

ACS College of Engineering
Bengaluru

**DEPARTMENT OF
BIOMEDICAL ENGINEERING**

**SELF ASSESSMENT REPORT
(SAR) FORMAT
UNDER GRADUATE ENGINEERING PROGRAMS (TIER-I)
FIRST TIME ACCREDITATION**

ACS COLLEGE OF ENGINEERING
Kambipura, Mysore Road, Bengaluru - 560 074
Website: www.acsce.edu.in

ACS College of Engineering



GLOBAL KNOWLEDGE . INNOVATIVE TECHNOLOGY



Kambipura, Mysore Road, Bangalore - 560 074



ACS College of Engineering
Kambipura, Mysore Road, Bengaluru-560 074
Affiliated to VTU, Belgaum, Approved by AICTE, New Delhi & Govt. Of Karnataka





Our College Building
ACS College of Engineering, Bangalore

Kambipura, Mysore Road, Bangalore - 560 074



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'A' GRADE



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ACS College of Engineering



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Kambipura, Mysore Road, Bangalore - 560 074



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Dr. M.S. MURALI
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ACS College of Engineering

Kambipura, Mysore Road, Bangalore - 560 074





Dr. Punal M Arabi
HOD of the Biomedical Department
ACS College of Engineering



Mrs. Surekha Nigudgi
NBA Co-ordinator
ACS College of Engineering

Kambipura, Mysore Road, Bangalore - 560 074



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SELF ASSESSMENT REPORT (SAR) FOR ACCREDITATION OF UG ENGINEERING PROGRAMME (TIER-II)

NATONAL BOARD OFACCREDITATION

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(June, 2015)

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DEPARTMENT OF BIOMEDICAL ENGINEERING

A-1 Institutional Information

Self Assessment Report (SAR) UG Part A

I. Institutional Information

1. Name and address of the institution:

ACS College of Engineering
207, Kambipura, Mysore Road
Bangalore-560074
Karnataka, India

2. Name and Address of the Affiliating University:

Visvesvaraya Technological University
"Jnana Sangama"
Belagavi – 590108
Karnataka, India

3. Year of establishment of the Institution:

2009-10

4. Type of Institution:

Institute of national Importance	<input type="checkbox"/>
University	<input type="checkbox"/>
Deemed university	<input type="checkbox"/>
Affiliated	<input checked="" type="checkbox"/>
Autonomous	<input type="checkbox"/>
Any other (Please specific)	<input type="checkbox"/>

Note:

1. In case of Autonomous and Deemed University, mention the year of grant of status by the authority.

2. In case of university Constituent Institution please indicate the academic autonomy status of the Institution as defined in 12th Plan guidelines if UGC. Institute should apply for Tier 1 only when fully academically autonomous.

5. Ownership Status:

Central Government	<input type="checkbox"/>
State Government	<input type="checkbox"/>
Government Aided	<input type="checkbox"/>
Self financing	<input type="checkbox"/>
Trust	<input checked="" type="checkbox"/>
Society	<input type="checkbox"/>
Section 25 Company	<input type="checkbox"/>
Any Other (Please specify)	<input type="checkbox"/>

DEPARTMENT OF BIOMEDICAL ENGINEERING

6. Other Academic Institutions of the Trust/Society/Company etc., if any

Name of the Institution(s)	Year of Establishment	Programs of Study	Location
RajaRajeswari Medical College & Hospital	2004-05	MBBS, MD, MS	Bangalore
RajaRajeswari Dental College & Hospital	1991-92	BDS, MDS	Bangalore
RajaRajeswari College of Engineering	2006-07	BE, M.Tech, Ph.D	Bangalore
RajaRajeswari College & School of Nursing	2004-05	GNM, BSC, PCBCS, MSC	Bangalore

Note: Add rows as needed.

7. Details of all the programs being offered by the institution under consideration

S. No.	Program Name	Year of Start	Intake	Increase in intake if any	Year of increase	AICTE Approval	Accreditation Status*
1.	B.E- Computer Science & Engg	2009-10	60	No	No	F.No.06/06/KTK / ENGG/2008/003 dt.22/06/2009	Yes Accredited
2.	B.E-Civil Engineering	2009-10	60	No	No		
3.	B.E-Electronics & Communication Engg	2009-10	60	No	No		
4.	B.E-Mechanical Engineering	2009-10	60	No	No		
5.	B.E-Aeronautical Engineering	2010-11	60	No	No	F.No.South-West Region/1-328729 /2010/EOA dt.23/08/2010	
6.	B.E-Bio-Medical Engineering	2010-11	60	No	No		
7.	B.E-Electrical & Electronic Engineering	2011-12	60	No	No	F.No.South-West Region/1-402580963 /2011/EOA dt.01/09/2011	

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M.Tech/PG Courses							
1.	M.Tech – Product Design & Manufacturing	2013-14	18	No	No	F.No.South-West Region/ 1-1359990619 /2013/EOA dt.19/03/2013	
2.	M.Tech – Structural Engineering	2013-14	18	No	No		
3.	M.Tech – Software Engineering	2014-15	18	No	No	F.No.South-West Region/ 1-2017625631 /2014/EOA dt.04/06/2014	
4.	M.Tech – Digital Electronics & Communication Engineering	2014-15	18	No	No		

* **Write applicable one:**

Applying first time

8. Programs to be considered for Accreditation vide this application

S. No.	Program Name
1.	B.E- Aeronautical Engineering
2.	B.E-Biomedical Engineering

9. Total number of employees: 124

A. Regular* Employees (Faculty and Staff):

Items		CAY		CAYM1		CAYM2	
		Min	Max	Min	Max	Min	Max
Faculty in Engineering	M	69	84	65	74	52	65
	F	33	34	37	35	28	40
Faculty in Maths, Science & Humanities	M	9	10	9	11	13	9
	F	8	9	8	7	9	8
Non-Teaching Staff	M	40		40		24	
	F	13		13		16	

- Means:**
- Full time on roll with prescribed pay scale. An employee on contract for a period of not less than two years AND drawing consolidated salary not less than applicable gross salary shall only be counted as a regular employee.
 - Prescribed pay scales means pay scales notified by the Regulatory Authority/ Central Government and implementation as prescribed by the Central/State Government as the case may be. In case State Government prescribes lesser consolidated salary for a particular cadre then same will be considered as reference while counting faculty as a regular faculty.

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CAY: Current Assessment Year (July –June: completed)

CAYm1: Current Assessment Year minus 1

CAYm2: Current Assessment Year minus 2

B. Contractual Staff Employees (Faculty and Staff): (Not covered in Table A):

Items		CAY		CAYM1		CAYM2	
		Min	Max	Min	Max	Min	Max
Faculty in Engineering	M						
	F						
Faculty in Maths, Science & Humanities	M						
	F			Not Applicable			
Non-Teaching Staff	M						
	F						

10. Total number of Engineering Students:

Item	CAY	CAYM1	CAYM2
Total No. of Boys	639	839	697
Total No. of Girls	401	387	329
Total No. of Students	1044	1226	1026

(Instruction: The data may be categorized in tabular form separately for undergraduate, postgraduate engineering, other program, if applicable)

Note:

In case the institution is running programs other than engineering programs, a separate table giving similar details is to be included.

11. Vision of the Institution:

Engineering the future of the nation by transforming the students to be technically skilled managers, innovative leaders and environmentally receptive citizens

12. Mission of the Institution:

- To implement holistic approach in curriculum and pedagogy through Industry Integrated Interactions to meet the needs of Global Engineering Environment.

DEPARTMENT OF BIOMEDICAL ENGINEERING

- To develop students with knowledge, attitude and skill of employability, entrepreneurship (Be Job creators than job seekers), research potential and professionally ethical citizens.

13. Contact Information of the Head of the Institution and NBA coordinator, if designated:

Name: **Dr M.S Murali**

Designation: **Principal**

Mobile No: **+91-9900028024**

Email Id: **principal@acsce.edu.in**

NBA coordinator, if designated:

Name: **Dr R.Siva Subramaniam**

Designation: **Associate professor**

Mobile No: **+91-9945535836**

Email Id: **shivasubramaniam@acsce.edu.in**

I.2. Name, designation, telephone number, and e-mail address of the contact person for the NBA:

Dr. M.S Murali

Principal

Tel: 080-28437955/56 Mobile: +91-9900028024

Fax No.: 080-28437989

E-mail: principal@acsce.edu.in

Website: www.acsce.edu.in

- I.3.** History of the College / Institution (including dates of introduction and no. of seats of Various programme of study along with NBA accreditation, if any), in tabular form: Not Applicable

1.3.1 Historical background

With a view to make available enormous opportunities for the in higher and technical education, Honorable Dr. A. C. Shanmugum, a Social Reformer in true sense, vowed to establish an ambitious project of an Engineering College at this interior, but a well connected place ACS College of Engineering (ACSCE), ACS College of Engineering, an institution and academic excellence, has been established in the year 2009 sponsored by Moogambigai Charitable and Educational Trust Bangalore with a cherished desire to serve the cause of humanity through the education. The institute is affiliated to Visvesvaraya Technological University, Belagavi. The college offers technical education in the range of engineering disciplines including new age ones

such as like B.E- Aeronautical Engineering, B.E - Bio-Medical Engineering and so on. The details of the programme offered by the institute are depicted in Table below.

1.3.2. Location

Bangalore known as a green city is a centrally located and well connected to all the parts of the country by air, rail and road. It is a capital city of Karnataka State. It is a fast growing Metropolis and is the third fast growing city.

ACSCE is located in Bangalore, the silicon valley of India. Many colleges are situated in the heart of India's "Garden City or the Silicon Valley of India"-Bangalore (1257N, 7738E, 920m altitude), which ranks amongst the most dynamic, progressive and fascinating of Indian cities.

The college is located at a beautiful lush green landscape, free from polluted environment and excellent atmosphere and ambience ideally suited for growth of the sound, soul & mind.

It is on the Bangalore – Mysore Highway 15Km from the Bangalore City Railway Station and Central Bus Stand and 2Km from Kengeri Railway Station and 36Km from International Airport.

1.3.3. Regular Academic Programme

Academic Programme

The Institution offers 8 Under Graduate Programs viz. B.E. in Aeronautical, Aerospace, Bio-Medical, Civil, Computer Science, Electronics & Communication, Electrical & Electronics and Mechanical Engineering.

The Institution also offers four Post Graduate full time programs (2 years duration) viz. M.Tech-Structural Engineering, M.Tech-Product Designing and Manufacturing Engineering, M.Tech-Software Engineering and M.Tech-Digital Electronics and Communication Systems. The Institution also offered Doctoral Research Ph.D., (full/part time) program in all Engineering Departments viz., Aero, Bio-Medical, Civil, Computer Science, Electronics & Communication, Electrical & Electronics, Mechanical Engineering, Mathematics, Chemistry and Physics.

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S. No	Program Name	Year	Intake Capacity
Under Graduate Program : B.E.			
01.	Computer Science Engineering	2009-10	120
02.	Civil Engineering	2009-10	120
03.	Electronics And Communication Engineering	2009-10	60
04.	Mechanical Engineering	2009-10	60
05.	Aeronautical Engineering	2010-11	60
06.	Bio-Medical Engineering	2010-11	60
07.	Electrical And Electronics Engineering	2012-13	60
08.	Aerospace Engineering	2017-18	60
TOTAL			600
Post Graduate & Research Programs: M.Tech.			
01.	Structural Engineering	2013-14	30
02.	Product Design And Manufacturing	2013-14	18
03.	Software Engineering	2014-15	18
04.	Digital Electronics And Communication System	2014-15	18
TOTAL			84
Research Centers (R&D)			
01.	Department of Mechanical Engineering	2014-15	-
02.	Department of Physics	2014-15	-
03.	Department of Computer Science	2014-15	-
04.	Department of Civil Engineering	2016-17	-
05.	Department of Electronics And Communication Engineering	2016-17	-
06.	Department of Aeronautical Engineering	2016-17	-
07.	Department of Bio-Medical Engineering	2016-17	-
08.	Department of Electrical And Electronics Engineering	2016-17	-
09.	Department of chemistry	2016-17	-
10.	Department of Mathematics	2016-17	-

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1.3.4 Accreditation Status:

S. No	Department	Accreditation Valid Up to
1.	Department of Civil Engineering	3 years Valid up to 30.06.2019
2.	Department of Computer Science & Engineering	
3.	Department of Electronics & Communication Engineering	
4.	Department of Mechanical Engineering	

Campus



Satellite View of ACSCE campus

ACSCE campus spread over an area of 10-00 acres on Bangalore-Mysore Road. It presents a panorama of harmony in architecture and natural beauty. The campus has been organized in three functional sectors;

- Hostels for Students, Health Centre, Sports Complex
- Academic Buildings, Administrative Building and Library
- Residential Sector for Family & Staff

The academic buildings are located fairly in close proximate, to the hostels and the staff quarters. The campus has a full-fledged computerized branch of Kotak Mahindra bank with ATM facility, Post office, Axis bank ATM as well as courier services and other needs of students, residents and office are nearby.

