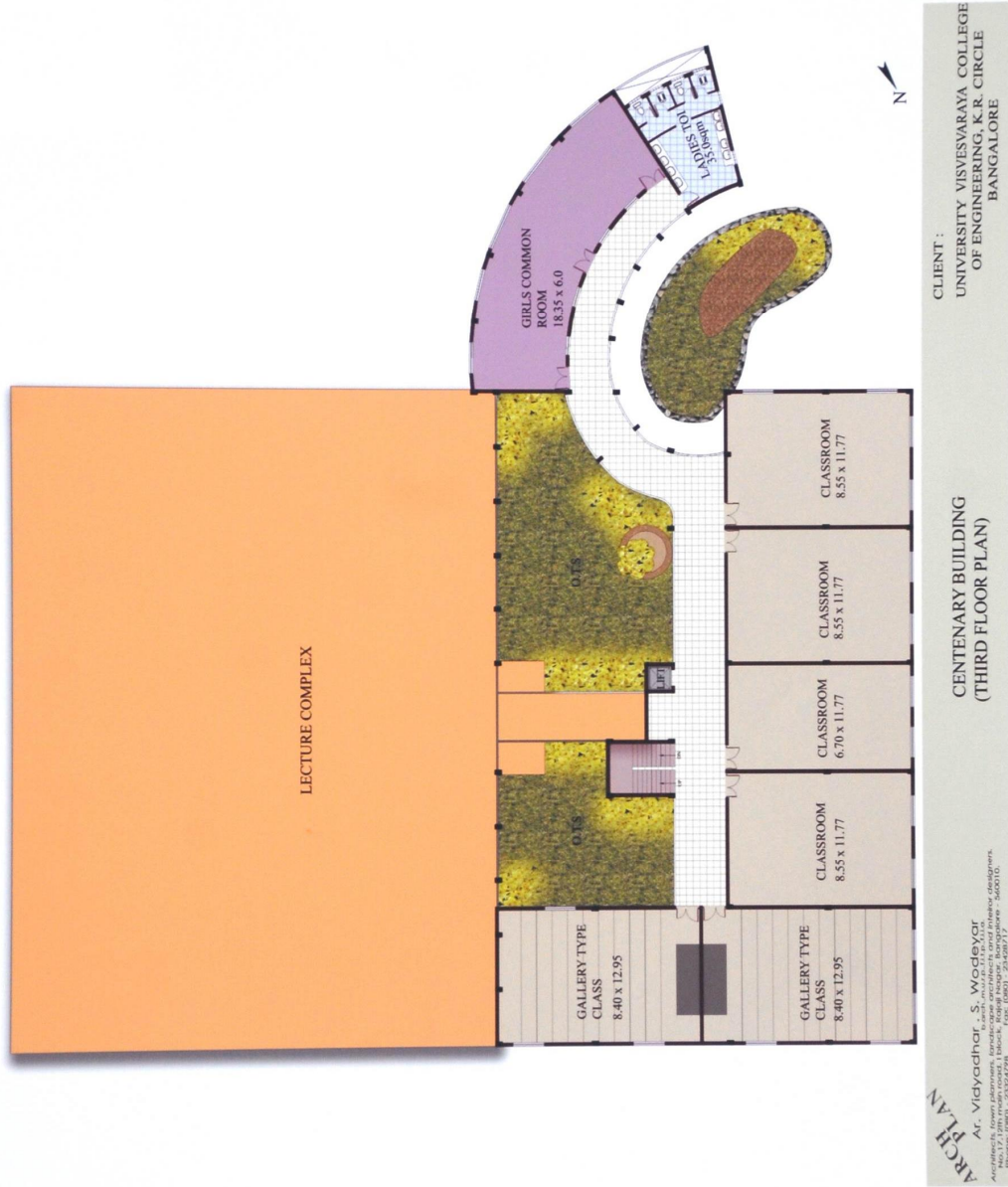
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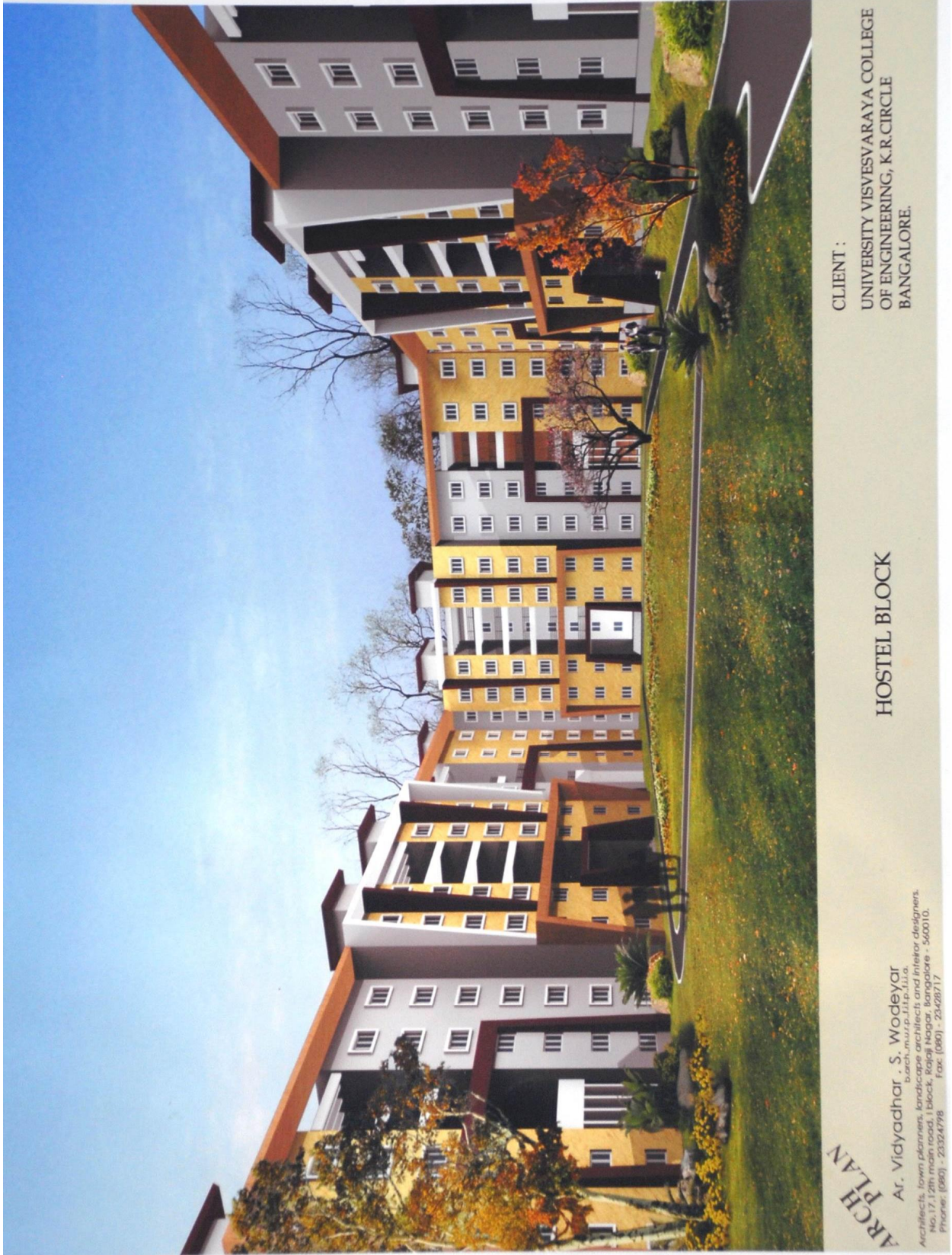












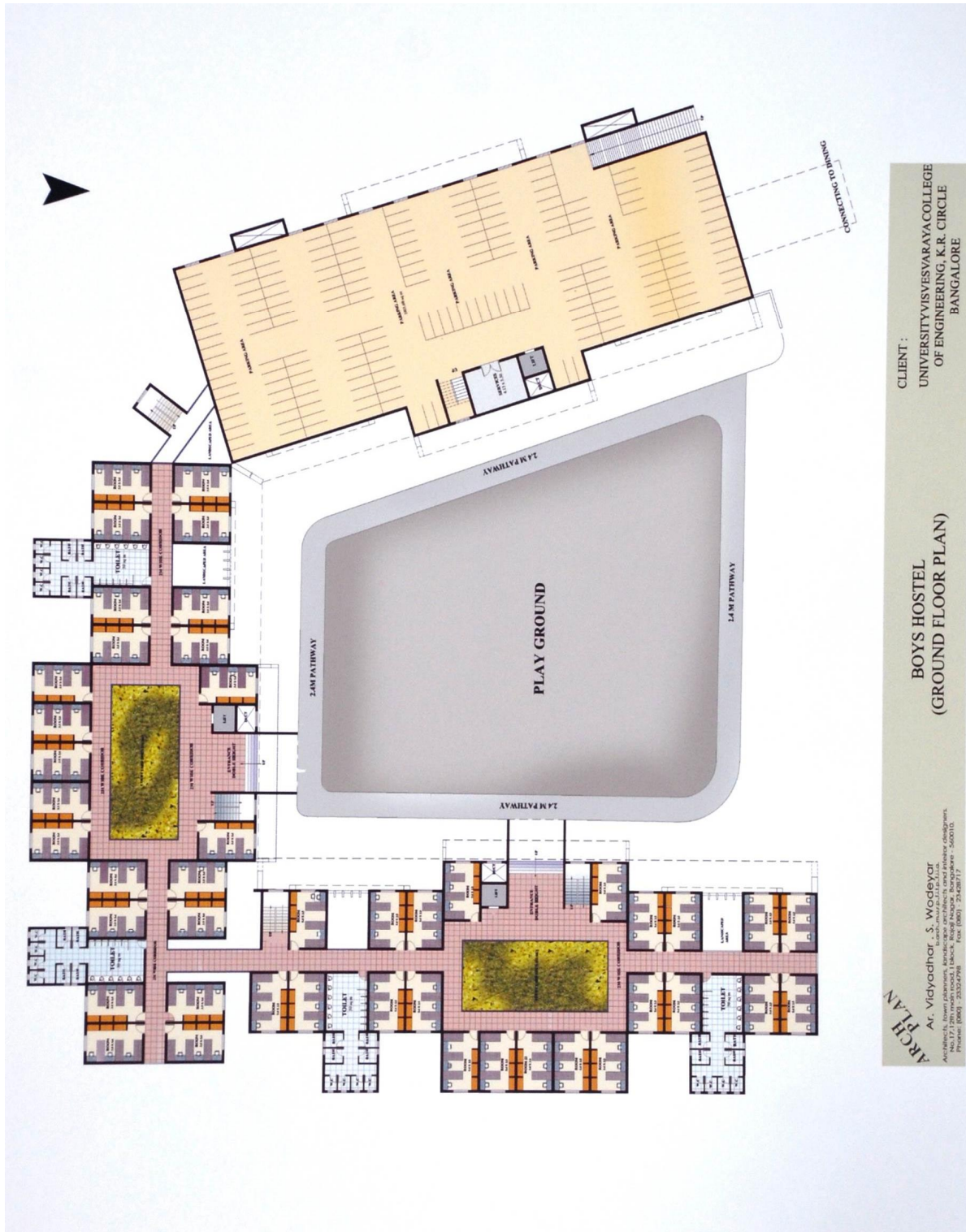
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HOSTEL BLOCK

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**BOYS HOSTEL
(GROUND FLOOR PLAN)**

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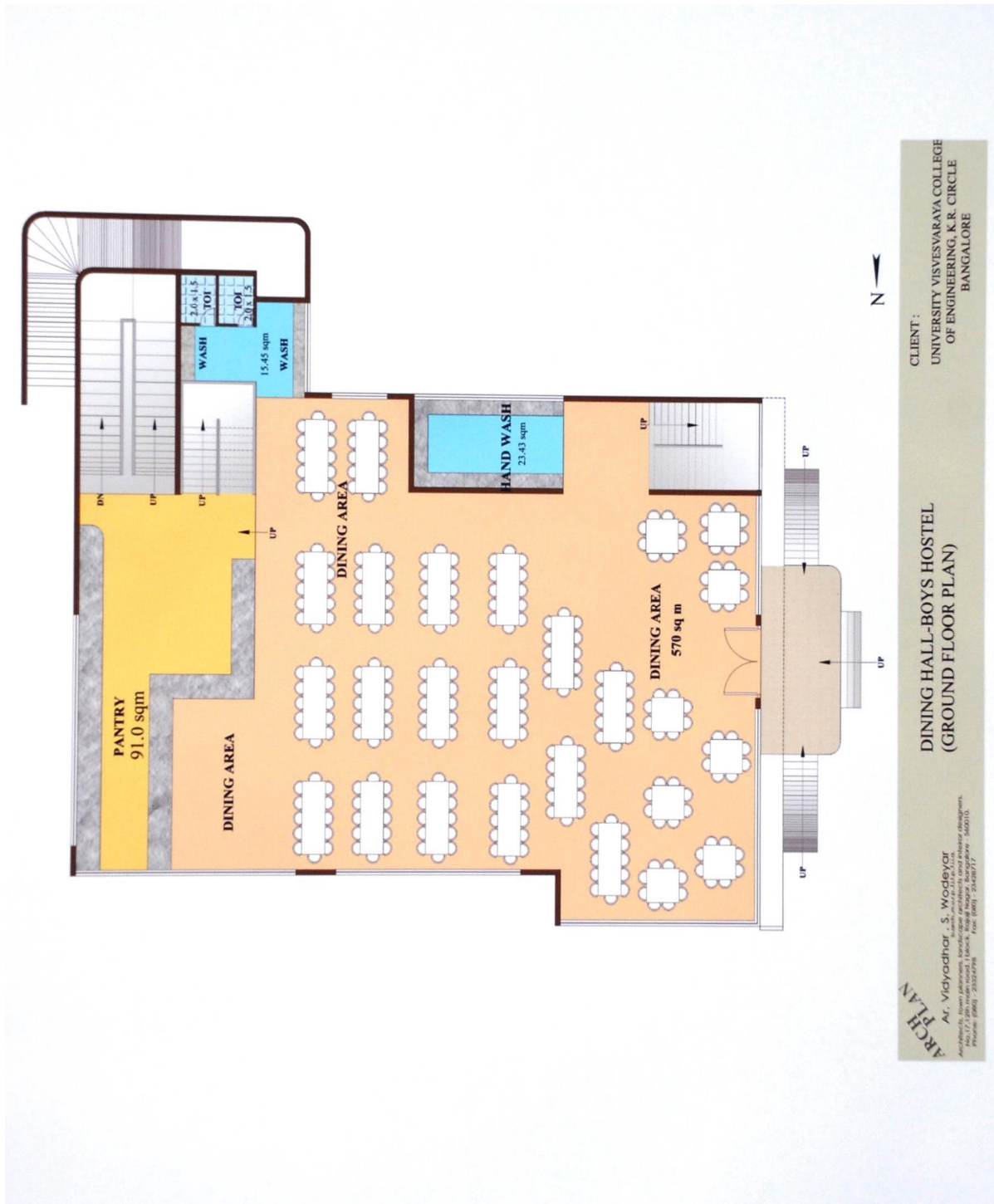


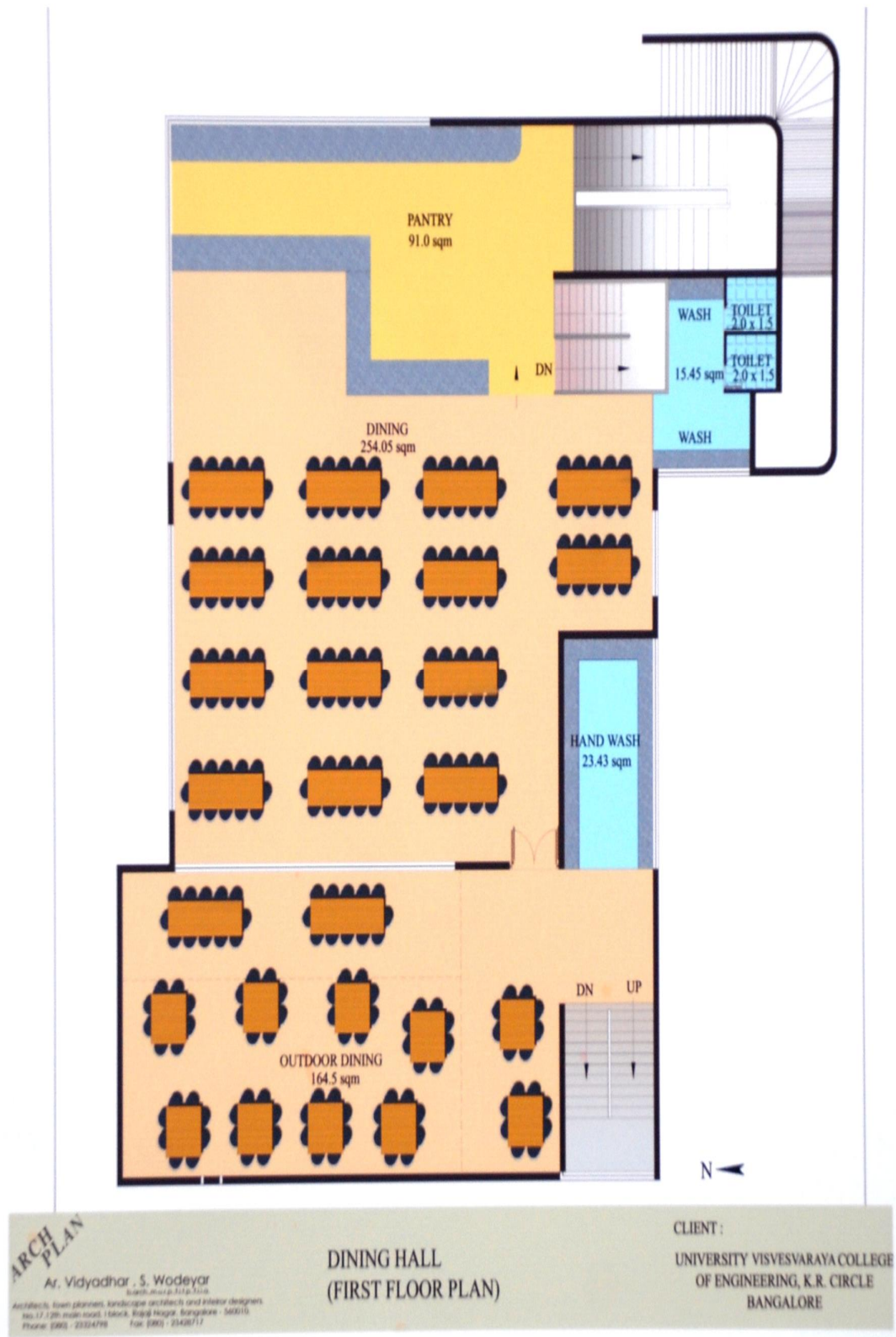
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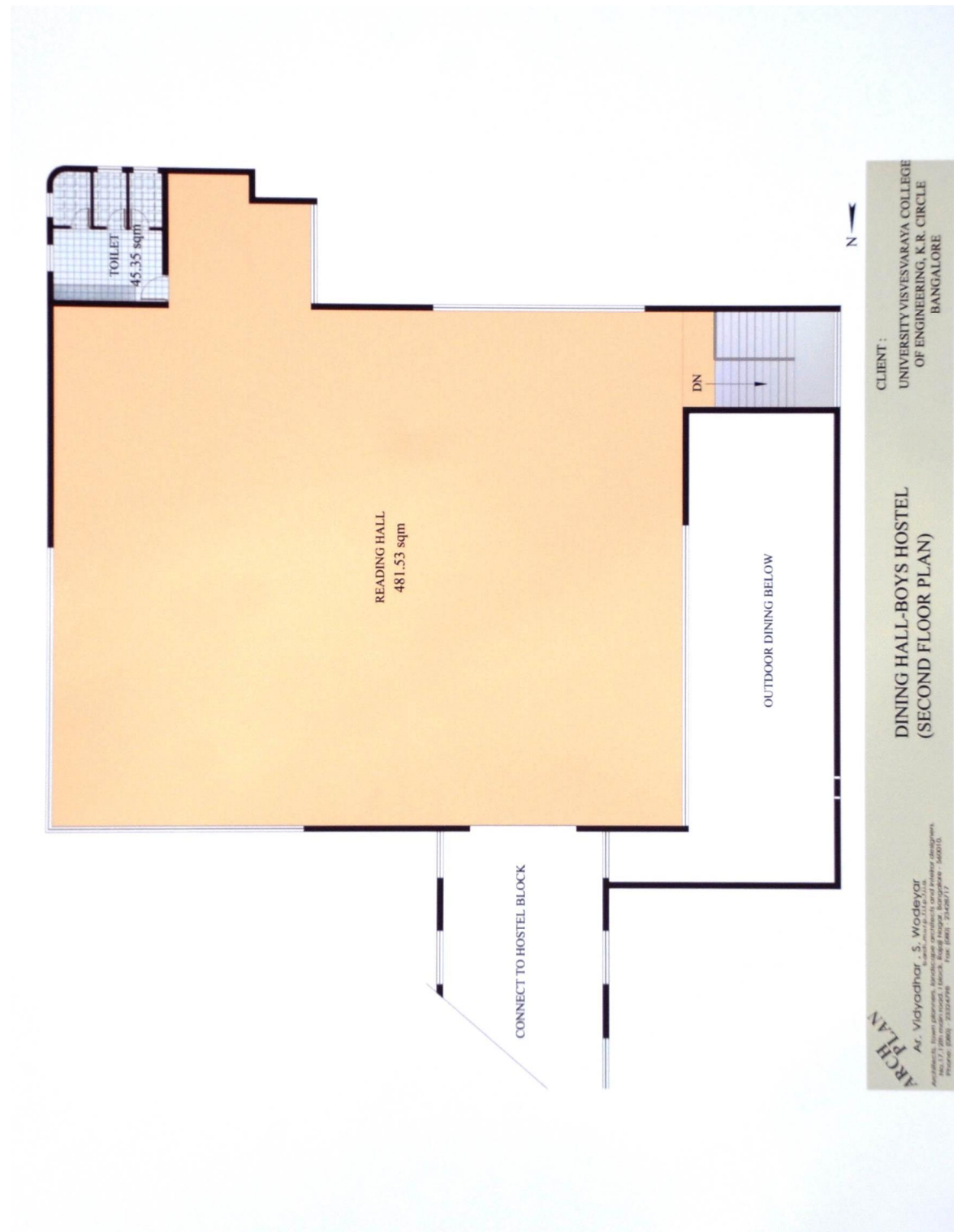
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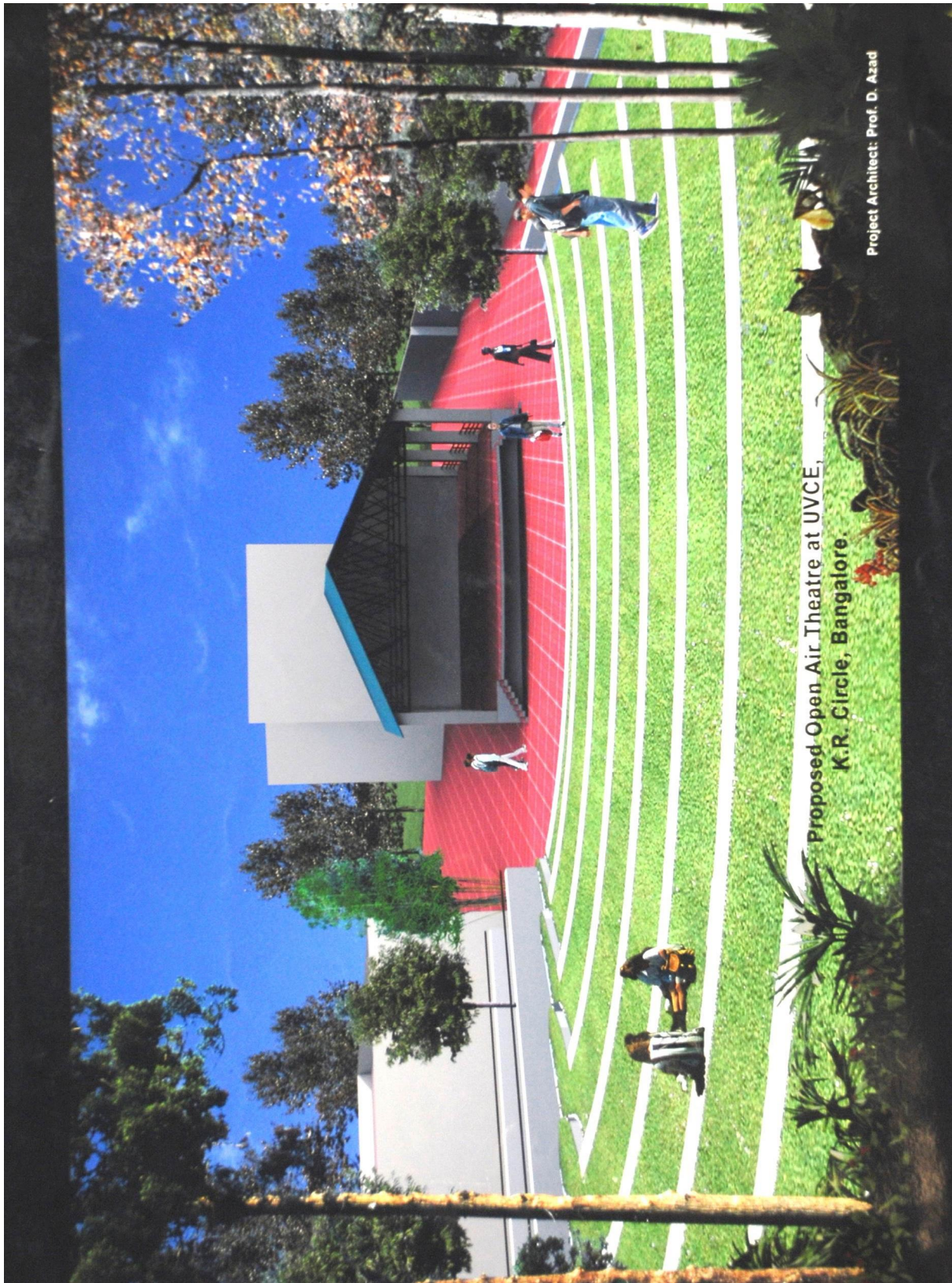
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**DINING HALL-BOYS HOSTEL
(BASEMENT FLOOR PLAN)**





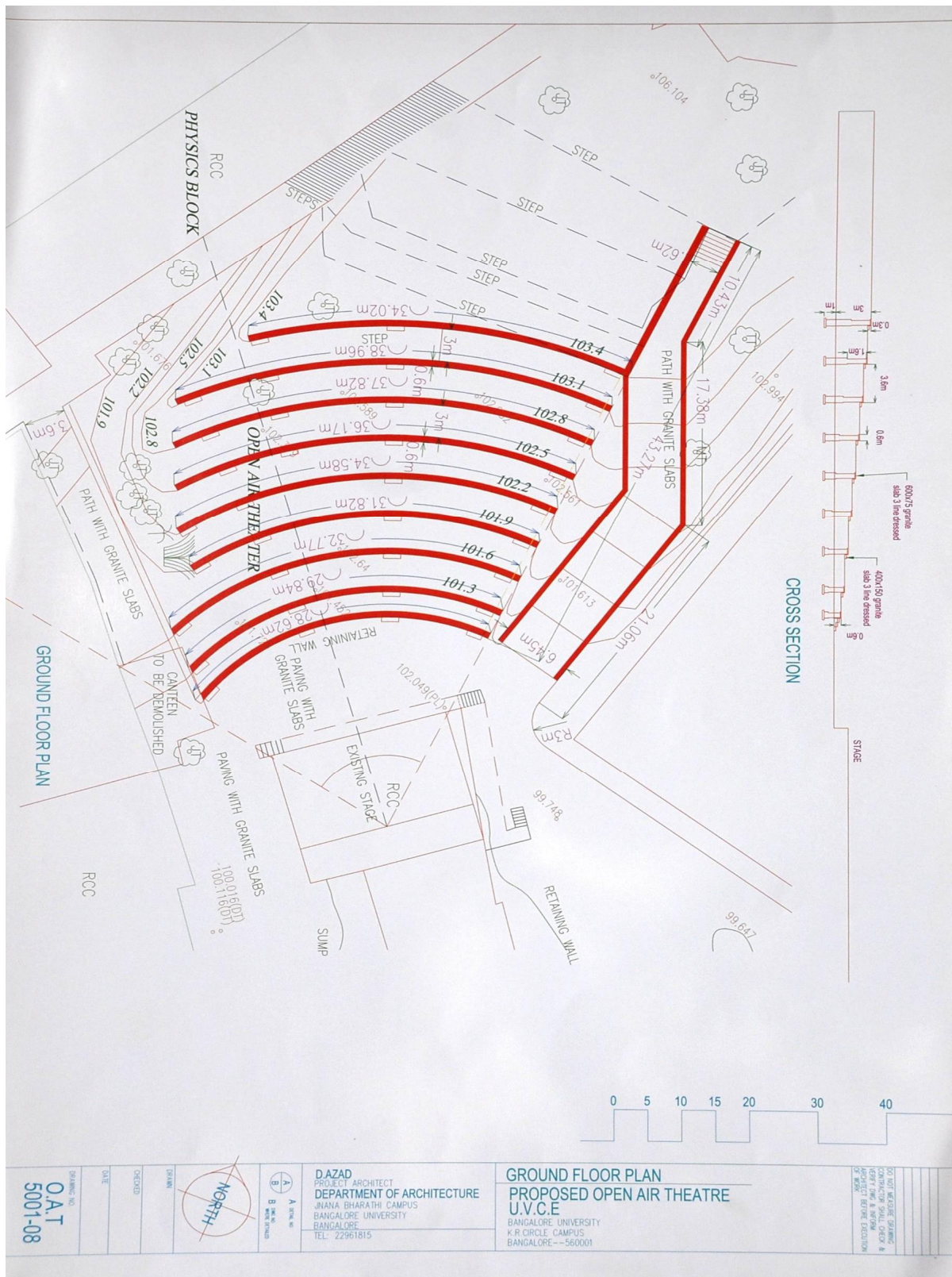












CHAPTER 12

Budget of Development Plan for Centenary Celebrations in UVCE

Overall Budget Estimation of UVCE for 2016-17, 2017- 18 and 2018-19

SI No	Activities	Amount (Rs. In Crores)			
		Project Life Allocation	Financial 1 Year 2016-17	Financial Year 2017-18	Financial Year 2018-19
1	Infrastructure				
	1.1 Modernization and Strengthening of laboratories (Annexure 1.1)	12.96	7.42	2.96	2.58
	1.2 Establishment of new Laboratories for Existing UG and PG programs and for New PG programs (Annexure 1.2)	27.16	13.85	8.42	4.89
	1.3 Modernization of classrooms (Annexure 1.3)	1.56	0.8	0.4	0.36
	1.4 Updating of learning Resources (Annexure 1.4)	3.66	1.7	1.1	0.86
	1.5 Procurement of furniture (Annexure 1.5)	2.28	1.23	0.55	0.5
	1.6 Establishment /up gradation of central and departmental computer centers (Annexure 1.6)	1.33	0.63	0.37	0.33
	1.7 Modernization/improvement of supporting departments (Annexure 1.7)	0.22	0.08	0.07	0.07
	1.8 Modernization and strengthening of libraries and increasing access to knowledge (Annexure 1.8)	1.28	0.46	0.42	0.4
	1.9 Refurbishment (Minor Civil Works) (Annexure 1.9)	1.93	0.86	0.55	0.52
2	Research and Development support				
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines (Annexure 2.1)	6.34	2.85	1.8	1.69
	2.2 Provision of resources for research support (Annexure 2.2)	2.70	1.36	0.7	0.64
	2.3 .1Enhancement of R&D and industrial consultancy activities (Annexure 2.3.1)	0.80	0.34	0.24	0.22
	2.3.2 Establishment of center of Excellence (Annexure 2.3.2)	16.01	7.48	5.68	2.85
3	Faculty Development support	60.00	-	30.00	30.00
	a) Faculty Appointment Faculty and staff development for improved competence based on TNA (Annexure 3.1)	4.89	2.08	1.51	1.3
4	Institutional reforms				
	4.1 Technical assistance for procurement and academic activities	0.48	0.16	0.16	0.16
	4.2 Institutional management capacity enhancement (Annexure 4.2)	0.69	0.24	0.22	0.23
5	Academic support				
	5.1 Creation of new Department/courses	140.00	50.00	50.00	40.00
	5.2 Enhanced interaction with industry (Annexure 5.2)	0.8	0.3	0.26	0.24
	5.3 Student support activities (Annexure5.3)	0.79	0.3	0.25	0.24
6	Others	6.35	2.65	1.95	1.75
	Total	292.2	94.79	107.6	89.81

Annexures are consolidation of all Annexures tabulated on Page Nos: Civil (200), Mechanical (211), Electrical (223), Architecture(235), Electronics(243), and Computer Science and Engg.(258)

Departmentwise Total Project Life Allocation (2016-17, 2017-18, 2018-19)

SI No	Activities	Amount (Rs. In Lakhs)						Total
		Civil	Mechanical	Electrical	Architecture	Electronics	Computer Science	
1	Infrastructure							
	1.1 Modernization and Strengthening of laboratories(Annexure 1.1)	571	242	183	46.6	60.6	193.3	1297
	1.2 Establishment of new Laboratories for Existing UG and PG programs and for New PG programs (Annexure 1.2)	253.9	1899	70	39.3	325	130	2717.2
	1.3 Modernization of classrooms(Annexure 1.3)	30	31.09	21	20.25	26	27.5	156
	1.4 Updating of learning Resources(Annexure 1.4)	115	40	26	25	52.5	105	364
	1.5 Procurement of furniture(Annexure 1.5)	60	25.9	27	28	34.85	52.55	228
	1.6 Establishment /up gradation of central and departmental computer centers(Annexure 1.6)	15	40.5	15	25	18.5	19	133
	1.7 Modernization/improvement of supporting departments (Annexure 1.7)	3	3	3	7	3	3	22
	1.8 Modernization and strengthening of libraries and increasing access to knowledge(Annexure 1.8)	36	13	10	12	21	36	128
	1.9 Refurbishment (Minor Civil Works)(Annexure 1.9)	30	30	15	28	30	60	193
2	Research and Development support							
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines(Annexure 2.1)	151	122.4	90	15	61.2	195	635
	2.2 Provision of resources for research support(Annexure 2.2)	30	40	30	10	40	120	270
	2.3 .1Enhancement of R&D and industrial consultancy activities(Annexure 2.3.1)	15	15	9	11	15	15	80
	2.3.2 Establishment of center of Excellence (Annexure 2.3.2)	500	500			600		1600
3	Faculty Development support							
	a) Faculty Appoitment	400	1400	800	1000	1400	1000	6000
	Faculty and staff development for improved competence based on TNA (Annexure 3.1)	150	121	60	42	35	81	489
4	Institutional reforms							
	4.1 Technical assistance for procurement and academic activities	6	6	18	6	6	6	48
	4.2 Institutional management capacity enhancement(Annexure 4.2)	15	9	9	3	15	15	66
5	Academic support							
	5.1 Creation of new department/courses							Building
	5.2 Enhanced interaction with industry(Annexure 5.2)	15	14	15	5.5	15	15	80
	5.3 Student support activities (Annexure5.3)	15	11	18	4.2	15	15	78
6	Others	300			20	100	215	635
	Total	2711	4563	1419	1348	2875	2304	29220