The Institute has its own fully fledged Health Center with a full time residential medical Officer. The specialized medical services of a Psychological Counselor, Dietician, physiotherapist, Pathology lab, Yoga Centre and also medical consultants in Ayurveda and Homeopathy are available. Patients suffering from serious illness/enquiring intensive care are referred to the Govt. Medical College and Hospital and other Health Care Centers duly approved under the CGHS. A full time dedicated Ambulance service is available at the dispensary. Spacious and multicuisine canteen

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is located close to the instruction zone and hostels. Two more cafeterias exist on the campus. The Institute has a well equipped Gymkhana apart from various playgrounds for Tennis, Badminton, Volley Ball, Foot Ball, Hockey and Cricket. NCC unit is also located on campus. They are very well used by students and campus residents of quarters.

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PART B: Criteria Summary

Name of the program: _____

Criteria No.	Criteria	Mark/Weightage
Program Level Criteria		
1.	Vision, Mission and Program Educational Objectives	60
2.	Program Curriculum and Teaching – Learning Processes	120
3.	Course Outcomes and Program Outcomes	120
4.	Students' Performance	150
5.	Faculty Information and Contributions	200
6.	Facilities and Technical Support	80
7.	Continuous Improvement	50
Institute Level Criteria		
8.	First Year Academics	50
9.	Student Support Systems	50
10.	Governance, Institutional Support and Financial Resources	120
Total		1000

DEPARTMENT OF BIOMEDICAL ENGINEERING

1. VISION, MISSION AND PROGRAM EDUCATIONAL OBJECTIVES (60)

1.1. State the Vision and Mission of the Department and Institute (5)

VISION AND MISSION OF THE INSTITUTE:

Vision

Engineering the future of the nation by transforming the students to be technically skilled managers, innovative leaders and environmentally receptive citizens

Mission

1. To implement holistic approach in curriculum and pedagogy through Industry Integrated Interactions to meet the needs of Global Engineering Environment.
2. To develop students with knowledge, attitude and skill of employability, entrepreneurship (Be Job creators than job seekers), research, potential and professionally ethical citizens.

VISION AND MISSION OF THE BIOMEDICAL ENGINEERING DEPARTMENT

Vision

To impart quality education to equip students with knowledge and skill to excel in the field of biomedical engineering to shoulder out their professional responsibility towards the future and wellbeing of the society.

Mission

- To adopt innovative teaching and learning methods to disseminate knowledge.
- To facilitate self learning, problem solving, Creative and software skills through practical exposure by internships
- To provide the state of the art technical ambience to foster research and development to serve the society by transforming students in to entrepreneurs, professionally ethical engineers.

1.2. State the Program Educational Objectives (PEOs) (5)

Our graduates are grounded in fundamentals that will serve them throughout their professional careers. They will have an understanding of human behavior, societal needs and the dynamics of human efforts and their effects on human health and that of our environment. With this underpinnings and abilities, we have defined several program educational objectives that we expect from our graduates in 3-5 years after graduation.

PEO1 Skill &	Prepare our graduates for continuing education and employment in biomedical engineering or related profession.
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knowledge	
PEO2 Lifelong learning	Instill in our graduates a desire to participate in lifelong learning that will farther their careers.
PEO3 Attitude	Work in a technically competent manner to address the challenges in engineering or in their chosen profession taking into consideration of ethical and societal concerns.

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1.3. Indicate where the Vision, Mission and PEOs are published and disseminated among stakeholders (10)

<u>Internal Stakeholders</u>	<u>External Stakeholders</u>
Management (Moogambigai Charitable and Educational Trust (R))	Parents
Governing body Members	Alumni
Faculty	Employers
Students	Industries
Non Teaching Staff	

Our Vision, Mission and PEOs are published in

Our Vision, Mission and PEOs are published in	Internal Stakeholders	External Stakeholders
College Website	√	√
Department Website	√	√
Department newsletter	√	

Our Vision, Mission and PEOs are disseminated in

Our Vision, Mission and PEOs are disseminated in	Internal Stakeholders	External Stakeholders
HOD Room	√	
Faculty rooms	√	
Class rooms	√	
Laboratories	√	
Department corridors	√	√
Department notice board	√	√
Seminar Hall	√	√

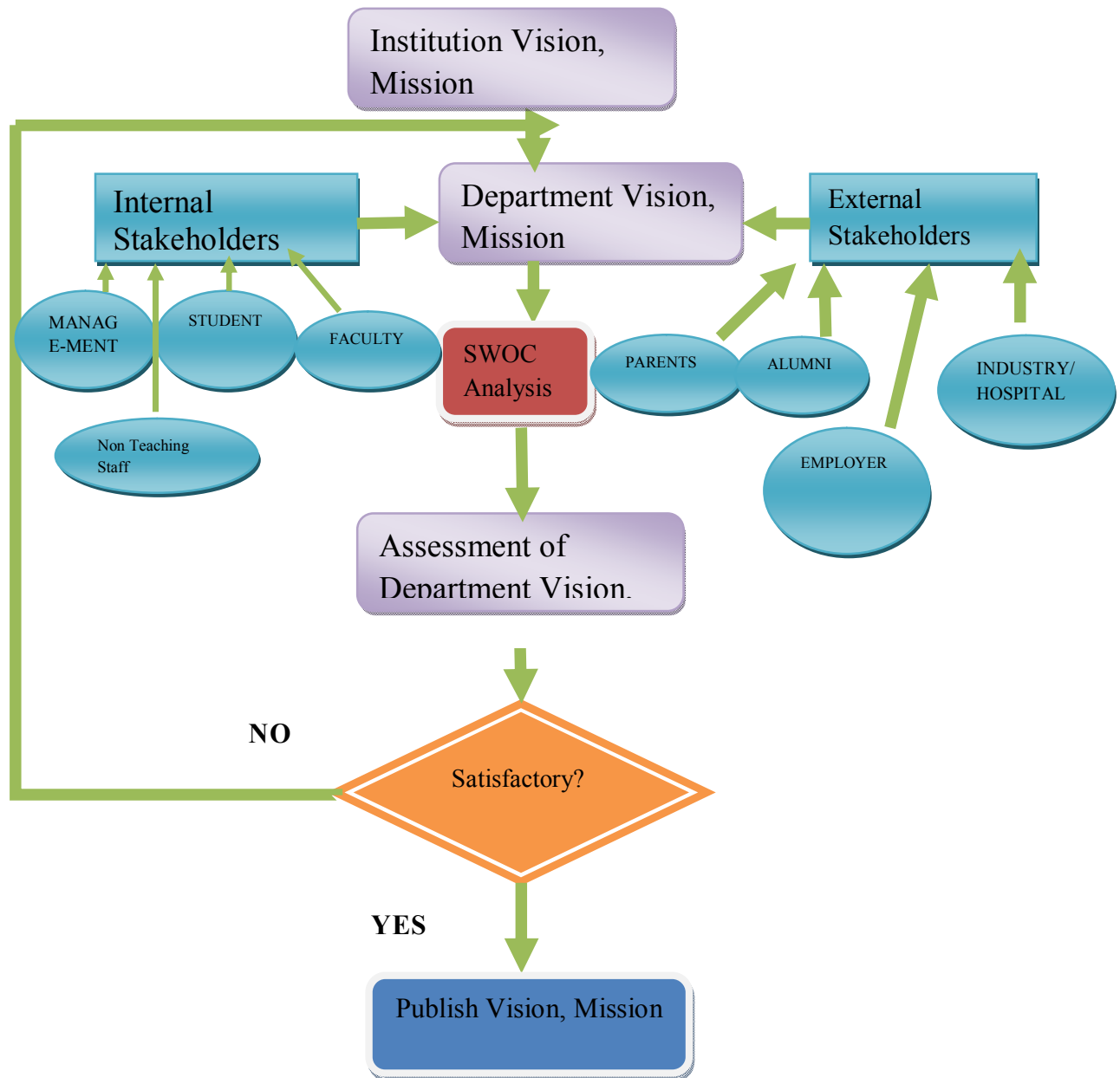
1.4. State the process for defining the Vision and Mission of the Department, and PEOs of the program (25)

The process for defining the vision, mission and PEOs of the program was discussed at department level and were defined through a continuous process involving internal and external stake holders of the department.

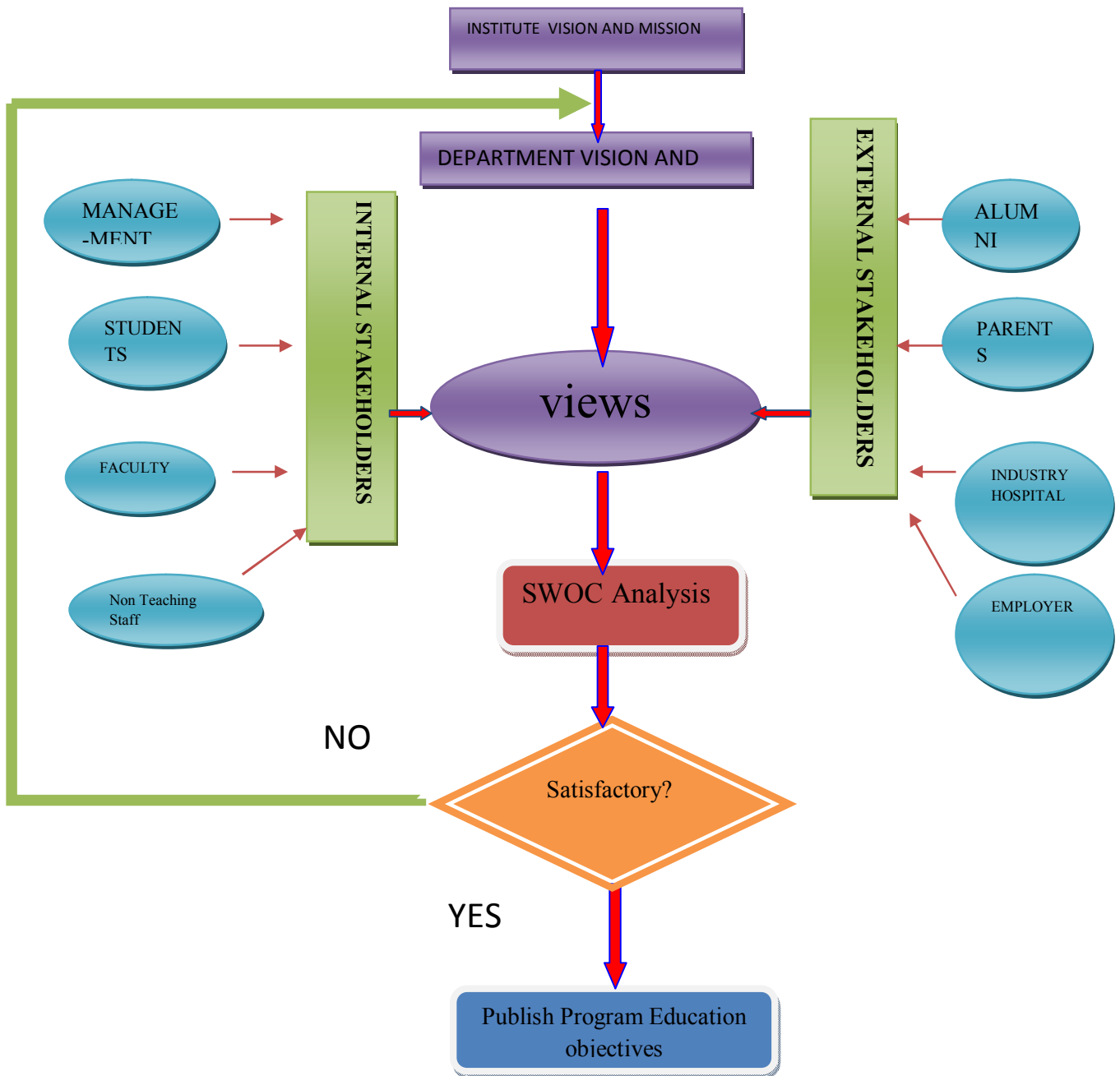
- Trust and Institution vision and mission were considered as foundation.
- Opinions from internal and external stakeholders are considered for defining vision, mission and PEO of the department.
- SWOC analyses were done to check the suitability of vision, mission and PEO of the department.
- Based on SWOC analyses, vision mission and PEO are finalized.
- If the finalized vision, mission and PEO are not satisfactory, the above steps are repeated for modification.

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Process for defining Vision and Mission



Process for defining program Education objectives



1.5. Establish consistency of PEOs with Mission of the Department (15)

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PEO Statement	Mission Key Components			Justification
	innovative teaching and learning methods M1	self learning, problem solving, Creative and software skills(M2)	Research and development (M3)	
Prepare our graduates for continuing education and employment in biomedical engineering or related profession.	3	2	3	<p>M1 strongly supports to achieve PEO1 because conventional teaching methods are not bridging gap between institute and industry, so to bridge the gap innovative teaching and learning methods are adopted.</p> <p>M2 moderately supports PEO1 since even though internships in relevant industries facilitate self learning, problem solving, creative and software skills but students and industry ratio is low.</p> <p>M3 strongly supports PEO1, due to technical ambience of the department, which encourages students to continue education or gain employment</p>
Instill in our graduates a desire to participate in lifelong learning that will farther their careers.	3	3	2	<p>M1 strongly adheres to PEO2 because teaching and learning methods adopted give in depth knowledge of biomedical field which will kindle desire in lifelong learning</p> <p>M2 strongly supports PEO2 since the following skills; self learning, problem solving, Creative and software skills helps our students in improving their careers</p> <p>M3 moderately agrees to PEO2, by providing expected level of technical ambience has a limitation</p>
Work in a technically competent manner to address the challenges in engineering or in their chosen profession taking into consideration of ethical and societal concerns.	2	2	2	<p>M1 slightly support PEO3 as teaching and learning methods does not address the problem towards ethical and social responsibilities.</p> <p>M2 strongly supports to achieve PEO3 since self learning, problem solving, Creative and software skills of students will help them to technically competent to address the challenges in engineering or in their chosen profession taking into consideration of ethical and societal concerns.</p> <p>M3 strongly obeys PEO3 because current challenges in biomedical field for UG students can be addressed by research and development activities</p>
<div style="display: flex; justify-content: space-between; padding: 0 10px;"> 1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High) </div>				

2. PROGRAM CURRICULUM AND TEACHING - LEARNING PROCESSES (120)**2.1. Program Curriculum (20)**

Process used to identify extent of compliance of the University curriculum for attaining the Program Outcomes and Program Specific Outcomes as mentioned in Annexure I. Also mention the identified curricular gaps, if any (10)

ACS College of Engineering is affiliated to Visvesvaraya Technological University, Belgaum. Biomedical engineering program curriculum is as per the scheme and syllabus of VTU. In general, Curriculum consists of subjects of Basic Science & Engineering, Humanities, Management subjects, Core subjects with Electives (Open & Professional). Course also consists of practical labs with Seminars & Project works.

Currently the Department running as following different Scheme for different batches.

Syllabus Scheme Year wise:

Year	Students	Scheme
2014-2018	Final Year	2010
2015-2019	Third Year	2015
2016-2020	Second Year	2015

1. The course is for four Academic years and Program is spread over 08 semesters.
2. Minimum of 85% attendance is mandatory to get eligibility to attend practical & theory examinations along with a provision of 10% of the attendance by the Vice- Chancellor on the specific recommendation of the principal of the college.
3. There shall be maximum of 25 Internal Assessment Marks in each theory subject or practical papers.
4. Three Internal Tests are offered to the student, after evaluating average marks of best two tests will be considered for Internal Assessment Marks for the each subject.
5. A candidate failing to secure a minimum of 50% of the IA marks in practical/project work shall not be eligible for the practical/project in the university.
6. Candidates shall carry forward maximum of 4 subjects form either 1st or 2nd semester to get admission to 3rd semester, and to get admission for 5th semester he/she can carry forward

maximum of 4 subjects from either 3rd or 4th semester & should have passed in all the subjects of 1st & 2nd Semesters. Similarly maximum of 4 subjects can be carried forward from 5th & 6th semester to get admission to 7th semester and should have cleared all the subjects from 1st to 4th semester.

7. For a pass in a theory subject/drawing, the candidate shall secure minimum of 35% of the maximum marks prescribed in the university examination & 40% of marks in the aggregate inclusive of the IA marks. Also for practical/project/viva-voce examination, a candidate shall secure a minimum of 40% of the maximum marks prescribed by the university.
8. A candidate shall take one elective in 6th semester from 'Group-A', two electives in 7th semester (one each from Groups 'B', 'C') & two electives in 8th semester (one each from Groups 'D' & 'E'). There shall be a minimum of 3 electives are to be listed in every group.

Program specific Criteria for Biomedical Engineering are specified by Visvesvaraya Technological University, **Program specific criteria and their associated subjects are**

A. Humanity Sciences (Basic Sciences):

Basic Sciences Subjects from engineering chemistry, engineering physics, engineering physics lab, engineering chemistry lab are studied to understand & strengthen the fundamental of basic sciences that are implemented to solve the engineering problems.

Mathematics This subject becomes the base for all the subjects where mathematical equations are made use. The course include probability and statistics, including applications appropriate to the program through differential and integral calculus, differential equations, linear algebra, complex variables, and discrete mathematics, etc. Subjects cover the following topics under this session are: Engineering Mathematics – I, II, III & IV Diploma Mathematics for 3rd semester lateral entry students (Diploma students).

Environmental studies: The subject includes the environment awareness with respect to pollution and control; sources of energy, awareness about the global warming, environmental education and legal aspects empowered by the government.

Constitutions of India & Professional Ethics: This subject gives the knowledge of constitution of India, fundamental rights, union, state executives, electoral, amendment procedure. The scope of engineering ethics, responsibilities, impediments to responsibility.

B. Basic Engineering:

This category includes Elements of Mechanical Engineering, Elements of Civil Engineering & Engineering Mechanics, Basic Electronics, Computer Concepts & C

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Programming, Computer Aided Engineering Drawing, and Computer Programming Lab & Basic Electrical Engineering. It gives basic exposure of all engineering stream so that in future students can correlate mechanical engineering with other streams while working in multidisciplinary environment.

C. Fundamentals of Course Coverage are as follows:

The core areas of Biomedical engineering are human anatomy and physiology, Biomedical transducers and measurements, Clinical Instrumentation –I &II, Biomedical equipments, Medical Imaging system, Medical Image Processing.

Human anatomy and physiology	Biomedical transducers and measurements	Biomedical equipments	Clinical Instrumentation
<p>1. Analyze and describe the structures and functions of human anatomy and physiology from a regional perspective for the following regions: head and neck, thoracic, abdominopelvic, and upper and lower extremities.</p> <p>2. Discuss in depth the physiology of the nervous, musculoskeletal, respiratory, and cardiovascular systems.</p> <p>3. Recognize the major organs and components of the respiratory system and understand their functions.</p> <p>4. Recognize the major organs and vessels of the cardiovascular system and understand their functions.</p> <p>5. Describe briefly the basic components and functions of the digestive, urinary, and endocrine systems.</p>	<p>Learning the basic concepts of measurements with basic medical instrumentation system along with general constraints</p> <p>Learning the bioelectric signals and the electrodes used to measure the signals</p> <p>Learning the measurement of pressure and temperature with various ranges and requirements</p> <p>Learning the measurement of blood flow with various blood flow meters</p> <p>Learning the objectives of chemical measurement with requirements and limitations</p> <p>Learning the concepts of biosensors</p> <p>With respect to above subject the practical lab is included in the syllabus. the following major experiments can be conducted in the practical session</p> <p>1. Strain gauge</p> <p>2. Transducer characteristics</p> <p>3. BP measurement</p>	<p>This subject deals with all hospital equipments, student learn the basics of working principle of all the biomedical equipments like physiotherapy, pacemakers, defibrillators.</p>	<p>This subject includes two parts : ophthalmology and anesthesia. Practical lab also is there in syllabus. The following experiments can be done.</p> <p>1. Inverting and non inverting characteristics</p> <p>2. Calorimeter</p> <p>3. PH meter</p> <p>4. Conductivity meter</p> <p>5. Pacemaker</p>

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Program Flow Chart:



2.1.1 State the process used to identify extent of compliance of the University curriculum for attaining the Program Outcomes and Program Specific Outcomes as mentioned in Annexure I. Also mention the identified curricular gaps, if any (10)

(State the process details; also mention identified curricular gaps).

Note: In case all POs are being demonstrably met through University Curriculum then

2.1.2 Will not be applicable and the weight age of 2.1.1 will be 20.

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Syllabus Copy:

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
SCHEME OF TEACHING AND EXAMINATION (2010 scheme)

I SEMESTER B.E/B.TECH

PHYSICS GROUP

S. no	Subject Code	Title	Teaching Hours/ week		Examination		
			Th.	Pr.	I.A marks	Theory/ Practical	Total Marks
1	10MAT-11	Engineering Maths-I	4	-	25	100	125
2	10PHY-12	Engineering Physics	4	-	25	100	125
3	10CIV-13	Elements of Civil Engg & Engg Mechanics	4	-	25	100	125
4	10EME-14	Elements of Mechanical Engg	4	-	25	100	125
5	10ELE-15	Basic Electrical Engg	4	-	25	100	125
6	10WSL-16	Workshop Practice	-	3	25	50	75
7	10PHYL-17	Engg. Physics Lab	-	3	25	50	75
8	10CIP-18	Constitution of India & Professional Ethics	2	-	25	50	75
9		Language(Kan.)	2		-	-	-
Total			30		175	600	775

II SEMESTER B.E/B.TECH

CHEMISTRY GROUP

S. no	Subject Code	Title	Teaching Hours/ week		Examination		
			Th.	Pr.	I.A marks	Theory/ Practical	Total Marks
1	10MAT-21	Engineering Maths-II	4	-	25	100	125
2	10CHE-22	Engineering Chemistry	4	-	25	100	125
3	10CCP-23	Computer Concepts & C programming	4	-	25	100	125
4	10CED-24	Computer Aided Engg Drawing	2	4	25	100	125
5	10ELN-25	Basic Electronics	4	-	25	100	125
6	10CPL-26	Computer Programming Lab	-	3	25	50	75
7	10CHEL-27	Engg. Chemistry Lab	-	3	25	50	75
8	10CIV- 28	Environmental Studies	2	-	25	50	75
9		Language(Eng.)	2		-	-	-
Total			32		175	600	775

DEPARTMENT OF BIOMEDICAL ENGINEERING

III SEMESTER B.E/B.TECH

S. no	Subject Code	Title	Teaching Hours/ week		Examination		
			Th	Pr	I.A marks	Theory/ Practical	Total Marks
1	10MAT31	Engineering Mathematics-III	4	-	25	100	125
2	10ES32	Analog Electronics circuits	4	-	25	100	125
3	10ES33	Logic design	4	-	25	100	125
4	10ES34	Network analysis	4	-	25	100	125
5	10IT35	Electronic instrumentation	4	-	25	100	125
6	10BM36	Human anatomy and physiology	1	3	25	100	125
7	10ESL37	Analog Electronics Lab	-	3	25	50	75
8	10EC38	Logic design lab	-	3	25	50	75
Total			21	9	200	700	900