Annexures are consolidation of all Annexures tabulated on Page Nos: Civil (200), Mechanical (211), Electrical (223), Architecture(235), Electronics(243), and Computer Science and Engg.(258)

Total Budget for Financial Year 2016-17

Sl No	Activities	Amount (Rs. In Lakhs)						Total
		Civil	Mechanical	Electrical	Architecture	Electronics	Computer Science	
1	Infrastructure							
	1.1 Modernization and Strengthening of laboratories(Annexure 1.1)	371	121	100	26.6	30.6	93.25	742.45
	1.2 Establishment of new Laboratories for Existing UG and PG programs and for New PG programs (Annexure 1.2)	154	949.5	30	19.3	162	70.02	1384.82
	1.3 Modernization of classrooms(Annexure 1.3)	20	15.45	7	10.25	10	16.5	79.2
	1.4 Updating of learning Resources(Annexure 1.4)	60	20	10	15	17.5	50	172.5
	1.5 Procurement of furniture(Annexure 1.5)	40	12.45	9	15	14.85	31.5	122.8
	1.6 Establishment /up gradation of central and departmental computer centers(Annexure 1.6)	5	20.25	5	15	6.5	11.4	63.15
	1.7 Modernization/improvement of supporting departments (Annexure 1.7)	1	1.5	1	3	1	1	8.5
	1.8 Modernization and strengthening of libraries and increasing access to knowledge(Annexure 1.8)	12	6.5	4	4	7	12	45.5
	1.9 Refurbishment (Minor Civil Works)(Annexure 1.9)	10	15	5	10	10	36	86
2	Research and Development support							
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines(Annexure 2.1)	51	61.2	30	5	20.4	117	284.6
	2.2 Provision of resources for research support(Annexure 2.2)	10	20	10	4	20	72	136
	2.3 .1Enhancement of R&D and industrial consultancy activities(Annexure 2.3.1)	5	7.5	3	5	5	9	34.5
	2.3.2 Establishment of center of Excellence (Annexure 2.3.2)	235	250			262.5		747.5
3	Faculty Development support							
	a)Faculty Appointment	-	-	-	-	-	-	-
	Faculty and staff development for improved competence based on TNA (Annexure 3.1)	50	60.5	20	15	14	48.6	208.1
4	Institutional reforms							
	4.1 Technical assistance for procurement and academic activities	2	2	6	2	2	2	16
	4.2 Institutional management capacity enhancement(Annexure 4.2)	5	4.5	3	1	5	5	23.5
5	Academic support							
	5.1 Creation of new Department/courses						Buildings	5000
	5.2 Enhanced interaction with industry(Annexure 5.2)	5	7	5	2.5	5	5	29.5
	5.3 Student support activities (Annexure5.3)	5	5.5	6	2	5	5	28.5
6	Others	100			10	40	115	265
	Total	1141	1580	254	165	639	700	9479

Annexures are consolidation of all Annexures tabulated on Page Nos: Civil (200), Mechanical (211), Electrical (223), Architecture(235), Electronics(243), and Computer Science and Engg.(258)

Total Budget for Financial Year 2017-18

SI N o	Activities	Amount (Rs. In Lakhs)						Total
		Civil	Mech anical	Elec tric al	Archi tecture	Electro nics	Compu ter Science	
1	Infrastructure							
	1.1 Modernization and Strengthening of laboratories(Annexure 1.1)	100	72.6	43	10	20	50	296
	1.2 Establishment of new Laboratories for Existing UG and PG programs and for New PG programs (Annexure 1.2)	50	569.7	30	10	153	30	843
	1.3 Modernization of classrooms(Annexure 1.3)	5	9.327	7	5	8	5.5	40
	1.4 Updating of learning Resources(Annexure 1.4)	30	12	10	5	17.5	30	105
	1.5 Procurement of furniture(Annexure 1.5)	10	7.77	9	8	10	10.55	55
	1.6 Establishment /up gradation of central and departmental computer centers(Annexure 1.6)	5	12.15	5	5	6	3.8	37
	1.7 Modernization/improvement of supporting departments (Annexure 1.7)	1	0.9	1	2	1	1	7
	1.8 Modernization and strengthening of libraries and increasing access to knowledge (Annexure 1.8)	12	3.9	4	4	7	12	43
	1.9 Refurbishment (Minor Civil Works) (Annexure 1.9)	10	9	5	9	10	12	55
2	Research and Development support							
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines(Annexure 2.1)	50	36.72	30	5	20.4	39	181
	2.2 Provision of resources for research support(Annexure 2.2)	10	12	10	4	10	24	70
	2.3 .1Enhancement of R&D and industrial consultancy activities(Annexure 2.3.1)	5	4.5	3	3	5	3	24
	2.3.2 Establishment of center of Excellence (Annexure 2.3.2)	155	150			262.5		568
3	Faculty Development support	200	700	400	500	700	500	3000
	a)Faculty Apoitment							
	Faculty and staff development for improved competence based on TNA (Annexure 3.1)	50	36.3	20	15	14	16.2	151.5
4	Institutional reforms							
	4.1 Technical assistance for procurement and academic activities	2	2	6	2	2	2	16
	4.2 Institutional management capacity enhancement(Annexure 4.2)	5	2.7	3	1	5	5	22
5	Academic support							
	5.1 Creation of new Department/courses						Buildings	5000
	5.2 Enhanced interaction with industry(Annexure 5.2)	5	4.2	5	2	5	5	26.
	5.3 Student support activities (Annexure5.3)	5	3.3	6	1.2	5	5	25.5
6	Others	100			5	40	50	195
	Total	810	1650	597	596	1302	805	10760

Annexures are consolidation of all Annexures tabulated on Page Nos: Civil (200), Mechanical (211), Electrical (223), Architecture(235), Electronics(243), and Computer Science and Engg.(258)

Total Budget for Financial Year 2018-19

Sl No	Activities	Amount (Rs. In Lakhs)						Total
		Civil	Mechanical	Electrical	Architecture	Electronics	Computer Science	
1	Infrastructure							
	1.1 Modernization and Strengthening of laboratories(Annexure 1.1)	100	48.4	40	10	10	50	258.4
	1.2 Establishment of new Laboratories for Existing UG and PG programs and for New PG programs (Annexure 1.2)	50	379.8	10	10	10	30	489.8
	1.3 Modernization of classrooms (Annexure 1.3)	5	6.218	7	5	8	5.5	36.718
	1.4 Updating of learning Resources(Annexure 1.4)	25	8	6	5	17.5	25	86.5
	1.5 Procurement of furniture(Annexure 1.5)	10	5.18	9	5	10	10.5	49.68
	1.6 Establishment /up gradation of central and departmental computer centers(Annexure 1.6)	5	8.1	5	5	6	3.8	32.9
	1.7 Modernization/improvement of supporting departments (Annexure 1.7)	1	0.6	1	2	1	1	6.6
	1.8 Modernization and strengthening of libraries and increasing access to knowledge(Annexure 1.8)	12	2.9	2	4	7	12	39.9
	1.9 Refurbishment (Minor Civil Works)(Annexure 1.9)	10	6	5	9	10	12	52
2	Research and Development support							
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines(Annexure 2.1)	50	24.48	30	5	20.4	39	168.88
	2.2 Provision of resources for research support(Annexure 2.2)	10	8	10	2	10	24	64
	2.3 .1Enhancement of R&D and industrial consultancy activities(Annexure 2.3.1)	5	3	3	3	5	3	22
	2.3.2 Establishment of center of Excellence (Annexure 2.3.2)	110	100			75		285
3	Faculty Development support							
	a)Faculty ApPOINTment	200	700	400	500	700	500	3000
	Faculty and staff development for improved competence based on TNA (Annexure 3.1)	50	24.2	20	12	7	16.2	129.4
4	Institutional reforms							
	4.1 Technical assistance for procurement and academic activities	2	2	6	2	2	2	16
	4.2 Institutional management capacity enhancement(Annexure 4.2)	5	1.8	3	1	5	5	20.8
5	Academic support							
	5.1 Creation of new Department/ courses							Buildings 4000
	5.2 Enhanced interaction with industry(Annexure 5.2)	5	2.8	5	1	5	5	23.8
	5.3 Student support activities (Annexure5.3)	5	2.2	6	1	5	5	24.2
6	Others	100			5	20	50	175
	Total	760	1333	568	587	934	799	8981

Annexures are consolidation of all Annexures tabulated on Page Nos: Civil (200), Mechanical (211), Electrical (223), Architecture(235), Electronics(243), and Computer Science and Engg.(258)

Department-wise list of Equipments / Courses / Estimations

12.1 Department of Civil Engineering

12.1.1 Budget of Civil Engineering Department (UVCE)

Sl. No	Activities	Amount (Rs. in Lakhs)			
		Project Life Allocation	Financial Year		
			2016-17	2017-18	2018-19
1.	Infrastructure				
	1.1 Modernization and Strengthening of laboratories (Annexure CV ó 1.1, p-201)	571	371	100	100
	1.2 Establishment of new Laboratories for Existing UG and PG programs and for New PG programs (Annexure CV ó 1.2, p- 204)	254	154	050	050
	1.3 Modernization of classrooms (Annexure CV ó 1.3, p-205)	030	020	005	005
	1.4 Updating of learning Resources (Annexure CV ó 1.4, p-206)	115	060	030	025
	1.5 Procurement of furniture (Annexure CV ó 1.5, p-206)	060	040	010	010
	1.6 Establishment /up gradation of central and departmental computer centers (Annexure CV ó 1.6, p- 207)	015	005	005	005
	1.7 Modernization/improvement of supporting departments (Annexure CV ó 1.7, p- 207)	003	001	001	001
	1.8 Modernization and strengthening of libraries and increasing access to knowledge (Annexure CV ó 1.8, p- 207)	036	012	012	012
	1.9 Refurbishment (Minor Civil Works) (Annexure CV ó 1.9, p- 207)	030	010	010	010
2.	Research and Development support				
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines (Annexure CV ó 2.1, p- 208)	151	051	050	050
	2.2 Provision of resources for research support (Annexure CV ó 2.2, p- 208)	030	010	010	010
	2.3.1 Enhancement of R&D and industrial consultancy activities (Annexure CV ó 2.3, p- 208)	015	005	005	005
	2.3.2 Establishment of Center of Excellence in Disaster Mitigation and Management (Chapter-9)	500	235	155	110
3.	Faculty Development support	400	-	200	200
	a. Faculty Appointment				
	Faculty and staff development for improved competence based on TNA (Annexure CV ó 3.1, p- 209)	150	050	050	050
4.	Institutional reforms				
	4.1 Technical assistance for procurement and academic activities	006	002	002	002
	4.2 Institutional management capacity enhancement (Annexure CV ó 4.2, p- 209)	015	005	005	005
5.	Academic support				
	5.1 Creation of new Department/courses (Building)		Chapter 11 Building plan		
	5.2 Enhanced interaction with industry (Annexure CV ó 5.2, p-209)	015	005	005	005
	5.3 Student support activities (Annexure CV ó 5.3, p- 209)	015	005	005	005
6.	Others (Repair of existing Building)	300	100	100	100
	Total	2711	1141	810	760

ANNEXURE CV – 1.1

1.1 Modernization and Strengthening of Laboratories of Department of Civil Engineering:

a. Civil Engineering Lab

Sl. No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Resonant Column Equipment	1	48	48
2	Vibration Measurement & Analysis system	1	0.92	0.92
3	Vibration test rig for measurement and analysis	1	3.37	3.37
4	Active Vibration control systems	1	2.6	2.6
5	Bi-00-300 Shake Table test system	1	144.3	144.3
6	Horizontal Shake Table with eccentric Cam	1	3.35	3.35
7	Cyclic cum static Tri axial-Test system	1	28	28
8	Multichannel Analysis of Surface Wavesystem (MASW)	1	25	25
Total				255.54

b. Modernization and Strengthening of Laboratories

Sl. No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	High end Desktop Computers	150	0.6	90
2	Servers with Networking	3	3	9
3	Printers	30	0.10	3
4	LCD projectors	5	0.50	2.5
5	Air Conditioners	20	0.50	10
6	Diesel for Generators			6
7	Laptops	30	0.7	21
8	Scanners	10	0.15	1.5
Total				143

c. Water Resource Engineering

Sl.No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Meteorological Station Mobile type	1	7	7
2	Stream gauging setup(current meter)	1	8	8
3	Pipe Network Health detection setup	1	12	12
4	Lysimeter, Infiltration set up	1	5	5
5	Neutron Probe	1	8	8
6	Remote Sensing Data	1	20	20
7	Resistivity Meter with Aquifer mapping	1	12	12
8	Atomic Absorption spectrometer	1	6	6
9	Remote Sensing Softwareø(Multi Users)	1	15	15
10	Geographic Information System Software(multi-User)	1	20	20
11	Ground Truth Radiometer	1	6	6
Total				119

d. High Performance Materials Testing Laboratory

Sl.No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Compressive Testing Macine-5000kN	1	5	5
2	Universal Testing machine3000 kN (Strain Controlled)	1	23	23
Total				28

e. **Structural Health Monitoring Laboratory**

Sl.No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	NDT Equipment with Accessories	1	5.50	5.50
2	Equipmentø for Durability Studies	1	14	14
Total				19.5

f. **Structural Evaluation for Retrofitting and Rehabilitations**

Sl.No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Rebound Hammer (PROCEQ, Switzerland)	1	1	1
2	Cover meter testing Apparatus	1	5	5
3	Half-Cell Potential measurement testing apparatus	1	1	1
4	Extraction of Concrete cores samples testing apparatus	1	0.5	0.5
Total				7.5

GRAND TOTAL (LABS a+b+c+d+e+f) = 570.75 Lakhs

ANNEXURE CV – 1.2

1.2 Establishment of new Laboratories for New PG programs

a. Earthquake Engineering laboratory

Sl.No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	3D-Electrical Resistivity Meter for finding Ground Water Potential Zones	1	22	22
2	Newton probes for moisture content computation	10	1	10
3	Depth water sampler	3	2	6
4	Water quality analysis kit	1	18	18
5	Visualization MOD flow	1	20	20
6	Erdas Imagine	1	20	20
7	Erdar surveying equipmentø	1	50	50
Total				146

b. List of Equipments

SI No	Title of the Equipments	Quantity	Approx Cost (Lakhs)
1	HPLCSYKAM Detector	1	14.0
2	Weighing Balance	1	2.0
3	Portable Microbiology Lab	1	2.7
4	Digestion Aparatus	1	1.0
5	Cannon Manning Viscometer	1	2.0
6	Brook Field Viscometer	1	6.0
7	Automated consolidation test apparatus	1	2.9
8	Hydro dynamic sieve test apparatus for Geotextile testing	1	2.0
9	Cross permeability test apparatus	1	1.0
10	Universal testing system for Geotextiles	1	3.0
11	Double stage direct drive rotary high vacuum pump, oil, water system, split mould 38x76mm	1	0.9
12	Flow meter kit with well sounder (vertical electrical sounding system)	1	3.7
13	Resistivity meter-CRM50	1	4.3
14	Hydraulic Jack	1	3.2
15	Pre stressed Jacks	1	4.5
16	Compression Testing machine	1	7.0
17	Concrete Mixer	1	1.2

18	Load cells	1	1.2
19	Electronic Theodolite	1	2.0
20	Automatic Weather Station Model	1	3.5
21	Infrared Thermometer, Sound level Meter, High Density LUX Meter, Moisture Meter	1	2.0
22	Benchtop Water/waste analysis UV-VIS Spectrometer	1	4.7
23	Portable Water/waste water analysis Spectrometer	1	2.8
24	COD Digester/Reactor	1	0.8
25	Portable Turbidity meter	1	0.8
26	Benchtop Ion meter	1	1.2
27	ISE probes, Ammonium Ion Selective Electrode, 1m cable	1	2.3
28	Portable dissolved Oxygen meter	1	1.0
29	Basic Benchtop pH meter	1	0.5
30	Benchtop conductivity meter	1	0.5
31	Rapid Digestion Apparatus	1	1.0
32	Multiparameter water quality sonde	1	8.2
33	Strain controlled universal testing machine, 200Tonn-Capacity	1	
34	LVDT & Load cells of different capacity	1	
35	Profometer	1	3.0
36	Pandit Ultrasonic Pulse Velocity Equipment (UPV)	1	
37	Digital rebound hammer	1	11.0
Total			107.9

GRAND TOTAL (a+b) = 146+107.9=253.9 Lakhs

ANNEXURE CV – 1.3

1.3 Modernization of Class Rooms

Sl.No	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Interactive Boards	10	1.5	15
2	Handheld Devices Tablets	50	0.01	5
3	LCD Projects	10	0.05	5
4	Glass Boards	10	0.20	2
5	Podium	10	0.05	0.5
6	Curtains	10	0.25	2.5
Total				30

ANNEXURE CV – 1.4

1.4 Updating of learning Resources

Sl.No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Arc GIS(Geographic information system)	1	25	25
2	EPANET software	1	20	20
3	SWAT software	1	20	20
4	HEC-HMS software	1	20	20
5	GPS total stations	3	10	30
Total				115