IV SEMESTER B.E/B.TECH

S. no	Subject Code	Title	Teaching Hours/ week		Examination		
			Th	Pr	I.A marks	Theory/ Practical	Total Marks
1	10MAT41	Engg. Mathematics-IV	4	-	25	100	125
2	10ES42	Micro controllers	4	-	25	100	125
3	10ES43	Control systems	4	-	25	100	125
4	10BM44	Biomedical Transducers	4	-	25	100	125
5	10EC45	HDL	4	-	25	100	125
6	10EC46	Linear integrated circuits	4	-	25	100	125
7	10ES47	Micro controllers lab	-	3	25	50	75
8	10EC48	HDL Lab	-	3	25	50	75
Total			24	6	200	700	900

DEPARTMENT OF BIOMEDICAL ENGINEERING

V SEMESTER B.E/B.TECH

S. No	Subject Code	Title	Teaching Hours/ week		Examination		
			Th	Pr	I.A marks	Theory/ Practical	Total Marks
1	10AL51	Management and Entrepreneurship	4	-	25	100	125
2	10BM52	Microprocessors	4	-	25	100	125
3	10BM53	Signals and systems	4	-	25	100	125
4	10BM54	VLSI	4	-	25	100	125
5	10BM55	Clinical instrumentation -1	4	-	25	100	125
6	10BM56	Biomedical equipments	4	-	25	100	125
7	10BML57	Micro processors Lab	-	3	25	50	75
8	10BML58	Clinical Instrumentation-1 Lab	-	3	25	50	75
Total			24	6	200	700	900

VI SEMESTER B.E/B.TECH

S. No	Subject Code	Title	Teaching Hours/ week		Examination		
			Th.	Pr.	I.A marks	Theory/ Practical	Total Marks
1	10BM61	Communication systems	4	-	25	100	125
2	10BM62	C++ and data structures	4	-	25	100	125
3	10BM63	Digital signal processing	4	-	25	100	125
4	10BM64	Analytical and pharmaceutical instrumentation	4	-	25	100	125
5	10BM65	Clinical instrumentation-2	4	-	25	100	125
6	10BM66	*Elective-I(Group A)	4	-	25	100	125
7	10BML67	C++ and data structures Lab	-	3	25	50	75
8	10BML68	Clinical instrumentation-2 Lab	-	3	25	50	75
Total			24	6	200	700	900

DEPARTMENT OF BIOMEDICAL ENGINEERING

Subject Code	*Elective I (Group A)
10BM661	Operating systems with Linux
10BM662	Bioinformatics
10BM663	Biomaterials and artificial organs
10BM664	Computer organization
10AE665	Hospital management
10AE666	Reliability Engineering

**Student shall register for one subject from Group A Electives*

VII SEMESTER B.E/B.TECH

S. No	Subject Code	Title	Teaching Hours/ week		Examination		
			Th	Pr	I.A marks	Theory/ Practical	Total Marks
1	10BM71	Computer communication networking	4	-	25	100	125
2	10BM72	BMDSP	4	-	25	100	125
3	10BM73	Embedded systems	4	-	25	100	125
4	10ABM74	Medical image processing	4	-	25	100	125
5	10BM*	*Electives II (Group B)	4	-	25	100	125
6	10BM76*	*Electives III (Group C)	4	-	25	100	125
7	10AEL77	Design, Modeling and Analysis Laboratory	-	3	25	50	75
8	10AEL78	Simulation Laboratory	-	3	25	50	75
Total			24	6	200	700	900

Subject Code	* Elective II (Group B)	Subject Code	* Elective III (Group C)
10BM751	Biomechanics and biodynamic	10BM761	Biostatistics
10BM752	Genetic engineering	10BM762	Tissue engineering
10BM753	Medical informatics	10BM763	Ergonomics
10BM754	DSP architecture	10BM764	ARM processors and programming
10BM755	Low power VLSI	10BM765	Wavelet transforms
10BM756	Speech signal processing	10BM766	Software engineering

** Students shall register for one subject from each Group B and C Electives*

DEPARTMENT OF BIOMEDICAL ENGINEERING

VIII SEMESTER B.E/B.TECH

S. No	Subject Code	Title	Teaching Hours/ week		Examination		
			Th	Pr	I.A marks	Theory/ Practical	Total Marks
1	10BM81	DBMS	4	-	25	100	125
2	10BM82	Medical imaging systems	4	-	25	100	125
3	10BM83 *	*Electives IV- (Group D)	4	-	25	100	125
4	10BM84 *	*Electives V- (Group E)	4	-	25	100	125
5	10BM85	Project Work	-	3	100	100	200
6	10BM86	Seminar on Current Topics	3	-	50	-	50
Total			19	3	250	500	750

Electives-IV (Group-D)			Electives-V (Group-E)		
S. No	Subject Code	Title of the Subject	S. No	Subject Code	Title of the Subject
1	10BM831	Lasers & Optical Fibers in Medicine	1	10BM841	Bio-MEMS
2	10BM832	Biosensors & Smart Sensors	2	10BM842	Biological Control Systems and Modeling
3	10BM833	Nanotechnology	3	10BM843	Picture Archiving & Communication Systems
4	10BM834	Neural Networks & AI in Biomedical Engg.	4	10BM844	Pattern Recognition in Medicine
5	10BM835	Hardware-Software Co-design	5	10BM845	Digital Systems using Verilog
6	10BM836	Distributed Sensor Networks	6	10BM846	Real Time Systems

DEPARTMENT OF BIOMEDICAL ENGINEERING

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM

SCHEME OF TEACHING AND EXAMINATION

I SEMESTER B.E/B.TECH(2015-2016)CBCS SCHEME

PHYSICS GROUP

S. No	Subject Code	Title	Teaching Hours/Practical week	Examination		
				I.A marks	Theory/ Practical	Total Marks
1	15MAT-11	Engineering Maths-I	4	20	80	100
2	15PHY-12	Engineering Physics	4	20	80	100
3	15CIV-13	Elements of Civil Engg & Engg Mechanics	4	20	80	100
4	15EME-14	Elements of Mechanical Engg	4	20	80	100
5	15ELE-15	Basic Electrical Engg	4	20	80	100
6	15WSL-16	Workshop Practice	3 (2 hrs lab+1 hr instruction)	20	80	100
7	15PHYL-17	Engg. Physics Lab	3(2 hrs lab+ 1 hr instruction)	20	80	100
8	15CIP-18	Constitution of India & Professional Ethics	2	10	40	50
9		Language(Kan.)	1	-	-	-
Total			29	150	600	750

DEPARTMENT OF BIOMEDICAL ENGINEERING

II SEMESTER B.E/B.TECH(2015-2016)CBCS SCHEME

CHEMISTRY GROUP

S. No	Subject Code	Title	Teaching Hours/Practical week	Examination		
				I.A marks	Theory/ Practical	Total Marks
1	10MAT-21	Engineering Maths-II	4	20	80	100
2	10CHE-22	Engineering Chemistry	4	20	80	100
3	10CCP-23	Computer Concepts & C programming	4	20	80	100
4	10CED-24	Computer Aided Engg Drawing	4	20	80	100
5	10ELN-25	Basic Electronics	4	20	80	100
6	10CPL-26	Computer Programming Lab	3(2 hrs lab+ 1 hr instruction)	20	80	100
7	15PHYL-17	Engg.Physics Lab	3(2 hrs lab+ 1 hr instruction)	20	80	100
8	15CIP-18	Constitution of India & Professional Ethics	2	10	40	50
9		Language(Kan.)	1	-	-	-
Total			29	150	600	750

DEPARTMENT OF BIOMEDICAL ENGINEERING

III SEMESTER B.E/B.TECH

S. No	Subject Code	Title	Teaching Hours/ week		Examination		
			Th.	Pr.	I.A marks	Theory/ Practical	Total Marks
1	15MAT31	Engineering Mathematics-III	4	-	20	80	100
2	15BM32	Electronic Instrumentation and	4	-	20	80	100
3	15BM33	Analog Electronic Circuits	4	-	20	80	100
4	15BM34	Digital Design and HDL	4	-	20	80	100
5	15BM35	Human Anatomy and Physiology	4	-	20	80	100
6	15BM36	Network Analysis *	4		20	80	100
7	15BML37	Analog Electronics Lab	-	1I+2 P	20	80	100
8	15BML38	Digital Design and HDL Lab	-	1I+2 P	20	80	100
Total			24	6	160	640	800

- 1. Core Subject:** This is the course which is compulsorily need to be studied by the student as a core requirement to complete the requirement of a programme in a said discipline of study.
- 2. Foundation Course *:** The courses based upon the content that leads to Knowledge enhancement.

DEPARTMENT OF BIOMEDICAL ENGINEERING

IV SEMESTER B.E/B.TECH

S. No	Subject Code	Title	Teaching Hours/ week		Examination		
			Th.	Pr.	I.A marks	Theory/ Practical	Total Marks
1	15MAT41	Engineering Mathematics-IV	4	-	20	80	100
2	15BM42	Signal Conditioning and Data Acquisition Circuits	4	-	20	80	100
3	15BM43	Embedded Controllers	4	-	20	80	100
4	15BM44	Control Systems	4	-	20	80	100
5	15BM45	Biomedical Transducers and Measurements	4	-	20	80	100
6	15BM46	Scientific and Analytical Instrumentation *	4		20	80	100
7	15BML47	Embedded Controllers Lab		1H+2P	20	80	100
8	15BML48	Biomedical Transducers and Measurements Lab	-	1H+2P	20	80	100
Total			24	6	160	640	800

- 1. Core Subject:** This is the course which is compulsorily need to be studied by the student as a core requirement to complete the requirement of a programme in a said discipline of study.
- 2. Foundation Course*:** The courses based upon the content that leads to Knowledge enhancement.

DEPARTMENT OF BIOMEDICAL ENGINEERING

VSEMESTER B.E/B.TECH

S. No	Subject Code	Title	Teaching Hours/ week		Examination		
			Th.	Pr.	I.A marks	Theory/ Practical	Total Marks
1	15ES51	Management and Entrepreneurship Development	4	-	20	80	100
2	15BM52	Fundamentals of Signals & DSP	4	-	20	80	100
3	15BM53	Clinical Instrumentation-I	4	-	20	80	100
4	15BM54	Biomedical Equipment's	4	-	20	80	100
5	15BM55x	Professional Elective-I	4	-	20	80	100
6	15BM56x	Open Elective-I	4		20	80	100
7	15BML57	Signal Conditioning Circuits and Data Acquisition Lab	-	1I+2 P	20	80	100
8	15BML58	Clinical Instrumentation Lab	-	1I+2 P	20	80	100
Total			24	6	160	640	800
Professional elective			Open elective				
15BM551	VLSI Design	15BM561	Computer Organization				
15BM552	Rehabilitation Engineering	15BM562	Virtual Bio-Instrumentation				
15BM553	Hospital Design, Planning and Management	15BM563	Operating Systems				
15BM554	Biomedical Nanotechnology	15BM564	Medical Physics				

15NC565	Essentials of NCC (common to all branches of Engg)
15CS561	Mobile Development Application (common to all branches of Engg)

- 1. Core Subject:** This is the course which is compulsorily needed to be studied by the student as a core requirement to complete the requirement of a programme in a said discipline of study.
- 2. Professional Elective:** Elective relevant to chosen specialization / branch
- 3. Open Elective:** Electives from other technical and/or emerging subject areas.