ANNEXURE CV – 1.5

1.5 Procurement of Furniture

Sl.No	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Almirahs Glazed Display Units For Material Museum	50	0.10	5.0
2	Filing Cabinets	50	0.03	1.5
3	Exhibition Display Boards	25	0.03	0.75
4	Storage Student Lockers	1000	0.02	20
5	Computer Chairs	150	0.03	4.5
6	Computer Tables	150	0.05	7.5
7	Table for Staff	30	0.05	1.5
8	Chairs for Staff	30	0.05	1.5
9	Desks ó students	100	0.10	10.0
10	Notice Board	10	0.06	0.6
11	Shoe rack	10	0.25	2.5
12	Fan	50	0.015	0.75
13	Drawing Board with Stand	120	0.03	3.6
Total				59.70

ANNEXURE CV – 1.6

1.6 Establishment / Upgradation of Central and Departmental Computer Centers

Sl.No	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Heavy Duty Photocopier	5	1	5
2	A0 Color Plotter	5	2	10
			Total	15

ANNEXURE CV – 1.7

1.7 Modernization/improvement of supporting departments

Equipmentø for Library, Placement, Physics, Chemistry and Administration ó **3 lakhs**

ANNEXURE CV – 1.8

1.8 Modernization and Strengthening of libraries and increasing access to knowledge resources

Sl.No	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Books For Library.	3000	0.005	15
2	E- Journals subscription.	20	0.3	6
3	E-Books	3000	0.005	15
	Total			36

ANNEXURE CV – 1.9

1.9 Refurbishment (Minor Civil Works)

Minor Civil Works such as partition, repair works, wiring etc...- **30 Lakhs**

ANNEXURE CV – 2.1

2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines

SI No.	Assistantship for	Number of Students	Scholarship per Month in lakhs	No. of Years	Total Amount in Lakhs
1	PG	60	0.04	3	86.4
2	Ph.D	10	0.18	3	64.8
				Total	151.2

ANNEXURE CV – 2.2

2.2 Provision of resources for research support

Every year 5 Best Projects proposed by PG/Ph.D Students are assisted with an amount of Rs 2 Lakhs.

$$15 \text{ Projects} * 2 \text{ Lakhs} = \mathbf{30 \text{ Lakhs}}$$

ANNEXURE CV – 2.3

2.3 Enhancement of R&D and industrial consultancy activities

Expenditure for

- a. industrial Visits
- b. Consultancy
- c. Survey Camps

$$5 \text{ Lakhs per year} * 3 \text{ years} = \mathbf{15 \text{ Lakhs}}$$

ANNEXURE CV – 3.1

3.1 Faculty and staff development for improved competence based on TNA

Faculty members are allowed

- a. to travel abroad
- b. to Present their Research Papers
- c. To attend Technical Training / Workshop in India
- d. Conduct a Workshop.

Approximately 30 Faculty members * 5 Lakhs = **150 Lakhs**

ANNEXURE CV – 4.2

4.2 Institutional management capacity enhancement

Senior Professors and Chairman are allowed to take management training

Approximately 15 Faculty members * 1 Lakh = **15 Lakhs**

ANNEXURE CV – 5.2

5.2 Enhanced interaction with industry

Expenditure for

- a. Guest Assistant Professors from Industry
- b. MOU with Industries

Approximately **15 Lakhs**

ANNEXURE CV – 5.3

5.3 Student support activities

Expenditure for

- a. conducting remedial classes
- b. placement related trainings
- c. Communicational English

Analytical and Aptitude training ó **15 Lakhs**

12.2 Department of Mechanical Engineering

12.2.1 Budget Mechanical Department (UVCE)

Sl No	Activities	Amount (Rs. In Lakhs)			
		Project Life Allocation	Financial Year		
			2016-17	2017-18	2018-19
1.	Infrastructure				
	1.1 Modernization and Strengthening of laboratories (Annexure Mech 1.1, p- 212)	242	121	72.6	48.4
	1.2 Establishment of new Laboratories for Existing UG and PG programs and for New PG programs (Annexure Mech 1.2, p- 214)	1899	949.5	569.7	379.8
	1.3 Modernization of classrooms (Annexure Mech 1.3, p- 217)	31	15.45	9.327	6.218
	1.4 Updating of learning Resources (Annexure Mech 1.4, p- 217)	40	20	12	8
	1.5 Procurement of furniture (Annexure Mech 1.5, p- 218)	26	12.45	7.77	5.18
	1.6 Establishment /up gradation of central and departmental computer centers (Annexure Mech 1.6, p- 218)	41	20.25	12.15	8.1
	1.7 Modernization/improvement of supporting departments (Annexure Mech 1.7, p- 218)	3	1.5	0.9	0.6
	1.8 Modernization and strengthening of libraries and increasing access to knowledge (Annexure Mech 1.8, p- 219)	13	6.5	3.9	2.9
	1.9 Refurbishment (Minor Civil Works) (Annexure Mech 1.9, p- 219)	30	15	9	6
2.	Research and Development support				
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines (Annexure Mech 2.1, p- 219)	122	61.2	36.72	24.48
	2.2 Provision of resources for research support (Annexure Mech 2.2, p- 219)	40	20	12	8
	2.3.1 Enhancement of R&D and industrial consultancy activities (Annexure Mech 2.3.1, p- 220)	15	7.5	4.5	3
	2.3.2 Establishment of center of Excellence (Annexure Mech 2.3.2, p- 220, Chapter -10)	500	250	150	100
3.	Faculty Development support				
	a. Faculty Appointment	1400	-	700	700
	Faculty and staff development for improved competence based on TNA (Annexure Mech 3.1, p- 220)	121	60.5	36.3	24.2
4.	Institutional reforms				
	4.1 Technical assistance for procurement and academic activities	6	2	2	2
	4.2 Institutional management capacity enhancement (Annexure Mech 4.2, p- 220)	9	4.5	2.7	1.8
5.	Academic support				
	5.1 Creation of new Department/courses	Chapter 11 Building			
	5.2 Enhanced interaction with industry (Annexure Mech 5.2, p- 220)	14	7	4.2	2.8
	5.3 Student support activities (Annexure Mech 5.3, p- 221)	11	5.5	3.3	2.2
	Total	4563	1580	1650	1333

ANNEXURE MECH – 1.1**Mechanical Engineering Lab**

Sl. No.	Equipments	Quantity	Cost/Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Differential Scanning Calorimeter	1	5	5
2.	MPFI engine test rig for petrol/diesel engine	1	10	10
3.	Thermo-mechanical analyzer	1	5	5
4.	Computerized Diesel Engine test rig(10HP, 1500RPM)	1	15	15
5.	Exhaust Gas Analyzer	1	10	10
6.	Fluid Property Analyzer, Mixing Units, Electronic weighing Balance and accessories	1	5	5
7.	Data acquisition system for wind tunnel with accessories	1	10	10
8.	Wind-tunnel accessories	1	7	7
TOTAL				67

a) Metrology Lab

Sl. No.	Equipments	Quantity	Cost/Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Surface finish tester	1	15	15
2.	Tool makers microscope (for measurement of geometry of tool wear with camera attachment)	1	5	5
TOTAL				20

b) Material Testing Lab

Sl. No.	Equipments	Quantity	Cost/Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Universal Testing Machine(Capacity: 5kN with facilities for high temperature testing)	1	15	15
TOTAL				15

c) CAD / CAM and Robotics Lab

Sl. No.	Equipments	Quantity	Cost/Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Hydraulic & electro-hydraulic system	1	5	5
2.	CNC Turning Centre	1	15	15
TOTAL				20

d) Design Lab

Sl. No.	Equipments	Quantity	Cost/Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Fully automatic micro hardness tester (computer integrated, both Vickers and Knoop hardness testing)	1	8	8
2.	High temperature Vacuum pin on disc machine	1	8	8
3.	Setting up of experimental analysis and Dynamics laboratory with facilities such as : P8048 data acquisition system, data software for 1FFT analysis, Modal analysis, stress analysis, etc., sensors: uniaxial accelerometers, tri-axial accelerometers, seismic accelerometers, capacitance probe, strain gauges, impact hammer and eddy current probes, laptop pc controller.	1	14	14
4.	Computerized Photo elastic bench	1	15	15
5.	Residual stress analyzer	1	15	15
TOTAL				60

e) Machine Shop

Sl. No.	Equipments	Quantity	Cost/Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Computational cutting tool dynamometer for turning, milling & drilling	1	20	20
TOTAL				20

f) Welding Lab

Sl. No.	Equipments	Quantity	Cost/Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Pulsed TIG welding ó computer interface, Automatic	1	15	15
2.	Computer interfacing of existing sub-merged arc welding	1	5	5
3.	Manual Metal arc welding invertor power source	1	5	5
4.	Cladding head for existing submerged arc welding machine	1	15	15
TOTAL				40

GRAND TOTAL (LABS a+b+c+d+e+f+g) = 242 Lakhs

ANNEXURE MECH – 1.2**a. M.E (Aero Science and Space Technology)**

Sl. No.	Equipments Required	Quantity	Cost/Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Boundary layer measurement equipment	1	10	10
2.	Flow visualization over a cambered Aero foil & other types	1	10	10
3.	Pressure distribution over a Aero foil blade	1	10	10
4.	Wake survey over a cylinder ,curved ,tester	1	5	5
5.	Oil flow and Smoke tester	1	5	5
6.	Drag measurement on a cylinder using strain gauge balancing equipment	1	10	10
7.	Wind tunnel equipment & balancing tester	2	50	100
8.	Shear force in a beam-equipment	1	10	10
9.	Strain gauge trainer equipment	1	10	10
10.	Creep & Rupture testing machine	1	35	35
11.	Digital pendulum system machine	1	10	10
12.	D.C Motor control equipment & twin rotor MIMO system	1	10	10
13.	Magnetic hesitation system	1	10	10
14.	Level calibration & flow calibration machine	1	10	10
15.	Pressure process rig	1	5	5
16.	Temperature control testing rig	1	5	5
17.	Nozzle pressure distribution system	1	10	10
18.	Machine vision inspection system	1	18	18
19.	Experimental setup for thin-walled pressure vessel	1	10	10
20.	Gas turbine model-tester	1	5	5
21.	Axial flow fan tester	1	10	10

22.	Ramjet engine tester	1	15	15
23.	Turbojet engine tester	1	10	10
24.	R C aircraft engine tester-model	1	5	5
25.	P C based temperature calibrator	1	8	8
26.	Actuator control for launch vehicle control	1	12	12
27.	Control & modelling simulation for inverted pendulum	1	10	10
28.	50 kN Vertical Bi axial Test System	1	120	120
29.	100 kN Uno Test System	1	75	75
Total				563

b. M.E (Nano Technology)

Sl. No.	Equipments Required	Quantity	Cost/Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Equipment for sol-gel Synthesis	1	10	10
2.	Equipment for polymer substrate and metallic Nano particles	1	16	16
3.	Dye sensitized solar cell equipment	1	10	10
4.	Synthesis and characterization of soft Nano structures Equipment	1	20	20
5.	Nano Composite testing equipment	1	20	20
6.	Surface enhanced Raman Scattering testing equipment	1	15	15
7.	X-ray diffraction tester	1	80	80
8.	Atomic Frequency Machine(AFM)	1	45	45
9.	Travelling Electron Microscope (TEM)	1	150	150
11.	Nano Test System	1	44	44
Total				410

c. M.E (Mechatronics)

Sl. No	Equipments Required	Quantity	Cost/Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Mechatronics for mechanical handling systems using PLC for distribution, tasking, handling, sorting and processing	1	80	80
2.	Mechatronics in mobile robots using sensors and feedback systems	1	20	20
3.	Process automation trainer kits	1	60	60
4.	Electro pneumatic, Electro Hydraulic, proportional hydraulic and closed loop hydraulic	1	90	90

	trainer kits			
5.	Control of DC machines, servo and stepper drive system, PLCø, servo break drive system	1	44	44
6.	Related systems like CIROS(virtual Mechatronics system software), Robot simulation software, virtual CNC machine software, Fluid-Sim, fluid lab , etc.,	1	50	50
Total				344

d. List of Equipments

SI No	Title of the Equipments and Software	Quantity	Approx Cost (Lakhs)
1	Computer workstations for CAD/CAM applications	20	20
2	Desktop Computers	100	75
3	CNC machining centre	01	60
4	Coordinate measurement machine	01	15
5	Form tester	01	15
6	Manufacturing simulation softwares	01	15
7	Fms for existing CNC machines	01 set	40
8	Fatigue test equipment	01	25
9	Corrosion test equipment	01	30
10	Bio compatibility test equipment	01	50
11	Biaxial stress measuring system	01	60
12	Computerized utm for composite material with environment chambers	01	40
13	Vacuum bag moulding facility for fabrication of composites	01	05
14	Filament winding machine for preparing polymer composites	01	10
15	Stir casting equipment for fabrication of mmc	01	05
16	Engine lathe	10	10
17	High temperature vacuum testing	01	40
18	Shapping machine (regular)	05	05
19	Drilling machine(regular)	01	04
20	Grinding machine	02	04
21	Computer assisted 10 hp a) Petrol engine b) Diesel engine	01 01	10 12
22	Exhaust emission measuring kit a) For diesel engine b) For petrol engine	01 01	05 05
23	Heat exchanger a) Surface heat exchanger b) Tubular heat exchanger c)To study nano fluids effect	01 01	02 02
24	Computer assisted crdi engine with accessories	01	13
25	Equipment to measure fuel properties	01	05
Total			582

GRAND TOTAL (a+b+c+d) =1899 Lakhs

ANNEXURE MECH 1.3**Modernization of classrooms**

Sl. No	Particulars	Quantity	Cost / Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Boards	10	0.2	2
2.	LCD Overhead Projectors	12	0.5	6
3.	Curtains	30	0.2	6
4.	Classroom Projector screens	12	0.1	1.2
5.	Interactive boards	10	1.5	15
6.	Fans	50	0.015	0.75
7.	Others (Lights)	28	0.005	0.14
Total				31.09

ANNEXURE MECH 1.4**Updating of learning resources**

Sl. No	Software	Quantity	Cost / Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	ANSYS ó CFD ó Research version	5	2	10
2.	ADAMS	6	1	6
3.	HYPERMESH	5	2	10
4.	MATLAB	35	0.4	14
Total				40

ANNEXURE MECH – 1.5**Procurement of furniture**

Sl. No	Particulars	Quantity	Cost / Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Benches	25	0.1	2.5
2.	Normal Chairs	55	0.03	1.65
3.	Normal Tables	40	0.05	2
4.	Computer Table	20	0.05	1
5.	Computer Chairs	40	0.05	2
6.	Almirah	30	0.1	3
7.	File Rack	40	0.03	1.2
8.	Student Locker	100	0.02	2
9.	Shoe Rack	15	0.25	3.75
10.	Notice Board	5	0.06	0.3
11.	Drawing Board	50	0.03	1.5
12.	Air Conditioner	10	0.5	5
Total				25.9

ANNEXURE MECH – 1.6**Establishment /up gradation of central and departmental computer centers**

Sl. No	Particulars	Quantity	Cost / Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Computers	50	0.6	30
2.	Networking	1	0.5	0.5
3.	Servers	1	2.5	2.5
4.	Printers	25	0.1	2.5
5.	Heavy Duty Photo Copiers	1	5	5
Total				40.5

ANNEXURE MECH – 1.7**Modernization/improvement of supporting departments**

Equipments for:

Placement, Chemistry, Physics, Mathematics and Administration

3 Lakhs

ANNEXURE MECH – 1.8**Modernization and strengthening of libraries and increasing access to knowledge**

Sl. No	Particulars	Estimated Amount (in Lakhs)
1.	E books	5
2.	Journal Subscriptions	8
Total		13

ANNEXURE MECH – 1.9**1.9 Refurbishment (Minor Civil Works)**

Minor civil works such as partition, repair works, wiring etcí . **30 Lakhs**

ANNEXURE MECH – 2.1**Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in engineering disciplines**

Sl No.	Particulars	Quantity	Cost/Unit (in Lakhs) X	Estimated Amount (in Lakhs) X *(12x3)
1.	Research Assistantship óME students	40	0.04	57.6
2.	Teaching assistantship óPh.Dstudents	10	0.18	64.8
Total				122.4

ANNEXURE MECH – 2.2**Provision of resources for research support**

Sl. No	Particulars	Quantity	Cost / Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Hiring of R&D and Industrial consultancy for projects taken up by the department for M.E & Ph.D	20	2	40
Total				40

ANNEXURE MECH – 2.3.1**Enhancement of R&D and industrial consultancy activities**

Industrial visit & consultancy of students (5 Lakhs per year) **15 Lakhs**

ANNEXURE MECH – 2.3.2

Centre of Excellence in Emerging Materials (Chapter 10) **500 Lakhs**

ANNEXURE MECH – 3.1**Faculty Development support**

Faculty and staff development for improved competence based on TNA

Faculty members are allowed to

- a. Travel abroad
- b. Present their research paper
- c. Attend technical training /workshops in India
- d. Conduct work shops

Approximately 23 Faculty* 5 Lakhs = **115 Lakhs**

Non Teaching staff development program 2 Lakhs per year * 3 years = **6 Lakhs**

Total =121 Lakhs

ANNEXURE MECH – 4.2

Conducting & Organizing Management Training Programmes **9 Lakhs**

ANNEXURE MECH – 5.2**Enhanced Interaction with industry**

Sl. No	Particulars	Quantity	Cost / Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Industry Webinars	20	0.2	4
2.	Faculty and staff Exchange	40	0.25	10
Total				14