DEPARTMENT OF BIOMEDICAL ENGINEERING

VI SEMESTER B.E/B.TECH

S. No	Subject Code	Title	Teaching Hours/ week		Examination		
			Th	Pr	I.A marks	Theory/ Practical	Total Marks
1	15BM61	Analog and Digital Communication Systems	4	-	20	80	100
2	15BM62	Medical Image Processing	4	-	20	80	100
3	15BM63	OOPs with C++	4	-	20	80	100
4	15BM64	Clinical Instrumentation-II	4	-	20	80	100
5	15BM65x	Professional Elective-I	4	-	20	80	100
6	15BM66x	Open Elective-I	4		20	80	100
7	15BML67	Medical Image Processing Lab	-	1I+2 P	20	80	100
8	15BML68	OOPs with C++Lab	-	1I+2 P	20	80	100
Total			24	6	160	640	800

Professional Elective - II		Open Elective - II	
15BM651	Biosensors and Smart Sensors	15BM661	Mobile Communication
15BM652	Distributed Sensor Networks	15BM662	Software Engineering
15BM653	Bioinformatics	15BM663	Embedded System Design and Programming
15BM654	Biomechanics and Biodynamic	15BM664	Statistics and Numerical Methods

DEPARTMENT OF BIOMEDICAL ENGINEERING

VII SEMESTER B.E/B.TECH

S. No	Subject Code	Title	Teaching Hours/ week		Examination		
			Th.	Pr.	I.A marks	Theory/ Practical	Total Marks
1	15BM71	Biomedical Digital Signal Processing	4	-	20	80	100
2	15BM72	Computer Communication Networks in Healthcare	4	-	20	80	100
3	15BM73	ARM Processor	4	-	20	80	100
4	15BM74x	Professional Elective-III	3	-	20	80	100
5	15BM75x	Professional Elective-IV	3	-	20	80	100
6	15BML76	Biomedical DSP Lab		1I+2 P	20	80	100
7	15BML77	ARM Processor Lab	-	1I+2 P	20	80	100
8	15BML78	Project Work Phase-I + Project Seminar	-	1I+2 P	100	-	100
Total			18	9	240	560	800

Professional Elective-IV		Open Elective - IV	
15BM741	Database Management System in Healthcare	15BM751	Biostatistics
15BM742	Medical Informatics and Expert Systems	15BM752	Lasers and Optical Fibers in Medicine
15BM743	Hardware-Software Co-design	15BM753	Ergonomics
15BM744	Biometric Systems	15BM754	Big-data and Cloud Computing

DEPARTMENT OF BIOMEDICAL ENGINEERING

VIII SEMESTER B.E/B.TECH

S. No	Subject Code	Title	Teaching Hours/ week		Examination		
			Th	Pr	I.A marks	Theory/ Practical	Total Marks
1	15BM81	Medical Imaging Systems	4	-	20	80	100
2	15BM82	Biomaterials and Artificial Organs	4	-	20	80	100
3	15BM83x	Professional Elective-V	3	-	20	80	100
4	15BM84	Internship / Professional Practice	Industry Oriented		50	50	100
5	15BMP85	Project Work Phase-II	-	6	100	100	200
6	15BMS86	Seminar		4	100		100
Total			11	10	310	390	700

Professional Elective - V	
15BM831	Bio-MEMS
15BM832	Medical Device Regulations
15BM833	Picture Archiving and Communication Systems
15BM834	Neural Networks and AI in Biomedical Engg.

DEPARTMENT OF BIOMEDICAL ENGINEERING

- 1. Core Subject:** This is the course which is compulsorily need to be studied by the student as a core requirement to complete the requirement of a programme in a said discipline of study.
- 2. Professional Elective:** Elective relevant to chosen specialization/ branch.
- 3. Internship / Professional Practice:** To be carried between the 6th and 7th semester vacation or 7th and 8th semester vacation period.
- 4. Project Work Phase –II:** Design, Development, Implementation, Demonstration, Testing, Presentation and Project Report Submission.

Seminar: On current topics of Engineering & Technology related to said discipline of study. Preparation of Seminar Report and Presentation

Program Outcomes:

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES

- An ability to apply mathematical knowledge to design, develop, and analyze Bio-medical problems and applications.
- Impart basic and advanced Bio-medical knowledge needed for the student relevant to excel as Bio-medical engineer.

Courses are analyzed for the curriculum gaps based on:

- Input from subject Teachers.
- Input from Industry Experts.
- Placement record.
- Alumni feedback.
- management feedback.

This college is affiliated to Visvesvaraya Technological University, Belgaum. Biomedical Engineering program curriculum is as per the scheme and syllabus of affiliated university. In general, Curriculum maintains the balance in the composition of Basic Science & Engineering, Humanities, Professional Courses and their distribution in Core and Electives along with Seminars & Project works. The feedback from the Alumni and Industry experts is taken with at most importance and GAPS were identified along with the data collected from Internet (National & International websites), other universities which are located in and around Karnataka. The data collected were then presented to the Department Core Committee. The committee illustrates the same to IQAC at institute level and the changes in course delivery and content beyond the syllabus are finalized. If some components, to attain CO's/ PO's, are not included in the curriculum provided by the affiliated university then the department makes additional efforts to impart such knowledge by covering aspects through "changes in course delivery and content beyond the syllabus". We add content beyond syllabus by process shown in Figure 2.1 and Figure 2.2.

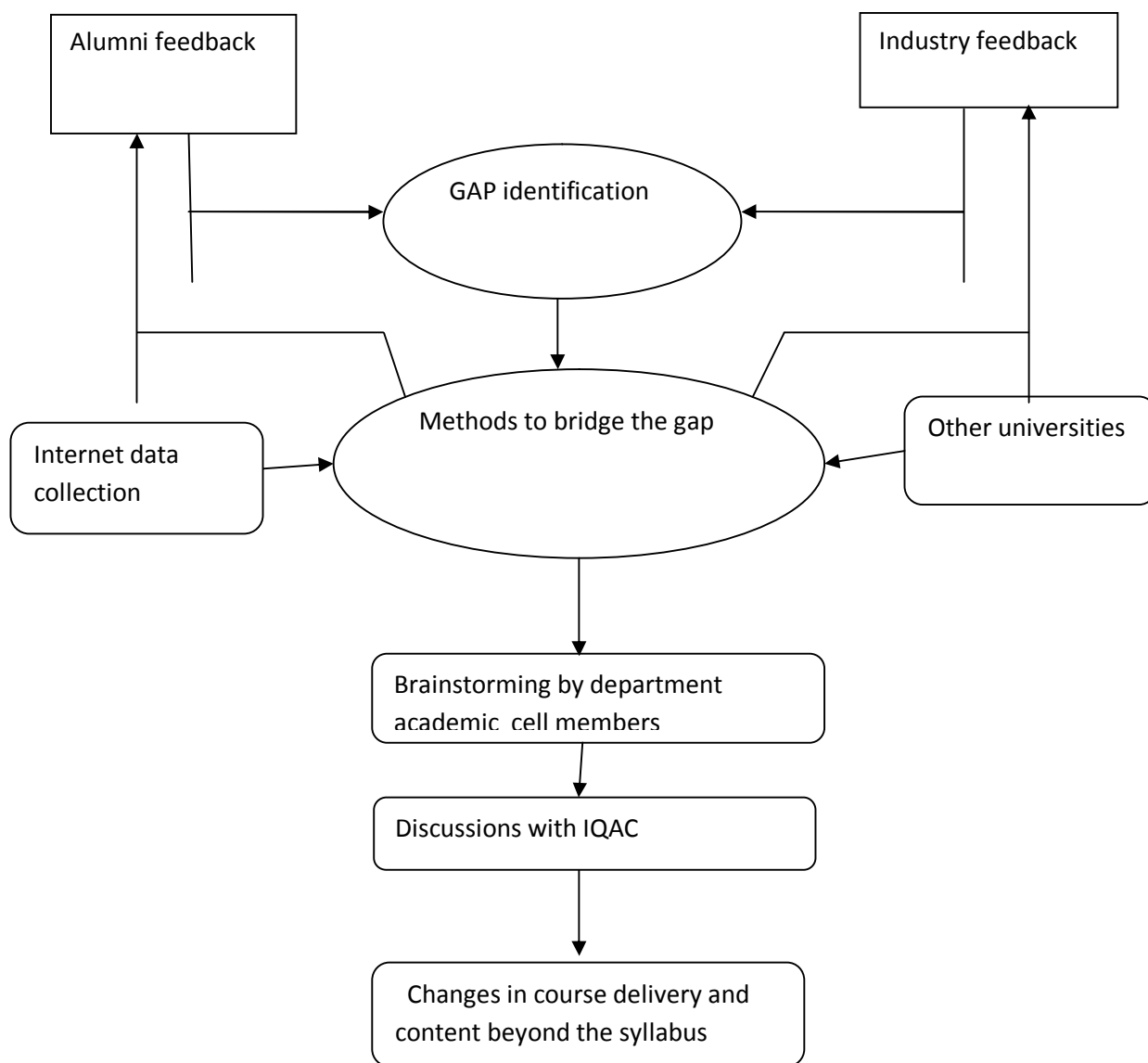
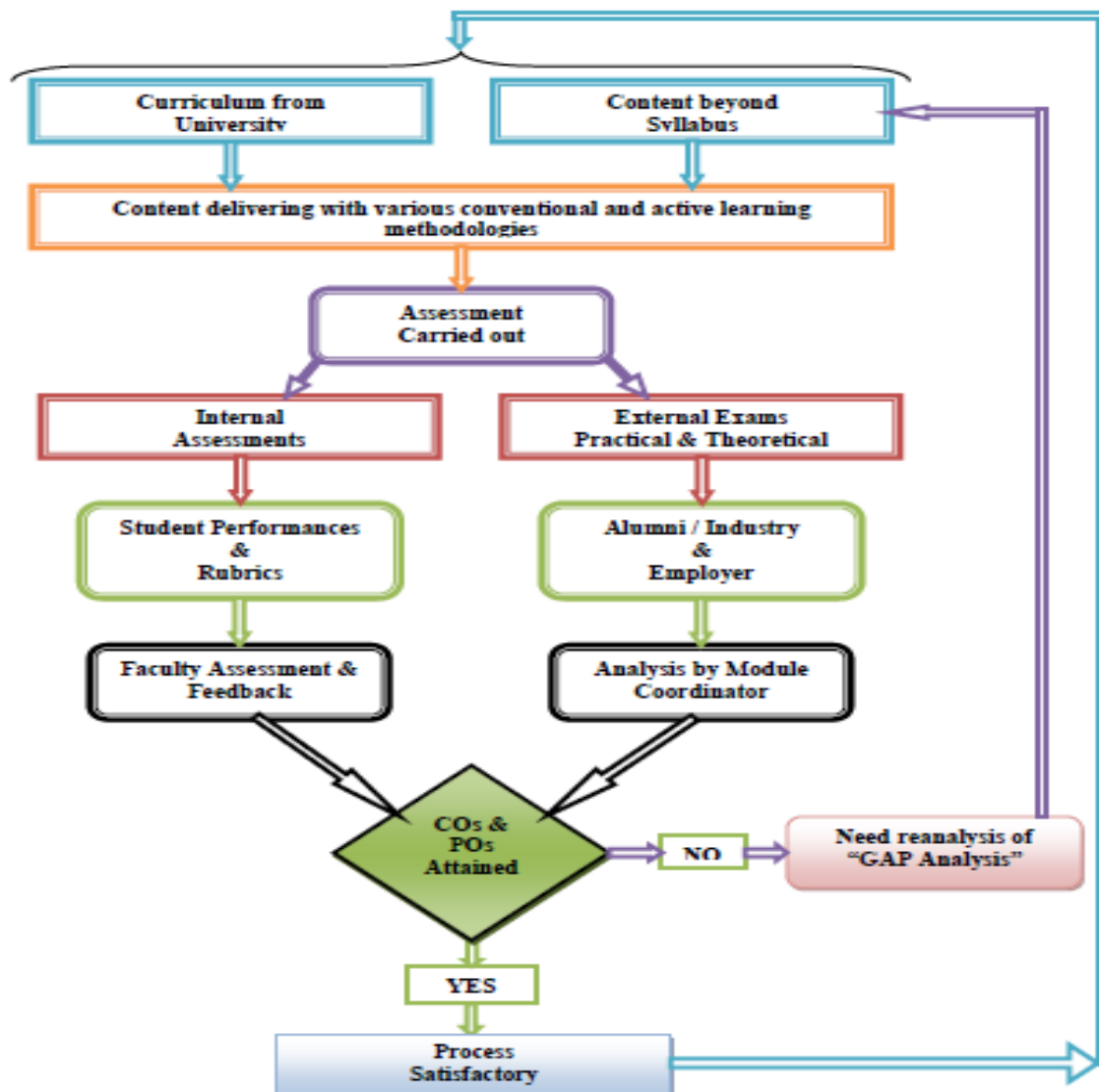


Fig:2.1 Curricular gap analysis towards attainment of CO/PO



Processes used to identify the curricular gaps to the attainment of the COs/POs

Fig.2.2. Process and programs used to bridge the curricular gaps

DEPARTMENT OF BIOMEDICAL ENGINEERING

2.1.2. State the delivery details of the content beyond the syllabus for the attainment of Pos and PSOs (10)

(Provide details of the additional course/learning material/content/laboratory experiments/projects etc., arising from the gaps identified in 2.1.1 in a tabular form in the format given below)

CAY (2017-2018)

S. NO	Gap Identified	Action taken	Date	Resource Person	PO, PSO
1	Hospital interaction	Internship	January 2018	Rajarajeswari Medical college and Hospital	Po 3,4,6,7,8,9 PSO 1,2
2	Knowledge about equipment servicing and product development	Servicing and product development lab	September 6 TH AND 24 TH 2017	Mr.Bipin Lal , CEO , Energia Solutions Mr. Nikhil Promod , Sales and service Engineer , Elite Medicals	PO3,4,5,6,8,9 PSO1,2
3	Need for exposure to recent technologies	National level student symposium” Yantravednatha”	September 21 and 22,2017	RR Elangovan HOD ,Aeronautical Dept, ACSCE	PO 4,7,8,9,10 PSO 1,2
		National conference	November 22,2017	Dr.Rajasheker P mandi Professor and director School of Electrical and electronics engineering ,REVA University	
4	Industrial exposure	Industrial visit	November 16,2017	Skanray Technologies,Mysore	PO 4,8,9,10,11 PSO 1,2
		Blood bank	October 24,2017	Rashtrotthana Blood Bank	
		Hospital visit	October 16,2017	Rajarajeswari Medical college and Hospital	
		Technical talk	September 9 2017	Mr.Deepak samntha Biomedical Engineer,Ababil healthcare pvt ltd.Mr.Tejaswi Bhat Biomedical Engineer,Panaceal Medical Pvt Ltd	
5	Lack of leadership quality and team work	Inauguration of the Biomedical association “BLAZE”	13th October 2017	MS Murali Principal ACSCE	PO 6,7,8,9,10 PSO 1,2
6	Practical knowledge about medical technology	Technical sessions on Medical equipments	26th October 2017	Mr.Nikhil Promod , Sales and service Engineer , Elite Medicals	PO2,3,4,6,7 PSO1,2
		Workshop	13th November 2017	Mr.Bipin Lal , CEO , Energia Solutions	

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7	Awareness of contemporary issues	1.Rally & awareness programme (Say No to Crackers)	October 17th 2017	Biomedical students and staff	PO8,9,10 PSO1,2
		2.Dengue prevention and awareness	August 19 2017		

CAY(2016-2017)

S. NO	Gap Identified	Action taken	Date	Resource Person	PO , PSO
1	Lack of understanding the fundamentals of biomedical engg	Practical course delivery with pre lab post lab modules	June 2016	Lab in charges	PO1,2,3,5 PSO1
2	Lack of exposure to recent Technologies	National level symposium "Neurotechnoblitz"	26/10/16	Gp Capt Dr V N Jha , Sc "F"(Retd)MBBS, AMD, MD, FeISAM	PO4, 7,8,9,10 PSO 1,2
		National Conference "Biomedical Signal and Image processing" (NCBSI)	11/11/16	Dr.Usha S Hod Dept of RRCE. Dr.Malathy M Assoc. Prof. RRCE Dr.C S Pillai Prof.Dept of CSE RRCE	
3	Lack of ability to use of engineering tools	One day Technical talk and hands on conducted on Local binary pattern"	29th Sept 2016	Dr. M.Malathy, Associate Professor, Dept of Computer Science and Engineering ,RRCE	PO3,4,5,9,11 PSO 1,2
		Workshop on NS-2	03/03/17	Mr Nitin K Project consultant Impulse systems	
4	Lacking of communication skills	Workshop on Critical thinking	1/10/2017	Dr.Punal M Arabi HOD,BME Dept ACSCE and PrathibhaTP Asst.Prof. ACSCE	PO5,6,7,8,9,10 PSO1,2
		Workshop on emotional intelligence	1/10/2017	Dr.Punal M Arabi HOD,BME Dept ACSCE and Gayatri Joshi,Asst.Professor, ACSCE	
		Workshop on Confidence building	1/10/17	Mrs.Nanditha Krishna Mr.Hemanth Kumar.G Mr.Naveen T.S.	

DEPARTMENT OF BIOMEDICAL ENGINEERING

5	Contemporary issues	Health awareness program for the children of orphanage visit "MADILU"	March 6 th 2017	Dr.Anitha S,Professor,Dept of BME,Mr.Hemanth Kumar G,Asst.Professor,Dept of BME,Mr.Naveen T.S, Asst.Professor,Dept of BME,Ms.Prathibha T.P, Asst.Professor,Dept of BME,Mrs.Surekha Nigudgi, Asst.Professor,Dept of BME,Mrs.Vamsha Deepa N , Asst.Professor,Dept of BME,	Po8,9,10 PSO1,2
6	Hospital interaction(3 rd year)	Internship	16/8/2016 to 22/8/2016	Rajarajeswari Medical college and Hospital	Po 3,4,5,6 PSO 1,2
	Hospital interaction(4 th year)	Internship	3/10/2016 to 7/10/16	Rajarajeswari Medical college and Hospital	

CAY(2015-2016)

S.NO	Gap Identified	Action taken	Date	Resource Person	PO PSO
1	Lack of understanding the fundamental knowledge	Internship with syllabus	June 2015	Respective subject faculty	Po 3,6,4,5 PSO 1,2
		Technical Talk on" Image processing and its applications"	5 th Sept 2015	Ravindranth Asst.Professor,DBIT,Bangalore	
2	Lack of exposure to recent Technologies	Student symposium"CLONEOL ECTRIC"	29/10/15	Rajeev Ramachandra Chief Technology Officer, Mistral Solutions	PO 3,4,12 PSO 1,2
3	Industry interaction	Technical talk on Hospital workflow	30/10/15	Miss Renita Olinda Fernandes Senior software engineer,Phillips	PO 1,2,3,5,8,12 PSO 1,2
		Internship	6/11/2015	Rajarajeswari Medical College and Hospital	
		Internship	2/2/16 to 8/2/16	Rajarajeswari Medical College and Hospital	
		Technical talk on" Ultrasound and Its Applications"	27th FEB 2016	Mr.Satish .U , Ultrasound application specialist , Siemens India Pvt Ltd.	

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		Industrial experience an overview	10th Mar 2016	Dr. M.Arunachalam, Prof & HOD, Dept of Electrical and Electronics Engineering, Rajarajeswari College of Engineering.	
4	Lack of ability to use of engineering tools	conducted on "MSP 430 and its applications	31/10/15	Miss Nitya .S , Design Engineer , Digibee Techsys	PO 3,4,5,9,11 PSO 1,2
		Work shop on "Image Processing and its applications"	27 & 28 th January 2016	By Dr Punal M Arabi HOD, Dept of BME & Vamsha Deepa N Asst professor Dept of BME	
5	Research	Research, Patent and Publish	25/01/16	Dr.Dinesh K Anvekar, Principal , Alpha College of Engineering	PO8,9,10 PSO 1,2
6	Basic knowledge	Technical talk on " Nanotechnology and its applications	12th FEB 2016	Dr.Anitha ,HOD Biomedical ,Rajiv Gandhi Institute of Technology	PO 3,4,11,9 PSO 1,2
7	Biometrics-fundamental knowledge	Technical talk on Recent trends in Biometrics	09th Mar 2016	Dr. M.Malathy ,Associate Professor , Dept of Computer Science and Engineering , Rajarajeswari College	PO 12,10,9 PSO 1,2
8	Basic knowledge	Technical talk on Neural Networks and its applications	16 th Mar 2016	Prof. Srinivas Halvi ,Associate Pofessor , Department of Medical Electronics, Dayananda Sagar College of Engineering	PO 1,2,3,9,11 PSO 1,2
9	Research	Technical talk on "MRI system on earth field NMR"	24th Mar 2016	Dr.Sairam Geethanath, Dr.Sairam Geethanath B.E.,M.S.,Ph.D. Professor & Director , Medical Imaging Research Center (MIRC) Department of Medical Electronics, Dayananda Sagar College of Engineering	PO 1,3,9,11 PSO 1,2
10	Genetics	Technical talk on "Genetic Engineering "	12th April 2016	Dr. S.Prabhakara , Senior Research Scientist , Chairperson, Department of Genetics, RRMCH,Bangalore	PO 3,4,5,11,9 PSO 1,2
11	Research methodology	Two day work shop on "Research Methodology"	27th and 28th july 2016	By Dr M S Murali, Dr.C S Pillai, Dr.T Senthilkumarn, Dr.A Murganandham, Dr.M Mathivanan, Dr Punal M Arabi Dr.M Eshwaramoorthy.	PO 2,9,11 PSO 1,2

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CAY(2014-2015)

S. NO	Gap Identified	Action taken	Date	Resource Person	PO PSO
1	Ultrasound Applications	Technical Talk on" Ultrasound and its applications	3rd march 2015	M Vinay GE,Service Engineer,Bangalore	PO 1, 9,11 PSO 1,2
2	Health awareness	Sugar and BP test conducted ,presentation on how to use sugar and BP test kits	12/04/15	Mr.Prasad, RRMCH,Bangalore Ragavendra G, Sree ranga, orthopadecis ,Bangalore	PO 9,11,12 PSO 1,2

Projects (2014-15)

S. No.	Name of the Mentor	Title	Name of the students	USN
1	Mr.Ramakrishna M M	Accelerometer operated wheelchair	Heena Kauser.A Betageri	1AH11BM002
			Thanuja.M	1AH11BM004

Project (2015-16)

S. No	Name of the Mentor	Title	Name of the students	USN
1	Mrs.Surekha Nigudgi	Wireless Interfacing of Vital signs with smart phones	Dilshad.N	1AH12BM007
			Kavya.P	1AH12BM010
			Mohammed Shahadad P.K	1AH12BM017
2	Mr.Naveen TS	Thermographic Analysis of diabetic Foot for disease diagnosis	Archana Sharma.B.N	1AH12BM003
			Chetan s	1AH12BM006
			Dushyanthi K	1AH12BM008
3	Mrs.Punal M Arabi	Computer Aided Diagnosing of Honeycomb lung disease of Idiopathic lung	Divya Hegade.M	1AH12BM010
			Chaitra.U.A	1AH12BM005
			Gagana B.N	1AH12BM009
			Lakshmi Bai.P	1AH12BM011
4	Mrs.Gayatri Joshi	Early Diabetes Diagnosis by the thermoregulatory skin texture analysis using NIR imaging	Abhik Raj Subedi	(1AH12BM001)
			Asma Poudel Chhetri	1AH12BM004
			Madecha Shazeen Farooq	1AH12BM013

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Project (2016-17)

S. No	Name of the Mentor	Title	Name of the students	USN
1	Mr.Naveen T S	Thermo graphic dental disease diagnosis	Deepak Samantha	1AH13BM008
			Aasma dahal	1AH13BM001
			Dinshid t ummer	1AH13BM010
2	Mr.Hemanth Kumar G	Wireless intra-venous drip delivery system”	Harsha l singh	1AH13BM012
			Mushtaq ahmad reshi	1AH12BM018
			Preethish kashyap h	1AH12BM020
			Prerana v prasad	1AH13BM017
3	Mrs.Nanditha Krishna	Identification of AMD using OCI images”	Ashwini .v	1AH13BM006
			Prathibha h.m	1AH13BM016
4	Mrs.Vamshadeepa N	Early diagnosis of pneumonia for lung X-ray images	Akshata Urs	1AH13BM003
			Priyanka H B	1AH13BM018
5	Mrs.Gayatri Joshi	Robotherapist version 1	Rohith n reddy	1AH13BM021
			Dhatri	1AH13BM009
6	Ms.Prathibha TP	Machine vision for diabetic foot screening using NIR foot images	Tejaswi bhat	1AH13BM025
			Abrar ahmed	1AH13BM002
7	Mrs.Anitha s	A Novel Approach for Image Authentication by compression for hiding medical data	Harsha p s	1AH13BM013
			Shaurya madappa k	1AH13BM023
			Shreya srinivas bhat	1AH13BM024
8	Mrs.Surekha Nigudgi	IOT based health care system using body sensor network	Pralesh devakota	1AH13BM015
			Sabith Kanoth	1AH12BM023

Best Project :Harsha L Singh,Preethish kashyap,Mustaq ahmad reshi,Prerana V Prasad bagged best project award entitled” Wireless intra-venous drip delivery system” first place at a state level Project expo conducted by RVCE in 2017,Bangalore.