ANNEXURE MECH – 5.3**Student Support Activities**

Sl. No	Particulars	Quantity	Cost / Unit (in Lakhs)	Estimated Amount (in Lakhs)
1.	Placement Training ó Students	600	0.012	7.2
2.	Sports and extracurricular activities ó students	-	-	3.8
Total				11

12.3 Department of Electrical Engineering

12.3.1 Budget of Electrical Department (UVCE)

Sl No.	Activities	Amount (in Lakhs Rs.)			
		Project Life Allocation	Financial Year		
			2016-17	2017-18	2018-19
1.	Infrastructure				
	1.1 Modernization and Strengthening of laboratories (Annexure EE ó 1.1, p- 224)	183	100	43	40
	1.2 Establishment of new Laboratories for Existing UG and PG programs and for New PG programs Annexure EE ó 1.2, p- 227)	70	30	30	10
	1.3 Modernization of classrooms (Annexure EE ó 1.3, p- 229)	21	7	7	7
	1.4 Updating of learning Resources (Annexure EE ó 1.4, p- 229)	26	10	10	6
	1.5 Procurement of furniture (Annexure EE ó 1.5, p- 229)	27	9	9	9
	1.6 Establishment /up gradation of central and departmental computer centers (Annexure EE ó 1.6, p- 230)	15	5	5	5
	1.7 Modernization/improvement of supporting departments (Annexure EE ó 1.7, p- 230)	3	1	1	1
	1.8 Modernization and strengthening of libraries and increasing access to knowledge resources (Annexure EE ó 1.8, p- 230)	10	4	4	2
	1.9 Refurbishment (Minor Civil Works)(Annexure EE ó 1.9, p- 231)	15	5	5	5
2.	Research and Development support				
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines (Annexure EE ó 2.1, p- 231)	90	30	30	30
	2.2 Provision of resources for research support(Annexure EE ó 2.2, p- 231)	30	10	10	10
	2.3 Enhancement of R&D and industrial consultancy activities (Annexure EE ó 2.3, p- 231)	9	3	3	3
3.	Faculty Development support	800	-	400	400
	a. Faculty Appointment				
	3.1 Faculty and staff development for improved competence based on TNA (Annexure EE ó 3.1, p- 232)	60	20	20	20
4.	Institutional reforms				
	4.1 Technical assistance for procurement and academic activities (Annexure EE ó 4.1, p- 232)	18	6	6	6
	4.2 Institutional management capacity enhancement (Annexure EE ó 4.2, p- 232)	9	3	3	3
5.	Academic support				
	5.1 Creation of new Department/courses (Building)	Chapter 11			
	5.2 Enhanced interaction with industry (Annexure EE ó 5.2, p- 232)	15	5	5	5
	5.3 Student support activities (Annexure EE ó 5.3, p- 233)	18	6	6	6
6.	Others (Rebuilding of existing structure)				
	Total	1419	254	597	568

ANNEXURE EE– 1.1

1.1 Modernization and Strengthening of Laboratories

Sl. No	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	High end Desktop Computers	70	60000	48
2	Servers with Networking	2	3,00,000	06
3	Printers	10	10,000	01
5	Interactive Boards	5	150000	7.5
6	LCD projectors	10	50,000	5
7	Air Conditioners	25	50,000	12.5
8	New Equipmentø	See Annexure EE - 1.1.A+ 1.1.B +1.1.C		103
Total				183

Annexure EE – 1.1.A

1.1.A Process Control and Instrumentation Lab

Sl. No.	Equipments Required	Estimated Amount (in Rs.)
1.	NI SPEEDY 33 Board only Bundle (Academic Use only)	3,90,960
2.	cRIO-9104 8-slot, 3 M Gate Reconfigurable Chassis for Compact RIO	3,23,510
3.	cRIO-9014 Real-Time PowerPC Controller for cRIO, 2 GB Storage	3,23,510
4.	PS-5 Power Supply, 24 VDC, 5 A, Universal Power Input	21,545
5.	NI 9219 - Universal Module for Strain/Temperature/Pressure/Voltage or Current	82,770
6.	NI 9264 16-Channel ±10 V, 25 kS/s, 16-Bit, Analog Output Module	74,555
7.	NI 9401 8-Channel, 100 ns, TTL Digital Input/Output Module	20,615
8.	NI 9934 25pin D-Sub connector kit	9,145
9.	NI 9940 Backshell for 36-pos connector block	2,480
10.	NI 9972 Backshell for 6-pos connector block	2,480

11.	USB 6221, 16-AI, 2-AO, 24 -DIO, with 250KS/sec with screw terminal connectivity	1,18,252
12.	USB-9211A 4-ch, 24-bit Thermocouple Input Module, for Windows	43,865
13.	NI USB-9219 4-Ch Universal Analog input module for RTD, Thermister, Strain gauge,	1,78,710
14.	USB 9234 4-Channel, ± 5 V, 51.2 kS/s per Channel, 24-Bit IEPE with AC & DC Coupling	1,97,910
15.	NI 9213 16-ch Thermocouple, 24-bit C Series module	82,770
16.	NI 9225, 3-Channel, 300 Vrms Analog Input Module	1,24,155
17.	NI USB 9263 4-Ch +/-10 V, 16-Bit, AO Module	48,050
18.	NI 9265, 4-Channel, 100 kS/s, 16-Bit, 0 to 20 mA Analog Output Module	28,985
19.	NI 9932 Backshell with 10-pos connector block	2,480
20.	USB 9421 8 Channel Digital Input module with Screw Terminal	26,505
21.	USB 9472 8 channel Digital Output module with Screw Terminal	26,505
22.	USB Single Module Carrier for C Series Modules	21,545
23.	CDAQ 9172 8-slot USB 2.0 Based Chassy	95,650
24.	NI WLS-9163 IEEE 802.11b/g Carrier for C Series Modules	54,400
25.	Power Cord, 240V, 10A, North American	2,410
26.	Sensor Board for Controls applications	3,84,481
27.	Power Card 240V Euro standard	2,100
28.	NI ELVIS II Electronics Bundle	3,01,200
TOTAL		29,91,543

Annexure EE – 1.1.B

1.1.B Advanced PLC Industrial Automation and SCADA Lab

SI No	Title of the equipments	Quantity	Approx Cost (Lakhs)
1	KIT-1: Testing Kit For Proximity Sensor, Limit Switch And Encoder	1	1.5
2	KIT-2: Testing Kit For Diffused Beam And Through Beam Sensors	1	1.25
3	KIT-3 : PLC Based Trainer Kit With All Input / Output Components	1	1.75
4	KIT-4: Level, Flow, Volume Control Measurement Kit With PLC	1	2.7
5	KIT-4: Level, Flow, Volume Control Measurement Kit with out PLC	1	2.25
6	KIT-5: Rotary Indexing Table With Stepper Motor And Pneumatic Pick & Place	1	2.9
7	KIT-5: Rotary Indexing Table With Stepper Motor And Pneumatic Pick & Place (with servo it will be extra)	1	0.95
8	SCADA Software	5 Users	6.0
9	3 station lift (table top model) with motor, sensors, door limit switch push buttons etc., (without PLC)	1	1.5
10	16 station automated plating plant without PLC	1	2.5
11	Servo drive controller kit (with out PLC)	1	1.5
12	XY plotter ó stepper motor based (Used along with welding unit)	1	1.5
13	Hydraulic controlled material lift (table top model)	1	1.9
14	4 bin batching plant with load cell	1	3.3
Total			31.5

Annexure EE – 1.1.C

1.1.C Industrial Robot and Application Lab

SI No	Title of the Equipments	Quantity	Approx Cost (Lakhs)
1	IRB Robot 140	1	32.0
2	IRC 5 Controller	1	
3	Teach pendent with touch screen	1	
4	Robot Mounting Pedestal	1	
5	Robot dressing	1	
6	Pneumatic Gripper	1	
7	Pick and place table	1	
8	Cabling & ducting	1	

9	Pneumatics	1	
10	Sensors	1	
11	Conveyor with sensor	1	
12	Operator Panel Cum Interface Panel	1	
13	Sample component	1	
14	Grouting screws for conveyor	1	
15	Robot Mounting Pedestal	1	
16	Robot dressing	1	
17	Pneumatic Gripper	1	
18	Pick and place table	1	
19	Cabling & ducting	1	
20	Pneumatics	1	
21	Sensors	1	
22	Conveyor with sensor	1	
23	Safety Fence	1	
24	Operator Panel cum Interface panel	1	
25	SiMS futurobot: ROBOT PROTOTYPING KIT Mobile programmable robot Kit	10	7.5
26	Software of Robotics kit: Icon based GUI	5 Users	2.0
Total			41.5

ANNEXURE EE – 1.2

1.2 Establishment of new Laboratories for New PG programs

a. Process Control and Instrumentation Lab 2:

Sl. No.	Equipments Required	Quantity	Cost per Unit	Estimated Amount (in Rs.)
1.	PC Based Temperature process control test kit (P,PI, PID, PD Mode) ADC/DAC, Card with RS-232-interfaces	1	225000	225000
2.	PC Base level process control (100LPH, ADC/DAC, RS-232 Interfaces) Both P,PI, PD & PID node.	1	225000	250000
3.	Magnetic Amplifier built in AC supply of 50V/ 1A variable DC supply is available	1	15000	15000
4.	AC Servomotor 230V AC, 400 w (3,000 RPM) and PLC with touch screen, temperature 20 ⁰ to 85 ⁰ C	1	230000	230000
5.	Bottling plane control module water full, Bottle full, bottle sensed 24V DC	1	50000	50000

6.	DC position control system 12V PMDC, Full 360 ⁰ rotation resolution 3 ½ digit	1	20000	20000
7.	Study of P,PI and PI controller PG 0 to 20, IG 0-1000, Kd=0.001, First order, Second order	1	20000	20000
8.	Study of stepper motor controller 2 x 16 LCD display, step angle 1.8 ⁰ ± 0.1 ⁰ 3kg cm = 0.1Nm steps per revolution 200 half 0.9 ⁰	1	10000	10000
9.	Study and experiment on PLC digital output line with RS232	1	40000	40000
10.	Elevator control module using PLC input, lift up, lift down, 4 lift position LEDø 24 VDC	1	50000	50000
Total				9 lakhs

b. High Power Drivers Lab

Sl. No.	Equipments Required	Quantity	Cost per Unit	Estimated Amount (in Rs.)
1.	DIGIVAC ó DSP based motor drives trainer Kit	1	212000	212000

c. Virtual Instrumentation Based RF Wireless Communication Lab

Sl. No	Equipments Required	Quantity	Cost per Unit	Estimated Amount (in Rs.)
1.	NI PXI-1042Q Quiet 8-Slot Chassis RF Cables (SMA to SMB) for PXI-5670, PXI-5671 or PXI-5610 Cables,SMA to SMB and SMA to BNC, PXI-5600 to PXI-5122 & PXI-5142 NI Modulation Toolkit For LabVIEW Spectral Measurements Toolkit for Windows LabVIEW Digital Filter Design Toolkit NI PXI-8106 Dual Core Controller Downgraded to Windows XP NI PXI-5671 2.7 GHz RF VSG, 512 MB, Onboard Signal Processing NI PXI-5661 2.7 GHz VSA, 256 MB, w/Real Time Streaming Analysis Power Cord, 240V, 10A, North American	1	59 Lakhs (package)	59 Lakhs
TOTAL				59 Lakhs

GRAND TOTAL (LABS a+b+c) = 70 Lakhs

ANNEXURE EE– 1.3

Sl.No	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Boards	9	5000	0.45
2	LCD Overhead Projectors	9	50000	4.5
3	Curtains	40	3000	1.2
4	Classroom Projector screens	9	10000	0.9
5	Interactive boards	9	1,50,000	13.5
6	Podium	9	5000	0.45
	Total			21

1.3 Modernization of classrooms**ANNEXURE EE – 1.4****1.4 Updating of learning Resources**

Sl. No.	Name of Equipment	Quantity	Cost per Unit	Total Cost (Rs in lakhs)
1.	NI LabVIEW Software	1	9 lakhs	9 Lakhs
2.	MATLAB Version 10 (Full version)	2	6 lakhs	12 lakhs
3.	INTEGRATED ELECTRONIC CIRCUIT DESIGN & PROTOTYPING PLATFORM	1	5 lakhs	5 Lakhs
TOTAL			26 Lakhs	

ANNEXURE EE – 1.5**1.5 Procurement of Furniture**

Sl. No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Almirahs Glazed Display Units For Material Museum	10	0.10	1.0
2	Filing Cabinets	20	0.03	0.6
3	Exhibition Display Boards	10	0.03	0.3
4	Storage Student Lockers	400	0.02	8
5	Computer Chairs	70	0.03	2.1
6	Computer Tables	70	0.05	3.5
7	Table for Staff	30	0.05	1.5
8	Chairs for Staff	20	0.05	1
9	Desks of students	66	0.10	6.6
10	Notice Board	5	0.06	0.3

11	Shoe rack	5	0.25	1.5
12	Fan	40	0.015	0.6
			Total	27

ANNEXURE EE – 1.6

1.6 Establishment / Upgradation of Central and Departmental Computer Centers

Sl. No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Heavy Duty Photocopier	5	1	5
2	A0 Color Plotter	5	2	10
			Total	15

ANNEXURE EE – 1.7

1.7 Modernization/improvement of supporting departments

Equipmentø for Library, Placement, Physics, Chemistry and Administration ó 3 lakhs

ANNEXURE EE – 1.8

1.8 Modernization and Strengthening of libraries and increasing access to knowledge resources

Sl. No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Books For Library.	800	0.005	4
2	E- Journals subscription.	13	0.3	4
3	E-Books	400	0.005	2
	Total			10

ANNEXURE EE – 1.9

1.9 Refurbishment (Minor Civil Works)

Minor Civil Works such as partition, repair works, wiring etc. - **15 Lakhs**

ANNEXURE EE – 2.1

2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines

Sl No.	Assistantship for	Number of Students	Scholarship per Month in lakhs	No. of Years	Total Amount in Lakhs
1	PG	40	0.04	3	57.6
2	Ph.D	5	0.18	3	32.4
				Total	90.0

ANNEXURE EE – 2.2

2.2 Provision of resources for research support

Every year 5 Best Projects proposed by PG/Ph.D Students are assisted with an amount of Rs 2 Lakhs.

5Projects * 2Lakhs = **10 Lakhs * 3 years = 30 Lakhs**

ANNEXURE EE – 2.3

2.3 Enhancement of R&D and industrial consultancy activities

Expenditure for

1. industrial Visits
2. Consultancy
3. Survey Camps

3 Lakhs per year * 3 years = **9 Lakhs**

ANNEXURE EE – 3.1**3.1 Faculty and staff development for improved competence based on TNA**

Faculty members are allowed

- a. to travel abroad
- b. to Present their Research Papers
- c. To attend Technical Training / Workshop in India
- d. Conduct a Workshop.

Approximately 12 Faculty members * 5 Lakhs = 60Lakhs

ANNEXURE EE– 4.1**4.1 Technical assistance for procurement and academic activities**

Approximately Rs18 lakhs is allocated for Technical assistance taken from industry experts

ANNEXURE EE– 4.2**4.2 Institutional management capacity enhancement**

Senior Professors and Chairman are allowed to take management training

Approximately 9 Faculty members * 1 Lakh = 9 Lakhs

ANNEXURE EE – 5.2**5.2 Enhanced interaction with industry**

Expenditure for

1. Guest Assistant Professors from Industry
2. MOU with Industries

Approximately 15 Lakhs

ANNEXURE EE– 5.3

5.3 Student support activities

Expenditure for

1. Conducting remedial classes
2. Placement related trainings
3. Communicational English
4. Analytical and Aptitude training

Approximately **18 Lakhs**

12.4 Department of Architecture Engineering

12.4.1 Architecture Department Project Budget (UVCE)

Sl. No	Activities	Project Life allocation	Financial Year and Amount		
			2016-17	2017-18	2018-19
1	Infrastructure				
	1.1 Modernization and strengthening of laboratories (Annexure Arch.:1.1, p-236)	47	26.6	10	10
	1.2. Establishment of new laboratories for existing UG and PG programs and for new PG programs (Annexure Arch.:1.2, p-237)	39	19.3	10	10
	1.3. Modernization of classrooms (Annexure Arch.:1.3, p-238)	20	10.25	5	5
	1.4. Updation of Learning Resources (Annexure Arch.:1.4, p-238)	25	15	5	5
	1.5. Procurement of furniture (Annexure Arch.:1.5, p-238)	28	15	8	5
	1.6. Establishment/Upgradation of Central and Departmental Computer Centers. (Annexure Arch.:1.6, p-239)	25	15	5	5
	1.7. Modernization/Improvements of supporting departments. (Annexure Arch.:1.7, p-239)	7	3	2	2
	1.8. Modernization and Strengthening of libraries and increasing access to knowledge resources (Annexure Arch.:1.8, p-239)	12	4	4	4
	1.9. Refurbishment (Minor Civil Works) (Annexure Arch.:1.9, p-239)	28	10	9	9
2	Research and development support				
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines (Annexure Arch.:2.1, p-240)	15	5	5	5
	2.2 Provision of resources for research support (Annexure Arch.:2.2, p-240)	10	4	4	2
	2.3 Enhancement of R&D and institutional consultancy activities (Annexure Arch.:2.3, p-240)	11	5	3	3
3	Faculty Development Support	1000	-	500	500
	a. Faculty Appointment				
	Faculty and Staff development for improved competence based on TNA(Annexure Arch.:3.1, p-240)	42	15	15	12
4	Institutional Reforms				
	4.1 Technical assistance for procurement and academic activities (Annexure Arch 4.1, p.241)	6	2	2	2
	4.2 Institutional Management Capacity enhancement (Annexure Arch.:4.2, p-241)	3	1	1	1
5	Academic support				
	5.1 Creation of new departments/courses		Chapter 11 Building Plan		
	5.3 Enhanced interaction with Industry (Annexure Arch.:5.2, p-241)	6	2.5	2	1
	5.4 Student support activities (Annexure Arch.5.3, p-241)	4	2	1.2	1
6	Others (Building)	20	10	5	5
	Total	1348	165	596	587