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Placements - CAY(2016-17)

S. NO	USN	Name	Name of the company
1	1AH13BM008	Deepak samantha	Ababil healthcare solutions
2	1AH13BM006	Ashwini	Kshema medical technologies
3	1AH13BM009	Dathri	
4	1AH13BM012	Harsha L Singh	Genworks Health Pvt Ltd
5	1AH13BM021	Rohith N Reddy	Panacea Medical Technologies
6	1AH13BM025	Tejaswi Bhat	Panacea Medical Technologies
7	1AH13BM013	Harsha PS	Sreedevi Hospital, Tumkur
8	1AH13BM009	Dathri	Mcgann hospital ,Shimoga
9	1AH13BM016	Prathibha TP	Higher studies(M.Tech in BMSCE)
10	1AH13BM017	Prerana V Prasad	MBA in PESIT
11	1AH13BM025	Tejaswi Bhat	Got selected for higher studies in Australia

CAY(2015-16)

S. NO	USN	Name	Name of the company
1	1AH12BM003	Archana Sharma N	Life cell international
2	1AH12BM006	Chethan.S	Infosys
3	1AH12BM010	Divya Hegade.M	Columbia Asia
4	1AH12BM009	Gagana B.N	Life cell international
5	1AH12BM011	Lakshmi Bai.P	Redonatura
6	1AH13BM013	Madeeha	Finfid
7	1AH13BM001	Abhik Raj Subedi	Doing higher studies in Australia

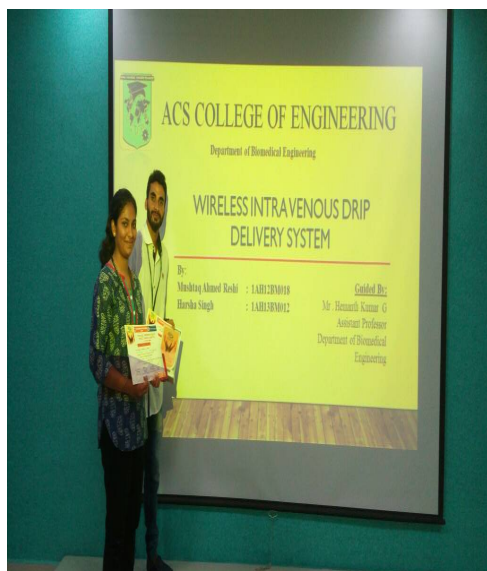
CAY(2014-2015)

S.NO	USN	Name	Name of the company
1	1AH11BM002	Heena Kauser.A Betageri	Tatwadarsha hospital,Hubli
2	1AH11BM004	Thanujha	Higher studies

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STUDENTS ACTIVITIES & ACHIEVEMENTS

1) The project entitled “Wireless intra-venous drip delivery system “won the First place in Embedded system projects at a state level project exhibition/competition held -2017 at RVCE,Bangalore,8 th sem students Harsha L Singh and Mushtaq Ahmed Reshi(VII sem) guided by Hemanth kumar G.



2) Tejaswi Bhat and Harsha L Singh got best paper award entitled “Identifying suitable enhancement techniques for thermal and non thermal diabetic foot images” in International conference held at RRCE -2016.



3) M.R Ramya ,sanjaya pandey got best paper award entitled “ Wearable sweat wire sensors and its biomedical applications” in national level symposium conducted in Adhiyamaan college of engineering ,Hosur-2017



4) Harsha.L.Singh got best paper award entitled “Smart sensors” in national level symposium conducted in Adhiyamaan College of engineering, Hosur-2017



5) Abhik Raj Subedi and Lakshmi Bai of 8th semester biomedical presented a paper on 27& 28th February at AEEICB 2016 International Conference , Prathyusha college of engineering, Chennai



6) Deepak Samantha and aasma dahal won best paper award entitled Distinguishing staghorn and struvite kidney stones using GLCM and Pixel Intensity Matrix Parameters in national conference organized in biomedical department (NCBSI-2016)

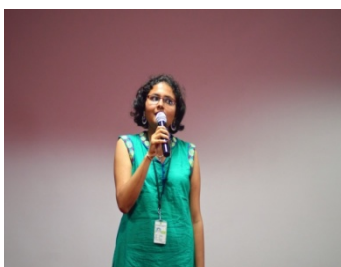
7) Harsha L shing Secured 1st place in technical debate at VTU fest during year 2016



8) Ramya got selected for Quiz conducted by CSIA during the year 2016

10) Drushya G.K is runner for quiz conducted by CSIA during the year 2016

11) Ramya R, varini chinnabhandar, varsha stood first place in singing competition held in RRMCH during the year 2017



12) Abrar ahmed and divyasusheel won best paper award entitled Computer Aided Diagnosis of Osteoporosis Using 1st Order Texture Parameters in national conference organized in biomedical department (NCBSI-2016)

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13) Divya susheel won best paper award entitled Non-invasive measurement of intracranial pressure in National conference organized in biomedical department (NCBSIP-2017)



14) Rohit N Reddy, Dhatri, Raveena B Prashanth , Akshay Das M won best paper award entitled Diagnosis to classify healthy lung and ground glass lung” at (NCBSIPE-2017) on 21st November 2017.



15) Ms.Ramya &Mr.Sanjay Pandey 7th Semester won the 1st best paper award for “Lung Cancer Nodule Segmentation and Feature Extraction “ at (NCBSIPE-2017) on 21st November 2017.



16) Ms.Varini Chinnabhandar presenting a paper on “Automatic Screening Method For Diagnosing Bone Health” at NGCT 2017 , Dehradun on October 30 2017



17) Ms.Divyashree , Ms.Indu , Ms.Lavanya G Dev won 2nd prize for best out of trash in National Level Technical Symposium “Yantra Vedanta” 22nd September 2017.




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2.2. Teaching - Learning Processes (100)

2.2.1. Describe Processes followed to improve quality of Teaching & Learning (25)

(Processes may include adherence to academic calendar and improving instruction methods using pedagogical initiatives such as real world examples, collaborative learning, quality of laboratory experience with regard to conducting experiments, recording observations, analysis of data etc. Encouraging bright students, assisting weak students etc. The implementation details and imDAt Analysis needs to be documented)

A) Adherence to Academic calendar



ACS COLLEGE OF ENGINEERING

Kambipura, Bengaluru-560074.

DEPARTMENT OF BIOMEDICAL ENGINEERING

VII SEMESTER - CLASS TIME TABLE - 2017 - 2018 (With Effect From 07.08.2017)

ROOM NO: 403						CLASS TEACHER:			
Time	08.30 to 09.30 AM	09.30 to 10.30 AM	10.30 to 10.45 AM	10.45 to 11.45 AM	11.45 to 12.45 PM	12.45 to 01.30	01.30 to 02.20	02.20 to 03.10	03.10 to 4:00 PM
Day									
MON	CCN	ELE-2	TeaBreak	ESD	BMDSP	Lunch Break	ELE-1	MIP	ELE-2
TUE	MIP	BMDSP		ESD	ELE-1		CCN	PROJECT- PHASE 1	
WED	BMDSP	CCN		ELE-2	ELE-1		PROJECT- PHASE 1		
THU	ESD	BMDSP		MIP	ELE-1		BMDSP(B1)/MIP(B2) LAB		
FRI	ELE-2	MIP		ESD	CCN		BMDSP(B2)/MIP(B1) LAB		
SAT	BME SERVICE ENGINEERING TRAINING								
Sub Code	Name of the Subject					Name of the Faculty		Signature	
10BM71	Computer Communication & Healthcare Networks					Dr Anitha			
10BM72	Biomedical Digital Signal Processing					Mrs. Nanditha Krishna			
10BM73	Embedded System Design & Programming					Mrs Gayatri Joshi			
10BM74	Medical Image Processing					Mrs Vamsha Deepa.N			
10BM752	Elective 1					Dr Punal.M.Arab			
10BM766	Elective 2					Mr Hemanth kumar.G			

ACS COLLEGE OF ENGINEERING Mysore Road, Bengaluru - 74									
CALENDER OF EVENTS OF ODD SEMESTERS AUG-NOV 2016									
Week No	Month	Mon	Tue	Wed	Thur	Fri	Sat	No of Working Days	Activities
1	Aug	01	02	03	04	05	06	06	1st Commencement of Odd Sem
2	Aug	08	09	10	11	12	13	05	13th Second Saturday Holiday
3	Aug	15	16	17	18	19	20	05	15th Independence Day
4	Aug	22	23	24	25	26	27	06	
5	Aug/Sep	29	30	31	01	02	03	06	
6	Sep	05	06	07	08	09	10	04	05th Ganesh Chaturthi, 10th Second Saturday Holiday
7	Sep	12	13	14	15	16	17	05	6th, 7th & 8th is 1st Internal Test
8	Sep	19	20	21	22	23	24	06	12th Bakrid Holiday 17th Parents Teachers meeting
9	Sep/Oct	26	27	28	29	30	01	05	30th Mahalaya Amavasya Holiday
10	Oct	03	04	05	06	07	08	05	4th, 5th & 6th is 2nd Internal Test
11	Oct	10	11	12	13	14		02	10th Ayudha Puja, 11th Vijaya Dashami, 12th Mahanavami, 13th Yashoda Jayanti
12	Oct	17	18	19	20	21	22	06	
13	Oct	24	25	26	27	28	29	05	29th Naraka Chaturdashi
14	Oct/Nov	31	01	02	03	04	05	04	31st Balipadyam, 1st Karnataka Rajyotsava
15	Nov	07	08	09	10	11	12	05	7th, 8th & 9th is 3rd Internal Test 12th Second Saturday Holiday
16	Nov	14	15	16	17	18	19	05	14, 15 & 16th is 1st Lab Test 17th Karavaka Jayanti 18th Last Working Day

ACS COLLEGE OF ENGINEERING, BENGALURU DEPARTMENT OF BIOMEDICAL ENGINEERING Assignment



		Marks	
1	Briefly explain the different types of ROM memories and their working principles.	10	
2	Explain how the smaller memory parts can be composed into larger memory.	10	
3	Describe three basic techniques used to accomplish cache mapping.	10	
4	i) Explain the following datatypes with syntax 1.structure 2.pointer 3.union 4.array ii) Define counting	8 2	
5	a) With a block diagram, explain the DRAM architecture. b) Explain: i)FPM DRAM ii)RDRAM	10	
6	a) Explain pipelining for the instruction execution. b) Explain how UART is used for communication highlighting the advantages of UART.	10	
7	Describe various read/write memories.	10	

Sub Code: 10ES33



S.No	Date	Topics to be covered
1	3.08.15	UNIT 1: Principles of combinational logic-1: Definition of combinational logic
2	4.08.15	Canonical forms, Generation of switching equations from truth tables
3	6.08.15	Karnaugh maps-3, 4 and 5 variables, Incompletely specified functions (Don't Care terms)
4	8.08.15	Simplifying Max term equations
5	10.08.15	UNIT 2:Principles of combinational Logic-2: Quine-McCluskey minimization technique
6	11.08.15	Quine-McCluskey using don't care terms
7	11.08.15	Reduced Prime Implicant Tables, Map entered variables.
8	13.08.15	UNIT 3:Analysis and design of combinational logic - I: General approach,
9	14.08.15	Decoders-BCD decoders, Encoders.
10	17.08.15	UNIT 4:Analysis and design of combinational logic - II: Digital multiplexers
11	17.08.15	Using multiplexers as Boolean function generators
12	18.08.15	Adders and subtractors-
13	20.08.15	Cascading full adders. Look ahead carry.