ANNEXURE ARCH.1.1**1.1. Modernization and Strengthening of Laboratories**

Sl.No	List of Equipment with Priority	Quantity	Cost in Rs. per Unit	Total Cost in Rs.
1	Fully Automatic Pottery Wheel	40	10,000	400000
2	Laser Cutter	5	200000	1000000
3	Etching Press	20	5000	100000
4	Carpentry Tools	20	50,000	1000000
5	Welding Machine	20	20,000	400000
6	Drill Gun	20	5000	100000
7	Power Saw	20	5000	100000
8	Model Making Tables	40	20,000	800000
9	Compressor With Spray Gun	20	20,000	400000
10	Step Ladder	10	10,000	100000
11	Weighing Machine	10	1000	10000
12	Cut Off Saw	20	1000	20000
13	Hot Air Blower	20	2000	40000
14	Flame Gun	20	2000	40000
15	Glass Cutter	20	500	10000
16	Angle Grinder	20	500	10000
17	Safety Gloves	60	500	30000
18	Safety Goggles	60	500	30000
19	Rubber Mats	40	1000	40000
20	Felt/Wool Mats	60	500	30000
			Total	4660000

Total in Rs. Forty Seven Lakhs

ANNEXURE ARCH.1.2

1.2 Annexure Arch. 1.2 Establishment of new laboratories for existing UG and PG programs and for new PG programs.

a) Acoustic Laboratory

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Reverberation Room	2	500000	1000000
2	Anechoic Chamber	1	200000	200000
3	Standard Testing Apparatus	1	100000	100000
4	Absorption Coefficient materials testing	1	100000	100000
5	Loudspeaker Response and Radiation Patterns	1	100000	100000
6	Speech Intelligibility HATS	1	100000	100000
7	Sound level Analysers and Meters	1	50000	50000
8	Binaural Recording Systems	2	50000	100000
9	Sound Intensity Probe	2	50000	100000
10	STC Wall Rating Measurement	2	50000	100000
11	3D Sound field Microphone	2	50000	100000
12	Noise Monitoring	2	50000	100000
13			Total	2150000

(b) Plumbing Lab for B.Arch UG Course.

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Hydro-Pneumatic Unit	1	100000	100000
2	Vfo Demo Unit	1	100000	100000
3	Symphonic Roof Top Drain	1	200000	200000
4	Public Toilets Layout	1	500000	500000
5	Toilets For Disabled Layout	1	500000	500000
6	Drinking Water Layout	1	200000	200000
			Total	16,00,000

c) Climatology Lab for B.Arch and B.Planning UG Courses.

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Mini Meteorological Station With 18 Sensors	2	50000	100000
2	Non Contact Thermometer	5	1000	5000
3	Wet And Dry Hygrometer (Imported)	5	5000	25000
4	Thermo Hydrograph	5	5000	25000
5	Digital Anemometer	5	5000	25000
6			Total	1,80,000

ANNEXURE ARCH. 1.3**1.3 Modernization of class rooms**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Glass Boards	20	5000	100000
2	LCD Overhead Projectors	5	50000	250000
3	Curtains	50	500	25000
4	Classroom Projector screens	10	10000	100000
5	Interactive boards	10	1,50,000	1500000
6	Podium	10	5000	50000
			Total	20,25,000

ANNEXURE ARCH.1.4**1.4 Updating of Learning Resources**

SL. No	Software	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Esri Arcgis	15	50,000	750000
2	Itt Envi 4.7	15	50,000	750000
3	Erdas Imagine 9.2	10	50,000	500000
4	Software Gis-Arch View	20	10,000	200000
5	Software Gis-Arch Map	20	10,000	200000
6	Software Gis-Arch Catlog	10	10,000	100000
			Total	25,00,000

ANNEXURE ARCH.1.5**1.5 Procurement of Furniture**

Sl. No	Furniture	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Chair	50	1200	60000
2	Table	100	2000	200000
3	Almirah	50	8000	400000
4	Student Lockers	200	2000	400000
5	Computer stands	100	1000	100000
6	Desks for students	40	1000	40000
7	A.C	20	50000	1000000
8	Drawing Boards	200	3000	600000
			Total	28,00,000

ANNEXURE ARCH.1.6**1.6 Establishment / Up gradation of Central and Departmental Computer Centers**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Color Scanner/Printer For Library	15	10,000	150000
2	A3-Heavy Duty Photocopier	15	50,000	750000
3	Desktop Computer For Computer Lab	20	60,000	1200000
4	A0 Color Plotter	2	200000	400000
			Total	25,00,000

ANNEXURE ARCH.1.7**1.7. Establishment / Upgradaton of Central and Departmental Computer Centers**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	E-Journals	200	2500	5,00,000
2	Journals	100	2000	2,00,000
			Total	7,00,000

ANNEXURE ARCH 1.8**1.8. Modernization and Strengthening of libraries and increasing access to knowledge resources**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Color Scanner/Printer For Library	10	10,000	1,00,000
2	Heavy Duty Photocopier	10	50,000	5,00,000
3	Desktop Computer For Computer Lab	10	60,000	6,00,000
			Total	12,00,000

ANNEXURE ARCH.1.9**1.9. Refurbishment (Minor Civil Work)**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Partition Walls	Where ever necessary		10,00,000
2	Cubical for Non teaching staff	5		5,00,000
3	Rest rooms for Students	2		4,00,000
4	Rest rooms for Teachers	2		4,00,000
5	Repair work for exposed concrete	Where ever necessary		5,00,000
			Total	28,00,000

ANNEXURE ARCH.2.1**2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines**

Sl.No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Research Assistantship to students	10	4000	15,00,000
			Total	15,00,000

ANNEXURE ARCH.2.2**2.2 Provision of resources for research support**

Sl.No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Workshops	10	50,000	5,00,000
2	Interaction with ,C.O.A, R&D, Architects, Field Experts and consultancy for projects taken up by the department	10	50,000	5,00,000
			Total	10,00,000

ANNEXURE ARCH.2.3**2.3 Enhancement of R&D and industrial consultancy activities**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Industrial training ó students	40	5000	2,00,000
2	Seminars (Nat. & Int. Nat.)	3	3,00,000	9,00,000
			Total	11,00,000

ANNEXURE ARCH.3.1**3.1 Faculty Development support**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Faculty Development Programmes	7	1,00,000	7,00,000
2	International Conferences in Abroad	7	5,00,000	35,00,000
			Total	42,00,000

ANNEXURE ARCH.4.1**4.1 Technical assistance for procurement and academic activities**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Expert consultancy fee	17	25,000	4,25,000
2	Annual Maintenance of Equipmentø			1,75,000
			Total	6,00,000

ANNEXURE ARCH.4.2**4.2 Institutional management capacity enhancement**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Conducting & Organizing Management Training Programmes			3,00,000
			Total	3,00,000

ANNEXURE ARCH.5.2**5.2 Enhanced Interaction with industry**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Council of Architecture and Practicing Architects	20	20000	4,00,000
2	Faculty Exchange Programs	6	25000	1,50,000
			Total	5,50,000

ANNEXURE ARCH.5.3**5.3 Student Support Activities**

Sl. No	Items	Number	Cost (in Rs.)	Total Cost (in Rs.)
1	Placement Training ó Students	120	1000	1,20,000
2	NASA, Zone NASA, Activities	3	1,00,000	3,00,000
			Total	4,20,000

12.5 Department of Electronics and Communication Engineering

12.5.1 Budget of Electronics & Communication Department (UVCE)

Sl. No	Activities	Project Life Allocation	Financial Year (Rs. In Lakhs)		
			2016-17	2017-18	2018-19
1.	Infrastructure				
	1.1. Modernization and strengthening of laboratories (Annexure EC ó 1.1, p-244)	61	30.6	20	10
	1.2. Establishment of new laboratories for existing UG and PG programs and for new PG programs (Annexure EC ó 1.2, p-245)	325	162	153	10
	1.3. Modernization of classrooms(Annexure EC- 1.3, p-252)	26	10	8	8
	1.4. Updation of Learning Resources (Annexure EC ó 1.4, p-253)	53	17.5	17.5	17.5
	1.5. Procurement of furniture(Annexure EC ó 1.5, p-253)	35	14.85	10	10
	1.6. Establishment/Upgradation of Central and Departmental Computer Centers(Annexure EC ó 1.6, p-254)	19	6.5	6	6
	1.7. Modernization/improvements of supporting departments (Annexure EC ó 1.7, p-254)	3	1	1	1
	1.8. Modernization and strengthening of libraries and increasing access to knowledge resources (Annexure EC ó 1.8, p-254)	21	7	7	7
	1.9. Refurbishment (Minor Civil Works) (Annexure EC ó 1.9, p-254)	30	10	10	10
2.	Research and development support				
	2.1 Providing Teaching and Research Assistantships to increase enrolment in existing and new PG programmes in Engineering disciplines(Annexure EC ó 2.1, p-255)	61	20.4	20.4	20.4
	2.2 Provision of resources for research support (Annexure EC ó 2.2, p-255)	40	20	10	10
	(i) Enhancement of R&D and institutional consultancy activities (Annexure EC ó 2.3, p-255)	15	5	5	5
	(ii) Establishment of Center of Excellence in Signal Processing (Chapter -8, p-109)	500	222.5	222.5	55
	(iii) Enhancement of existing Center of Excellence in Electromagnetic Compatibility and Power Quality	100	40	40	20
3.	Faculty Development Support				
	a. Faculty Appointment	1400	-	700	700
	Faculty and Staff Development (including faculty qualification Upgradation, pedagogical training and organizing/participation of faculty in workshops, seminars and conferences) for improved competence based on TNA (Annexure EC ó 3.1, p-255)	35	14	14	7
4.	Institutional reforms				
	4.1 Technical Assistance for procurement and academic activities	6	2	2	2
	4.2 Institutional management capacity enhancement (Annexure EC ó 4.2, p-256)	15	5	5	5
5.	Academic Support				
	5.1 Creation of new departments/courses		Chapter 11 Building		
	5.2 Enhanced interaction with industry(Annexure EC ó 5.2, p-256)	15	5	5	5
	5.3 Student support activities(Annexure EC ó 5.3, p-256)	15	5	5	5
6.	Others (Repair work of existing building)	100	40	40	20
	TOTAL	2875	639	1302	934

ANNEXURE EC – 1.1
Modernization and Strengthening of Laboratories

a) Analog Electronics Lab

Sl. No.	Equipments	Quantity	Cost/unit	Total Amount (in lakh Rs.)
1	Dual Channel CRO	20	35,000	7.0
2	Power Supply(0-30v)	20	15,000	3.0
3	Signal Generator	20	15,000	3.0
4	Decade Resistance Box	20	4,000	0.8
5	Decade Inductance Box	20	4,000	0.8
6	Decade Capacitance Box	20	4,000	0.8
7	Analog Voltmeter	20	2,500	0.5
8	Analog Ammeter	20	2,500	0.5
9	Analog Multimeter	20	3,000	0.6
TOTAL				17.0

b) Analog Communication Lab

Sl. No.	Equipments	Quantity	Cost/unit	Total Amount (in lakh Rs.)
1	Dual Channel CRO	20	35,000	7.0
2	Power Supply(0-30v)	20	35,000	7.0
3	SG(High Frequency)	10	80,000	16.0
4	Communication Trainer Kits	20	35,000	3.5
5	D.R.B	20	4,000	0.8
6	D.I.B	20	4,000	0.8
7	D.C.B	20	4,000	0.8
8	Microwave Bench	05	1,00,000	5.0
TOTAL				40.9

c) Digital Electronics Lab

Sl. No.	Equipments	Quantity	Cost/unit	Total Amount (in lakh Rs.)
1	Digital IC Trainer Kit	10	8,200	0.82
2	Linear IC Trainer Kit	10	8,000	0.8
3	Digital IC Tester	5	15,000	0.75
4	Digital Multimeter	15	2,200	0.33
TOTAL				2.7

Grand Total: 17+40.9+2.7= 60.6 Lakhs

ANNEXURE EC - 1.2

1.2 Establishment of new laboratories for existing UG and PG programs and for new PG programs

1. Embedded System Design (New PG Course)

a) Microcontroller Lab

Sl. No	Item Description	Qty	Total amount in (Lakhs Rs.)
1.	<u>MICROCONTROLLER TRAINER KIT:SiMS-AIO-PF51</u> Power Supply: (+12V/+5V),Program Downloading Cable,10 Pin FRC Cables 05 Nos.	10	1.5
2.	FLASH 8051 CORE TRAINER KIT:SiMS-PF 51 FLASH Philips ϕ 89V51RD2 Microcontroller Trainer Kit On board programmer, 4 port led output, Reset button, 32 IO lines taken out in 8bit batch RS232 serial interface through 9pin D type	10	0.8
3.	GENERAL PURPOSE ADC WITH SENSOR INTER:SiMS-GADC On board LDR, Thermistor input interface, 8 channel Analog input , internal or external input selection, potentiometer to vary input 0 ó 5 voltage, clock generation on board up to 5khz for ADC start button switch and end of conversion indication, ADC operation stand alone and external control mode	10	0.22
4.	DAC WITH BUZZAR& SPEAKER OUTPUT:SiMS-GDAC Single channel DAC with DAC08 chip, To generate different waveforms like sine, square, triangle, ramp, staircase etc., Possible to amplify the signal and frequency with control, 8 ohms speaker and buzzer interface to generate tones	10	0.22
5.	SEVEN SEGMENT WITH HEX KEYPAD 4 X 4:SiMS-GKBDSP Six digit seven segment led display with driver circuit, 4 x 4 matrix cherry keys with user definable functions, possible to perform experiments on combination by user while performing experiments display and keyboard standard routine will be provide	10	0.22
6.	STEPPER MOTOR & DC MOTR WITH KEYS:SiMS-GSMDM interface should have 0.5kg/cm ² torque three phase stepper motor interface, control the speed, direction and steps of the motor facility for four function keys which should be possible to configure through software	10	0.42
7.	RTC WITH LCD DISPLAY & 4 KEY MEMEORY:SiMS-RTCLCD 16 characters x 2 line LCD display with backlight control, battery back up to store the data and display when powered on four user definable switches to control the display	10	0.22
8.	ELEVATOR SIMULATOR:SiMS-GENELEV Lift operation up or down with arrow keys, Display separately the	10	0.22

	current floor indication and accepted floor, Eight keys to accept eight floor operation		
9.	TRAFFIC LIGHT CONTROLLER:SiMS-DTLI Facility to display four roads, LED indication through different colours like red green, yellow, Demonstrate pedestrians crossing	10	0.22
10.	LCD KEYBOARD DISPLAY INTERFACE:SiMS-GKBLCD 16 Characters Single LCD Display with back light, 4 X 4 Matrix De-bounce switches HEX keypad	10	0.22
TOTAL			4.26

b) ARM7 (32 BIT) MICROCONTROLLER KITS FOR EMBEDDED APPLICATION

Sl. No.	Item Description	Qty.	Rate/Unit Rs.	Amount Rs.(in lakhs)
1.	UNIVERSAL EMBEDDED DEVELOPMENT BOARD (SiMS-UEdb-832)	10	14,000	1.40
2.	Daughter boards: 8-bit, 16-bit and 32 bit Microcontroller boards			
	a) 32 Bit: ARM 7 ó LPC2148FBD64 family of Microcontrollers board	10	8,500	0.85
	b) 8 Bit: Atmel 89S51 Microcontroller board	10	6,500	0.65
	c) 16 Bit: TI - MSP430F149 Microcontrollers board	10	7,500	0.75
3.	Advanced Application Specific Interfacing Modules:			
	a) RFID Kit		13900	1.39
	b) Graphic LCD Interfacing Kit (320X240)	10	18000	1.8
	c) GSM Modem Interfacing Kit	each	20000	2.0
	d) Finger Print Sensor Interfacing Kit		20000	2.0
	e) RF Development Kit		25000	2.5
	f) SPI Protocol Demonstration Kit		6500	0.65
TOTAL				13.99

c) Embedded Lab Based on Arm Cortex M3 Platform

Sl. No.	Item Description	Qty.	Amount Rs. (in lakhs)
1	Educational Practice Board for ARM Cortex M3 LPC1768 (For Ethernet based experiments)	10	3.0
2	All in One General Purpose Board	10	0.95
TOTAL			3.95

d) Embedded Lab Based on ARM920T Platform

Sl. No.	Item Description	Qty.	Amount Rs. (in lakhs)
1	Educational Practice Board for ARM920T (Linux Porting activity)	10	4.0
2	LCD Matrix Key board interfacing kit	10	0.38
3	I/O Module	10	0.26
4	Application Specific Kit for I2C protocol demonstration	10	0.68
TOTAL			5.32

e) ARM9 Tutors (10 user License)

Sl. No.	Item Description	Amount Rs.(in lakhs)
1	AT91RM9200 Hands on Session - OS Concepts	0.0355
2	AT91RM9200 Hands on Session - GPIO	0.0355
3	AT91RM9200 Hands on Session - LCD Matrix KB	0.0355
4	AT91RM9200 Hands on Session - Stepper Motor	0.0355
5	AT91RM9200 Hands on Session - Configuration	0.0355
6	AT91RM9200 Hands on Session - Image Flashing	0.0355
7	AT91RM9200 Hands on Session - Thermal Printer	0.0355
8	AT91RM9200 Hands on Session ó RFID	0.0355
9	AT91RM9200 Hands on Session - Fingerprint	0.0355
10	AT91RM9200 Hands on Session - GSM	0.0355
11	Working Environment for ARM9	0.0516
12	Boot Loader Basics	0.0516
13	AT91RM9200 Boot Loader Porting	0.0516
14	Introduction to Linux Kernel Structure	0.0516
15	AT91RM9200 Hands on Session - Kernel Porting	0.0516
16	AT91RM9200 Hands on Session - File System Porting	0.0516
17	Introduction to GNU Debugger	0.0516
18	AT91RM9200 Hands on Session Device Driver	0.0516
TOTAL		0.7678

f. PC based Robotic Trainer Prototyping Kit

Sl. No.	Item Description	Qty	Amount Rs.(in lakhs)
1.	PC BASED ROBOTIC TRAINER PROTOTYPING KIT-Sims-Lego-PP:Consists of : NXT Intelligent Brick: 32-bit ARM7 microcontroller, <ul style="list-style-type: none"> • 256 Kbytes FLASH, 64 Kbytes RAM • Bluetooth wireless communication, USB 2.0 port ; 4 input ports, 6 wire digital platform • 3 output ports, 6 wire digital platform • Dot matrix Graphical display 60 x 100 pixels • 	2	0.63
2	HighEnd Computers	20	16.0
3	LAN		1.5
TOTAL			18.13

g. Modernization of Antenna Laboratory

Sl. No	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	High End Computers	10	0.8	8
2	UPS (5 KVA)	1	1.0	1
3	HFSS software (10 License)	1	10.0	10
4	FEKO Antenna (10 License)	1	8.0	8
5	Microstrip Antenna Design Board		10.0	10
6	Miscellaneous		5.0	5
TOTAL				42

Grand Total: 4.26+13.99+3.95+5.32+0.77+18.13+42=88.42 Lakhs

2. Digital Signal Processing (New PG Course)**a) DSP Kits**

Sl. no	Item Description	Rate/Unit Rs.	Qty.	Amount Rs. (in lakhs)
1	TI make TMS30C6713 based DSP Starter Kit	38,000	20	7.6
2	TI make TMS320C6748 based DSP development kit.	65,000	15	9.75

3	a. Advanced Application Specific Interfacing Modules: b. Finger print sensor interfacing kit c. Daughter board for 6713 DSP UART All in one General purpose board	20,000 15,500 5,500	10 10 20	2.0 1.55 1.10
4	OMAP Kit	3,20,000	2	6.4
5	HighEnd Computers	80,000	20	16.0
TOTAL				44.4

Grand Total: 44.4 Lakhs

3. Digital Communication Engineering (New PG Course)

a) Analog Communication Lab

Sl. No.	Name Of The Product	Unit Price (Rs)	Qty	Amount Rs. (in lakhs)
1	Amplitude Modulation and Demodulation Board	5,800	15	0.87
2	Frequency Modulation and Demodulation Board	5,800	15	0.87
3	Signal Sampling & reconstruction system with aliasing effect Board	7,500	15	1.125
4	2-channel Pulse code modulation & Demodulation with TDM Board	12,500	15	1.875
5	Delta & Adaptive Delta Modulation & Demodulation system Board	12,500	15	1.875
6	4-ch Analog Time Division Multiplexing & Demultiplexing Board	9,000	15	1.35
7	PWM and PPM modulation and demodulation Board	7,500	15	1.125
TOTAL				9.09

b) Digital Communication Lab

Sl. No.	Name Of The Product	Unit Price (Rs)	Qty	Amount Rs. (In Lakhs)
1	ASK Modulation & Demodulation system Board	7,500	20	1.5
2	FSK Modulation & Demodulation system Board	8,500	20	1.7
3	BPSK Modulation & Demodulation system	7,500	20	1.5

	Board			
4	DPSK Modulation & Demodulation system Board	7,500	20	1.5
5	QPSK Modulation & Demodulation system Board	11,000	20	2.2
TOTAL				9.9

c) Advanced Communication Lab

Sl. No.	Name Of The Product	Unit Price (Rs)	Qty	Amount Rs. (In Lakhs)
1	EPABX Trainer kit (Octave)	45,000	1	0.45
2	40MHz-4GHz TRANSMISSION LINE TRAINER/ NETWORK ANALYSER:	1,90,000	1	1.9
3	HighEnd Computers	80,000	20	16.0
4	LAN	1,50,000		1.5
TOTAL				19.85

Grand Total: 9.09+9.9+19.85= 38.84 Lakhs

4. Communication Networks (New PG Course)

a) Optical Communication Lab

Sl. No.	Name Of The Product	Unit Price (Rs)	Qty	Amount Rs. (In Lakhs)
1	850 nm fiber optics LED and Detector Module	90,000	5	4.5
2	Dual Wavelength Fiber Optic Laser Source and Detector Module	1,20,000	5	6.0
3	Fiber Optic Passive Component Module	90,000	5	4.5
4	Single Mode Fiber Optic Cable Module	90,000	5	4.5
5	Chromatic dispersion Module	1,20,000	5	6.0
6	Erbium Doped Fiber Amplifier Module	3,50,000	2	7.0
7	DWDM with Fiber Bragg Grating	3,50,000	2	7.0
8	Study of Mode Properties of Planar Waveguide Unit	3,50,000	2	7.0
9	Optical Power Meter	30,000	3	0.9
10	Fiber Optic Components	60,000	3	1.8
11	Optical Fiber Communication Links a. Fiber Optic Analog Transmitter b. Fiber Optic Analog Receiver c. Fiber Optic Analog and Digital Modulation	1,35,000 per set	4 Sets Each	5.4

	Trainer d. Fiber Optic Advanced Digital Trainer			
12	Digital Storage Oscilloscope 100MHz	49,000	3	1.47
13	OTDR	3,00,000	2	6.0
14	Optical Network Module	3,00,000	2	6.0
15	High End Computers	80,000	4	2.4
16	LAN	1,50,000		1.5
TOTAL				71.97

b) Wireless/Adhoc Network Communication Lab

Sl. No.	Name Of The Product	Unit Price (Rs)	Qty	Amount In (Rs)
1	Network Communication Trainer Kits	1,00,000	20	20.0
2	High End Computers	80,000	20	16.0
3	LAN	1,50,000		1.5
TOTAL				37.5

Grand Total: 71.97+37.5= 109.47 Lakhs

5. VLSI Lab and Signal Processing (New PG Course)

a) FPGA & CPLD Kits

Sl. No.	Name Of The Product	Unit Price (Rs)	Qty	Amount Rs. (in lakhs)
1	FPGA-CPLDADDON MODULE FOR UVLSI KIT			
	ALTERA : ACEX1K : FPGA : EPF1K50TC144	6,250	20	1.25
	ALTERA : APEX 20K : FPGA : EP20K100TC144	9,850	20	1.97
	ALTERA : MAX3000 : CPLD : EPM3128TC144	3,450	20	0.69
	XILINX : FPGA : SPARTAN-III : XC3S400TQ144	4,900	20	0.98
	XILINX : FPGA : SPARTAN-II : XC2S100TQ144	4,500	20	0.9
	XILINX : CPLD : COOLRUNNER : XCR3128XLTQ144	3,900	20	0.78
	XILINX : CPLD : 9000 : 9572PLCC84	3,000	20	0.6
	FPGA CONFIGURATION			
	XILINX : SPROM : DEVICE : XC18V01PC20C			
	ALTERA : SPROM : DEVICE : EPC2LC20			

		3,480	20	0.696
		3,480	20	0.696
2	COMPACT UNIVERSAL VLSI FPGA-CPLD BOARDS WITH GPIO			
	XILINX : FPGA : SPARTAN-III : XC3S400	18,000	20	3.6
	XILINX : FPGA : SPARTAN-II : XC2S100			
	XILINX : CPLD : COOLRUNNER : XCR3128	16,000	20	3.2
	XILINX : CPLD : 9000 : 9572			
		14,000	20	2.8
		9,000	20	1.8
3	Vertex Board with Image Processing Tool	3,20,000	2	6.4
4	HighEnd Computers	80,000	20	16.0
5	LAN	1,50,000		1.5
TOTAL				43.862

Grand Total: 43.862 Lakhs

Grand Total for (1+2+3+4+5) = 325 Lakhs

ANNEXURE EC-1.3**1.3 Modernization of Classrooms**

Sl. No	Equipments	Total Units	Cost / Unit in Rs.	Estimated Amount (in lakh Rs.)
1.	Boards	10	20,000	2.0
2.	LCD Overhead Projectors	10	50,000	5.0
3.	Curtains	10	25,000	2.5
4.	Classroom Projector Screens	10	10,000	1.0
5.	Interactive Boards	10	1,50,000	15.0
6.	Podium	10	5,000	0.5
TOTAL				26.0

ANNEXURE EC-1.4**1.4 Updating of Learning Resources
Course Specific Software's for present and new PG courses**

Sl. No	Equipments	Total Units	Cost / Unit in Rs.	Estimated Amount (in lakh Rs.)
1.	ROBOT Programming Software	5 user	1,00,000	1.0
2.	MATLAB	50 users	15,00,000	15.0
3.	Antenna Simulation Software (FEKO 6.2)	10 user	13,00,000	13.0
4.	Cadence Tool	30 user	7,00,000	7.0
5.	XILINX IDE	10 user	1,50,000	1.5
6.	LABVIEW	30 user	7,00,000	7.0
7.	Network Simulator Software	10 user	8,00,000	8.0
TOTAL				52.5

ANNEXURE EC-1.5**1.5 Procurement of furniture**

Sl. No	Equipments	Total Units	Cost / Unit in Rs.	Estimated Amount (in lakh Rs.)
1.	Benches	150	10,000	15.0
2.	Fans	40	1,500	0.6
3.	Computer Tables	100	5,000	5.0
4.	Computer Chairs	100	3,000	3.0
5.	Almirah	10	10,000	1.0
6.	Staff Table	10	5,000	0.5
7.	Staff Chair	10	5,000	0.5
8.	File Rack	10	3,000	0.3
9.	Notice Board	5	6,000	0.3
10.	Student Locker	420	2,000	8.4
11.	Shoe Rack	1	25,000	0.25
TOTAL				34.85

ANNEXURE EC-1.6**1.6 Establishment/Upgradation of Central and Departmental Computer Centre's**

Sl. No	Equipments	Total Units	Cost / Unit in Rs.	Estimated Amount (in lakh Rs.)
1.	HighEnd Computers	25	60,000	15.0
2.	Server	1	2,50,000	2.5
3.	Networking	1	50,000	0.5
4.	Printer	2	10,000	0.2
5.	Scanner	2	15,000	0.3
TOTAL				18.5

ANNEXURE EC – 1.7**1.7 Modernization/improvement of supporting departments**

Equipmentø for Library, Placement, Physics, Chemistry and Administration ó **3 lakhs**

ANNEXURE EC 1.8**1.8. Modernization and Strengthening of libraries and increasing access to knowledge resources**

Sl. No	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	E- Journals subscription.	20	0.3	6
2	E-Books	3000	0.005	15
TOTAL				21

ANNEXURE EC.1.9**1.9 Refurbishment (Minor Civil Work)**

Minor Civil Works such as partition, repair works, wiring etc...- **30 Lakhs**

ANNEXURE EC-2.1**2.1 Providing Teaching and Research assistantships to increase enrollment in existing and new PG programmes in Engineering Disciplines**

Sl. No	Discipline	No. of students	Cost/month in Rs.	No. of months	Estimated Amount (in lakh Rs.)
	PG	20	4,000	36	28.8
	Ph.D	5	18,000	36	32.4
TOTAL					61.2

ANNEXURE EC-2.2**2.2 Provision of Resources for Research Support**

Sl.No.	Discipline	Total No. of Projects	Project cost/year in Rs.	Estimated Amount (in lakh Rs.)
1	M.E./Ph.D/Guide	20	2,00,000	40.0
TOTAL				40.0

ANNEXURE EC-2.3**2.3 Enhancement of R&D and Institutional Consultancy Activities**

Sl.No.	Particular	No. of Years	Cost/year in Rs.	Estimated Amount (in lakh Rs.)
1	Industrial visit/Consultancy	3	5,00,000	15.0
TOTAL				15.0

ANNEXURE EC-3.1**3.1 Faculty and Staff Development for improved competence based on TNA**

Sl.No.	No. of Staff	No. of Years	Cost/staff in Rs.	Estimated Amount (in lakh Rs.)
1	7	3	5,00,000	35.0
TOTAL				35.0

ANNEXURE EC – 4.2

4.2 Institutional management capacity enhancement

Senior Professors and Chairman are allowed to take management training

Approximately 15 Faculty members * 1 Lakh = **15 Lakhs**

ANNEXURE EC – 5.2

5.2 Enhanced interaction with industry

Expenditure for

c. Guest Assistant Professors from Industry

d. MOU with Industries

Approximately **15 Lakhs**

ANNEXURE EC – 5.3

5.3 Student support activities

Expenditure for

e. conducting remedial classes

f. placement related trainings

g. Communicational English

h. Analytical and Aptitude training ó **15 Lakhs**

12.6 Department of Computer Science and Engineering

12.6.1 Budget of Computer Science and Engineering Department (UVCE)

SI No	Activities	Amount (Rs. in Lakhs)			
		Project Life Allocation	Financial Year		
			2016-17	2017-18	2018-19
1.	Infrastructure				
	1.1 Modernization and Strengthening of laboratories (Annexure CS ó 1.1, p-259)	193	93.25	50	50
	1.2 Establishment of new Laboratories for Existing UG and PG programs and for New PG programs (Annexure CS ó 1.2, p-260)	130	70.02	30	30
	1.3 Modernization of classrooms (Annexure CS ó 1.3, p-261)	28	16.5	5.5	5.5
	1.4 Updating of learning Resources (Annexure CS ó 1.4, p-262)	105	50	30	25
	1.5 Procurement of furniture (Annexure CS ó 1.5, p-263)	53	31.5	10.55	10.5
	1.6 Establishment /up gradation of central and departmental computer centres (Annexure CS ó 1.6, p-263)	19	11.4	3.8	3.8
	1.7 Modernization/improvement of supporting departments (Annexure CS ó 1.7, p-264)	3	1	1	1
	1.8 Modernization and strengthening of libraries and increasing access to knowledge (Annexure CS ó 1.8, p-264)	36	12	12	12
	1.9 Refurbishment (Minor Civil Works) (Annexure CS ó 1.9, p-264)	60	36	12	12
2.	Research and Development support				
	2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines (Annexure CS ó 2.1, p-265)	195	117	39	39
	2.2 Provision of resources for research support (Annexure CS ó 2.2, p-265)	120	72	24	24
	2.3 Enhancement of R&D and industrial consultancy activities (Annexure CS ó 2.3, p-265)	15	9	3	3
3.	Faculty Development support	1000	-	500	500
	a. Faculty Appointment				
	3.1 Faculty and staff development for improved competence based on TNA (Annexure CS ó 3.1, p-266)	81	48.6	16.2	16.2
4.	Institutional reforms				
	4.1 Technical assistance for procurement and academic activities (Annexure CS ó 4.1, p-266)	6	2	2	2
	4.2 Institutional management capacity enhancement (Annexure CS ó 4.2, p-266)	15	5	5	5
5.	Academic support				
	5.1 Creation of new Department/courses (Building)				Chapter 11
	5.2 Enhanced interaction with industry (Annexure CS ó 5.2, p-267)	15	5	5	5
	5.3 Student support activities (Annexure CS ó 5.3, p-267)	15	5	5	5
6.	Others (Repair of existing structure) Annexure CS ó 6, p-267)	215	115	50	50
	Total	2304	700	805	799

ANNEXURE CS – 1.1

1.1 Modernization and Strengthening of Laboratories of Department of Computer Science and Engineering:

a. Computer Science and Engineering Lab

Sl. No.	Name of Equipment	Quantity	Cost per Unit (In Rs.)	Total Cost (Rs in lakhs)
1	High end Desktop Computers	50	70,000	35
2	Servers	02	2,50,000	05
3	Networking	02	50,000	01
4	Printers	05	15,000	0.75
5	New Equipments (See Annexure CS ó 1.1b)			70
6	Interactive Boards	05	1,50,000	7.5
7	LCD projectors	08	50,000	4
TOTAL				123.25

ANNEXURE CS – 1.1b

Sl. No.	New Equipments Required	Quantity	Unit Price (In Rs.)	Estimated Amount (in Lakh. Rs)
1.	Microprocessor and Microcontroller Kits	25	16,000	4
2.	Sensor Network Testbed	3	7,00,000	21
3.	Equipments for Cloud Computing Laboratory	1 Package		35
4.	Cloud Setup	1 Package		10
	i. Network			
	ii. Public Cloud			
	iii. Licensed Database			
	iv. Backup and Firewall			
TOTAL				70

GRAND TOTAL (a + b) = 193.25 LAKHS

ANNEXURE CS– 1.2

1.2 Establishment of new Laboratories for New UG/ PG programs

a) **B.E (Bio Computing Engineering)**

Sl. No.	Equipments Required	Quantity	Unit Price (In Rs.)	Estimated Amount (in Lakhs. Rs.)
1.	Workstations	05	1,50,000	7.5
2.	Biometric Scanners Eg, Heartbeat, palm, hand vein, Fingerprint, Iris.	1	Package	5
3.	Cameras for Biometric	02	2,50,000	5
TOTAL				17.5

b) **M.E (Data Mining & Warehousing)**

Sl. No.	Equipments Required	Estimated Amount (In Lakh. Rs)
1.	High end Desktop Computers	12
2.	Software for Data Acquisition & Knowledge Processing (10 Users Each)	
	I. Social Engine	4.4
	II. php Fox	0.62
	III. Win DAQ Pro	8.7
	IV. Adv CODAS	3.7
	V. Hadoop	12
	VI. Mat Lab	10
	VII. ERDAS	1.4
	VIII. IDRISI	7.8
3.	Equipment for Knowledge Acquisition	10
TOTAL		70.62

c) M.E (Cognitive Science, Computer Security, Free and Open Source Software Technologies)

Sl. No.	Equipments Required	Quantity	Unit Price (In Rs.)	Estimated Amount (In Lakh. Rs.)
1.	Laptop Computers for faculties	20	1,00,000	20
2.	Development Boards for Robotics Laboratory	20	7,000	1.4
3.	High end Webcam for Robotics Laboratory	5	3,40,000	17
4.	Brushless motors for Robotics Laboratory	10	25,000	2.5
5.	Small LED Display for Robotics Laboratory	20	5,000	1
TOTAL				41.9

GRAND TOTAL (a + b + c) = 130.02 LAKHS

ANNEXURE CS – 1.3

1.3 Modernization of Class Rooms

Sl. No.	Equipments	Total No's Required	Cost/Unit (In Rs.)	Estimated Amount (In Lakh Rs.)
1.	LCD Overhead Projectors	10	50,000	5
2.	Interactive Boards	10	1,50,000	15
3.	Synthetic Boards	10	20,000	2
4.	Podium	10	5,000	0.5
5.	Curtains	20	25,000	5
TOTAL				27.5

ANNEXURE CS – 1.4

1.4 Updating of Learning Resources

Sl. No.	Name of Equipment	Quantity	Cost per Unit (In lakhs Rs.)	Total Cost for 3 year (In lakhs Rs.)
1	Intel Parallel Studio XE Suites	1	1.3	3.9
2	Intel Cluster Studio XE 2013	1	2	6
3	Adobe e-Learning Suites (HTML,3D & 2D Design)	1	1.5	4.5
4	SAS/ACCESS-Interface to Hadoop	1	2	6
5	SAS Visual Data Discovery	1	6	18
6	International and National Webinars	18	0.2	3.6
7	VX Works (RTOS)	1	-	12
8	Development Platform for Embedded Systems	20	-	7
9	Open ROV V 2.5	10	0.5	5
10	Animator Survival Kit	10	0.5	5
11	ORACLE Package	1	-	7
12	Microsoft Package	1	-	6
13	NetSim	15	0.4	6
14	E óbooks	-	-	15
			TOTAL	105

ANNEXURE CS – 1.5**1.5 Procurement of Furniture**

Sl. No.	Equipments	Total No's Required	Cost/Unit (In Rs.)	Estimated Amount (In Lakh Rs.)
1.	Benches	200	10,000	20
2.	Fan	50	1,500	0.75
3.	Almirah	25	10,000	2.5
4.	File Racks	10	2,000	0.2
5.	Student Lockers(8x25)	200	2,000	4
6.	Shoe Racks (8x25)			2
7.	Staff Table and Chairs	30	10,000	3
8.	Drawing Board with Stand	150	3,000	4.5
9.	Notice Board	10	6,000	0.6
10.	Air Conditioner (2 Tons)	30	50,000	15
TOTAL				52.55

ANNEXURE CS – 1.6**1.6 Establishment / Upgradation of Central and Departmental Computer Centers**

Sl. No.	Equipments	Total No's Required	Cost/Unit (In Rs.)	Estimated Amount (In Lakh Rs.)
1.	High end Computers	10	60,000	6
2.	Servers	2	2,50,000	5
3.	Networking(1 for 25 Computers)	4	50,000	2
4.	Printers	25	10,000	2.5
5.	Scanners	5	10,000	0.5
6.	Photo Copy Machine(XEROX)	3	1,00,000	3
TOTAL				19

ANNEXURE CS – 1.7**1.7 Modernization/improvement of supporting departments**

Equipmentø for Library, Placement, Physics, Chemistry and Administration ó **3 lakhs**

ANNEXURE CS – 1.8**1.8 Modernization and Strengthening of libraries and increasing access to knowledge resources**

Sl. No.	Name of Equipment	Quantity	Cost per Unit (Rs in lakhs)	Total Cost (Rs in lakhs)
1	Books For Library.	3000	0.005	15
2	E- Journals subscription.	20	0.3	6
3	E-Books	3000	0.005	15
TOTAL				36

ANNEXURE CS – 1.9**1.9 Refurbishment (Minor Civil Works)**

Sl. No.	Particulars	Estimated Amount For 1 Year (In Rs.)	Estimated Amount For 3 Year (In Lakh Rs.)
1.	Refurbishment(Partition,Rest rooms,Wiring,etc.,)	20,00,000	60
TOTAL			60

ANNEXURE CS – 2.1**2.1 Providing teaching and research assistantship to increase enrolment in existing and new PG programmes in Engineering disciplines**

Sl No.	Assistantship for	Number of Students	Scholarship per Month in lakhs	No. of Years	Total Amount in Lakhs
1	M.E(Full-Time)	100	0.04	3	144
2	Ph.D(Full-Time)	8	0.18	3	51.84
TOTAL					195

ANNEXURE CS – 2.2**2.2 Provision of resources for research support**

Sl. No.	Particulars	Total No's	Estimated Amount for 1 year	Estimated Amount for 3 years
1.	Technical Projects	20	20 x 2,00,000 = 40,00,000	1,20,00,000
TOTAL				120 Lakhs

ANNEXURE CS – 2.3**2.3 Enhancement of R&D and industrial consultancy activities**

Sl. No.	Particulars	Estimated Amount for 1 year	Estimated Amount for 3 years
1.	Enhancement of R&D and industrial consultancy activities	5,00,000	15,00,000
TOTAL			15 Lakhs

ANNEXURE CS – 3.1**3.1 Faculty and staff development for improved competence based on TNA**

Sl. No.	Particulars	Faculty	Estimated Amount for 3 years
1.	Faculty and staff development for improved competence based on TNA	15 Teaching Faculty (5 lakh/Person/3years)	75,00,000
		Non Teaching Faculty	6,00,000
TOTAL			81 Lakhs

ANNEXURE CS – 4.1**4.1 Technical assistance for procurement and academic activities**

Sl. No.	Particulars	Estimated Amount for 1 year	Estimated Amount for 3 years
1.	Technical assistance for procurement and academic activities	2,00,000	6,00,000
TOTAL			6 Lakhs

ANNEXURE CS – 4.2**4.2 Institutional management capacity enhancement**

Sl. No.	Particulars	Estimated Amount for 1 year	Estimated Amount for 3 years
1	Institutional management capacity enhancement	5,00,000	15,00,000
TOTAL			15 Lakhs

ANNEXURE CS – 5.2**5.2 Enhanced interaction with industry**

Sl. No.	Particulars	Estimated Amount for 1 year	Estimated Amount for 3 years
1	Enhanced interaction with industry	5,00,000	15,00,000
TOTAL			15 Lakhs

ANNEXURE CS – 5.3**5.3 Student support activities**

Sl. No.	Particulars	Estimated Amount for 1 year	Estimated Amount for 3 years
1	Student support activities	5,00,000	15,00,000
TOTAL			15 Lakhs

ANNEXURE CS – 6**6. Student support activities**

Sl. No.	Particulars	Estimated Amount for 3 years
1	Miscellaneous	2,15,00,000
TOTAL		215 Lakhs

CHAPTER 13

List of AICTE Approved Courses



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7th Floor, Chandra'ok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724103 www.aicte-India.org

F.No. South-West/1-2016821057/2014/EOA/Corrigendum-

Corrigendum

To,
The Principal Secretary (Hr. & Tech Education)
Govt. of Karnataka, K. G.S., 8th Floor,
M.S. Building, R. N. 645, Dr. B. R. Ambedkar Road,
Bangalore-550001

Sub: Extension of approval for the academic year 2014-15.

Ref: Application of the Institution for Extension of Approval for the Year 2014-15

EOA Issued on F.No. South-West/1-2016821057/2014/EOA 04-Jun-2014
EOA Printed on F.No. South-West/1-2016821057/2014/EOA 03-Oct-2012

Sir/Madam,

Regional Office	South West	Application Id	1-2016821057		
		Permanent Id	1-04022401		
Name of the Institute	UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING	Institute Address	UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING (UVCE), KR CIRCLE, BANGALORE UNIVERSITY, BANGALORE 560001, KARNATAKA, BANGALORE, BANGALORE URBAN, Karnataka, 560001		
Name of the Society/Trust	UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING	Society/Trust Address	UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING KR CIRCLE, BANGALORE-560001, BANGALORE, BANGALORE URBAN, Karnataka, 560001		
Institute Type	Government				
Opted for change from Women to Co-ed	No	Opted for change of name	No	Opted for change of site	No
Change from Women to Co-ed approved	Not Applicable	Change of name Approved	Not Applicable	Change of site Approved	Not Applicable

to conduct following courses with the intake indicated below for the academic year 2014-15

Application Number: 1-2016821057

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Application Id: 1-2016821057			Course	Full/Part Time	Affiliating Body	Intake 2012-13	Intake 2013-14	Intake Approved for 2014-15	NRI	PIO
Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	UNDER GRADUATE	CIVIL ENGINEERING	FULL TIME	Bangalore University, Bangalore	100	100	60	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	UNDER GRADUATE	MECHANICAL ENGINEERING	FULL TIME	Bangalore University, Bangalore	100	100	100	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	UNDER GRADUATE	ELECTRICAL AND ELECTRONICS ENGINEERING	FULL TIME	Bangalore University, Bangalore	80	80	80	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	UNDER GRADUATE	ELECTRONICS AND COMMUNICATIONS ENGINEERING	FULL TIME	Bangalore University, Bangalore	60	60	60	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	UNDER GRADUATE	COMPUTER SCIENCE & ENGINEERING	FULL TIME	Bangalore University, Bangalore	70	70	70	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	UNDER GRADUATE	INFORMATION SCIENCE AND ENGINEERING	FULL TIME	Bangalore University, Bangalore	60	60	60	NA	NA
ARCHITECTURE AND TOWN PLANNING	1st Shift	UNDER GRADUATE	ARCHITECTURE	FULL TIME	Bangalore University, Bangalore	40	40	40	NA	NA

Application Number: 1-2016821057*

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Application Id: 1-2016821057			Course	Full/Part Time	Affiliating Body	Intake 2012-13	Intake 2013-14	Intake Approved for 2014-15	NMI	PIU
Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	CIVIL ENGINEERING(CONSTRUCTION TECHNOLOGY)	FULL TIME	Bangalore University, Bangalore	10	10	10	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	GEOTECHNICAL ENGINEERING	FULL TIME	Bangalore University, Bangalore	12	12	12	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	STRUCTURAL ENGINEERING	FULL TIME	Bangalore University, Bangalore	15	15	15	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	HIGHWAY ENGINEERING	FULL TIME	Bangalore University, Bangalore	10	10	10	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	PRE STRESSED CONCRETE	FULL TIME	Bangalore University, Bangalore	10	10	10	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	WATER RESOURCE ENGINEERING	FULL TIME	Bangalore University, Bangalore	10	10	10	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	ENVIRONMENTAL ENGINEERING AND MANAGEMENT	FULL TIME	Bangalore University, Bangalore	10	10	10	NA	NA

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Application Id: 1-2016821057			Course	Full/Part Time	Affiliating Body	Intake 2012-13	Intake 2013-14	Intake Approved for 2014-15	NRI	PIO
Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	EARTHQUAKE ENGINEERING	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	MACHINE DESIGN	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	MANUFACTURING SCIENCE AND ENGINEERING	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	THERMAL SCIENCE ENGINEERING	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	ADVANCED MATERIALS TECHNOLOGY	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	POWER ENGINEERING AND ENERGY SYSTEMS	FULL TIME	Bangalore University, Bangalore	14	14	14	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	POWER ELECTRONICS	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA

Application Number: 1-2016821057*

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Application Id: 1-2016021057			Course	Full/Part Time	Affiliating Body	Intake 2012-13	Intake 2013-14	Intake Approved for 2014-15	NRI	PIO
Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	CONTROL AND INSTRUMENTATION	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	ELECTRONICS AND COMMUNICATIONS ENGINEERING	FULL TIME	Bangalore University, Bangalore	25	25	25	NA	NA
ARCHITECTURE AND TOWN PLANNING	1st Shift	POST GRADUATE	ARCHITECTURE (LANDSCAPE)	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	COMPUTER SCIENCE & ENGINEERING	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	SOFTWARE ENGINEERING	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	COMPUTER NETWORKING	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	WEB TECHNOLOGIES	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA

Application Number: 1-2016821057*

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All India Council for Technical Education
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7th Floor, Chandralok Building, Janpath, New Delhi- 110 001
PHONE: 23724151/52/53/54/55/56/57 FAX: 011-23724183 www.aicte-india.org

Application Id: 1-2016821057			Course	Full/Part Time	Affiliating Body	Intake 2012-13	Intake 2013-14	Intake Approved for 2014-15	NRI	PIO
Program	Shift	Level								
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	BIOINFORMATICS	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ARCHITECTURE AND TOWN PLANNING	1st Shift	POST GRADUATE	CONSTRUCTION AND PROJECT MANAGEMENT	FULL TIME	Bangalore University, Bangalore	18	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	UG 2nd Yr DIRECT	MECHANICAL ENGINEERING	PART TIME	Bangalore University, Bangalore	60	60	60	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	UG 2nd Yr DIRECT	ELECTRONICS AND COMMUNICATIONS ENGINEERING	PART TIME	Bangalore University, Bangalore	60	60	60	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	UG 2nd Yr DIRECT	CIVIL ENGINEERING	PART TIME	Bangalore University, Bangalore	60	60	60	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	POST GRADUATE	INFORMATION TECHNOLOGY	FULL TIME	Bangalore University, Bangalore	25	25	25	NA	NA
ENGINEERING AND TECHNOLOGY	1st Shift	UNDER GRADUATE	CIVIL ENGINEERING	FULL TIME	Bangalore University, Bangalore	100	100	60	NA	NA

Application Number: 1-2016821057*

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- Validity of the course details may be verified at www.aicte-india.org>departments>approvals

The above mentioned approval is subject to the condition that UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING shall follow and adhere to the Regulations, guidelines and directions issued by AICTE from time to time and the undertaking / affidavit given by the institution along with the application submitted by the institution on portal.

In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Strict compliance of Anti-Ragging Regulation:- Approval is subject to strict compliance of provisions made in AICTE Regulation notified vide F. No. 37-3/Legal/AICTE/2009 dated July 1, 2009 for Prevention and Prohibition of Ragging in Technical Institutions. In case Institution fails to take adequate steps to Prevent Ragging or fails to act in accordance with AICTE Regulation or fails to punish perpetrators or incidents of Ragging, it will be liable to take any action as defined under clause 9(4) of the said Regulation.

(Dr. Kuncheria P. Isaac)
Member Secretary, AICTE

Copy to:

1. **The Regional Officer,**
All India Council for Technical Education
Health Centre Building
Bangalore University Campus
Bangalore - 560 009, Karnataka
2. **The Director Of Technical Education,**
Karnataka
3. **The Principal / Director,**
UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING
UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING (UVCE), KR CIRCLE, BANGALORE UNIVERSITY,
BANGALORE 560001, KARNATAKA.,
BANGALORE, BANGALORE URBAN,
Karnataka, 560001
4. **The Secretary / Chairman,**
UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING
UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING
KR CIRCLE, BANGALORE-560001,
BANGALORE, BANGALORE URBAN,
Karnataka, 560001
5. **Guard File(AICTE)**

Application Number: 1-2016821057*

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CHAPTER 14

National Assessment and Accreditation Council Certificates





राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद
विश्वविद्यालय अनुदान आयोग का स्वायत्त संस्थान
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL
An Autonomous Institution of the University Grants Commission

Quality Profile

Name of the Institution : Bangalore University
Place : Jnana Bharathi, Bangalore, Karnataka

Criteria	Weightage (W _i)	Criterion-Wise Grade Point Averages (Cr, GPA)	W _i X Cr, GPA
I. Curricular Aspects	150	3.66	549
II. Teaching-Learning and Evaluation	250	3.12	780
III. Research, Consultancy and Extension	200	2.90	580
IV. Infrastructure and Learning Resources	100	3.55	355
V. Student Support and Progression	100	3.00	300
VI. Governance and Leadership	150	2.70	405
VII. Innovative Practices	050	3.00	150
Total	$\sum_{i=1}^7 W_i = 1000$		$\sum_{i=1}^7 (W_i X Cr, GPA) = 3119$

$$\text{Institutional Score} = \frac{\sum_{i=1}^7 (W_i X Cr, GPA)}{\sum_{i=1}^7 W_i} = \frac{3119}{1000} = 3.12$$

Grade = **A** Descriptor = **VERY GOOD**

Date : September 16, 2008

H. Rausi
Director

- This certification is valid for a period of Five years with effect from September 16, 2008
- An institutional CGPA on four point scale in the range of 3.01 - 4.00 denotes A grade (Very Good), 2.01 - 3.00 denotes B grade (Good), 1.51 - 2.00 denoted C grade (Satisfactory)
- Scores rounded off to the nearest integer

EC/46/RAR/15