Assignments

2.2.1. B) Use of Various instructional methods and pedagogical initiatives

- NPTEL videos
- Library E-Learning Facilities
- Journal Access Facilities
- Webinars

It is identified that the students have lack of fundamental knowledge about the subject is key factor to enhance their employability ,enrolment for higher studies to address this issue the department IQAC cell suggested the course delivery of practical courses could be of three modules pre lab, experimental ,post lab

Pre lab would prepare the students towards the background knowledge about the experiment. Where experimental lab is referring to after conduction of the experiment would be a conventional one where the students do the experiments and tabulate the results, interpret them. Post lab module is designed to test the students understanding of the experiment.

C) To support weak students and encourage bright students:

- 1) Special coaching classes and additional tests will be given. Question bank will be given to them is of three folds(Medium, higher, very important questions)
- 2) Frequent monitoring of their performance during class tests and assignments
- 3) Informing and Interacting with Parents through regular Progress Reports
- 4) Counseling and Discussion to understand the real problems and solve the genuine problems.

Sample Copy of Slow Learners Details

DEPARTMENT OF BIOMEDICAL ENGINEERING

III SEMESTER STUDENTS LIST (2016-17)

SL.No	USN	Name
1	1AH14BM028	PAVAN G REVANAKAR
2	1AH14BM014	KESHAV BASAVARAJ NAYAK
3	1AH15BM001	ANANYA PAVITRA
4	1AH15BM003	APOORVA N
5	1AH15BM004	DEEPIKA R
6	1AH15BM007	KAMYA M
7	1AH15BM010	MEGHANA R
8	1AH15BM012	NISHITHA E
9	1AH15BM013	NUSRATH FATHIMA
10	1AH15BM014	RAGHAVI AR
11	1AH15BM015	RANJITH J L
12	1AH15BM016	S ARCHANA
13	1AH15BM017	SAJAD K
14	1AH15BM018	SHREE GOWRI M
15	1AH15BM019	SHREYA DUNDUR
16	1AH15BM020	SHRI RAM S
17	1AH15BM021	SUSHMA P
18	1AH15BM023	TUSHAR R
19	-	KRUTHI
20	-	NAYANA

DEPARTMENT OF BIOMEDICAL ENGINEERING

V SEMESTER STUDENTS LIST (2016-17)

S. No	USN	Name
1	1AH14BM400	Niranjan
2	1AH14BM004	Bharath david kumar
3	1AH14BM011	Drushya G

VII SEMESTER STUDENTS LIST (2016-17)

Sl.No	USN	Name
1	1AH13BM017	Pralesh
2	1AH13BM024	Sabith konnoth

DEPARTMENT OF BIOMEDICAL ENGINEERING

Encouraging the Bright Students:

Actions	Details
<p>Appreciating and Rewarding at various levels</p>  <p>Graduation award</p>  <p>Best paper award</p>  <p>Department award</p>	<p>Constituting awards at various levels</p> <ul style="list-style-type: none"> i) Department awards ii) Management level awards iii) College day awards
<p>Encouraging their co curricular activities</p>  <p>Best paper award</p>  <p>Presented paper in international</p>	<ul style="list-style-type: none"> i) Sponsoring them for seminar, conferences workshop etc ii) Giving OOD to participate in the events iii) Financial support like Travel model making
<p>Encouraging them in extracurricular activities</p>   	<p>Permitting them to participate in sports cultural college Inter colleges</p>



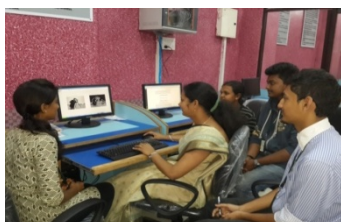
DEPARTMENT OF BIOMEDICAL ENGINEERING

Academic Exposure



- i) Introduce the topics out of syllabus
- ii) Create opportunities for them to interact with industry experts from out side
- iii) To bring out the leader from students, giving more opportunities to organize events like seminar guest lecturers, Industrial visits.

Recognition



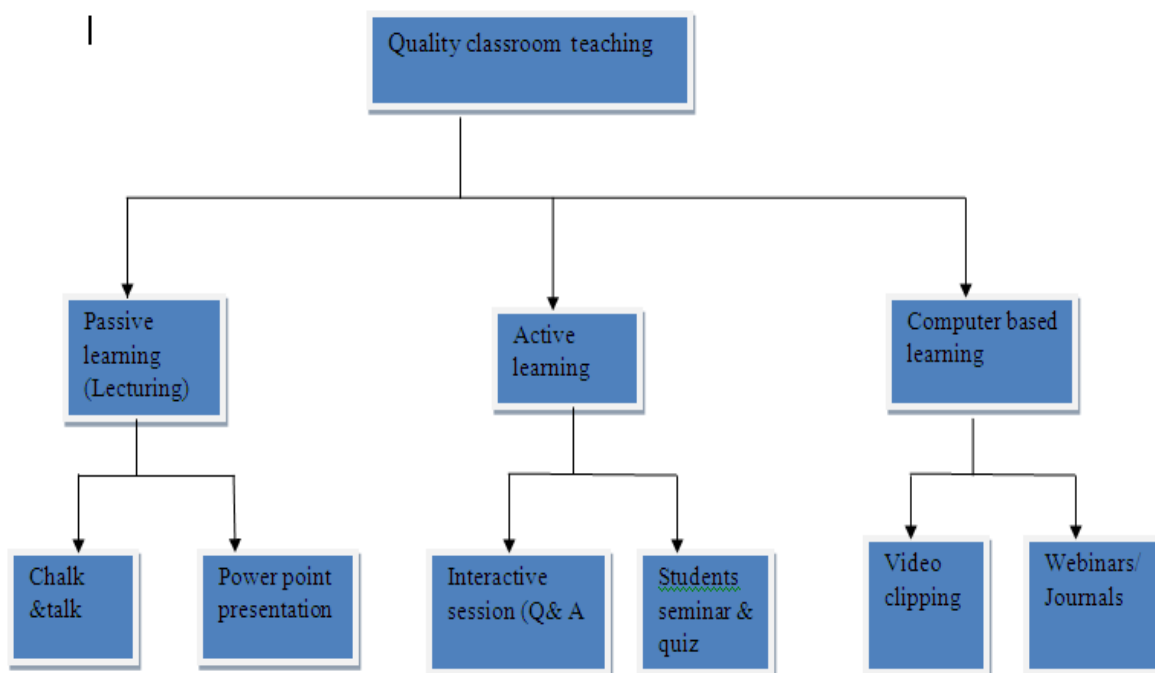
Solving Research Problem



- a) Displaying bright students names and figures in the following places:
 - i) College Brochures
 - ii) College Roll of Honor ,
 - iii) Departmental roll of honor
 - iv) News Letter
- b) Depending on personal capacity students are given training to carryout additional projects and research activities

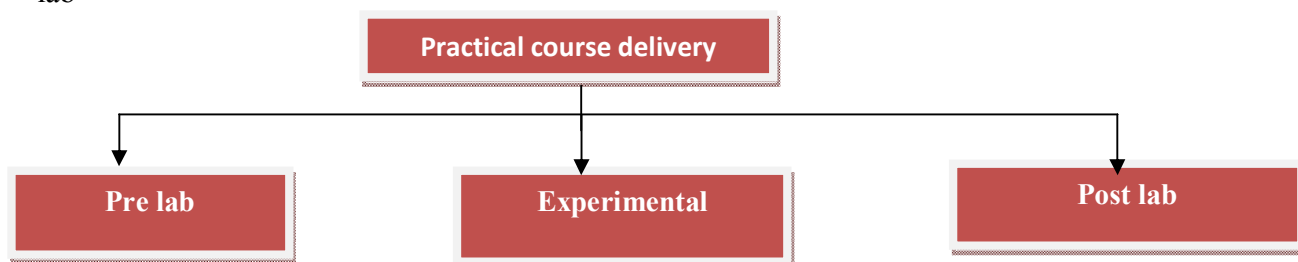


D) Quality of classroom teaching



E) Conduction of lab experiments:

- Labs are conducted in batches. The class is dividing into batches and each batch is restricted to have maximum of 20 students.
- Students Log card are maintained and students must get sign in Log cards after every lab class.
- Students will bring Observation and Record note books for lab classes and will do the calculations after the experiments.
- Lab-Vivas will be asked after conduction of experiments.
- The practical course delivery is divided in to three modules. i.e Pre lab ,experimental ,post lab



DEPARTMENT OF BIOMEDICAL ENGINEERING



Analog Electronics Lab
(Pre lab session)



Biomedical Transducers and measurement lab
(Pre lab session)



Digital design and HDL Lab
(Experimental session)



Post lab session (discussion on bone
and OCT images)



Post lab session(Discussion on lung image processing)



F) Continuous Assessment in laboratory

To assess the students in lab, we are maintaining the log cards which are used to check and monitor the student's attendance and conduction of experiments. As per the university guidelines 10-12 experiments are to be conducted. However for the relevant courses, provision is made to conduct 1 or 2 experiments beyond the specified list, but within the scope of the course. Laboratory manual explaining the details of the experiment is available with the course teacher. This guides the students to understand and perform the experiment easily. Students will be maintaining the record note books and they will be getting signature from the faculties for the experiment done at the end of every class. This also helps to monitor the student performances. The Biomedical department introduced practical course delivery of experiments in to three to four cycles with pre lab, experimental , post lab. Pre lab means the basics about individual experiment of the particular laboratory. In the Experiment lab the conduction of experiment. Post lab means the content beyond the syllabus about that particular experiment and how much knowledge student understood about that particular lab by giving simple problems about different experiments and content beyond the syllabus.

2.2.1.1. Initiatives and implementation details of improving Quality of Laboratory Experiments

1. Faculty members of respective specialization form a group with a team leader to discuss the preparation of manual, Material requirements, conduction of experiments and cycle of experiments before commencement of semester.
2. The Biomedical Engineering Laboratories are conducted in session of 3 hours, in each session the faculty explains the circuits/logic and design/ algorithm of the experiment.
3. The students will write the complete experiment concerned in the observation book, and then rig up / code/debug/execute the program on the system and interpret the results.
4. The executed program with output, related theory and Algorithm or flowchart is documented in the record book by the students later which will be evaluated.
5. In each subject many students are made to work on number of additional programs for the better understanding of the subject.
6. Viva questions will be prepared in advance for all the experiment.
7. The college organize inter collegiate contests, Symposiums, to encourage students to demonstrate their programming skills

8. The Laboratories are evaluated by the faculties for 25 marks based on their performance during the semester, attendance, internal test and record submission.
9. The practical course delivery is divided into three to four cycles and that cycles are divided in to three modules i.e Pre lab ,experimental and post lab sessions for deeper understanding of practical courses. In Pre lab the basics about individual experiment of the particular laboratory. Post lab means the content beyond the syllabus about that particular experiment and how much knowledge student understood about that particular lab by giving simple problems about different experiments.

Practical delivery:

1) Pre lab

The teacher gives basic knowledge about experiment after which a set of questions will be given to students to answer which infuses the basic knowledge about particular experiment and subject

2) Experimental

Students conduct experiment, note down the readings and record the findings.

3) Post lab

To test the knowledge gained by the experiment assignments, quiz, content beyond the syllabus experiments, mini project & tiny research problems are given to the students

2.2.1.2. Impact analysis

1. Very good results in laboratory examination.
2. Improvement in analytical abilities of students thus improves the placement.
3. The stimulating environment made students to learn other programming languages apart from curriculum.
4. Strong understanding of fundamental knowledge which kindled their research interest. It is evident in student publication in premier institutions like IIT Delhi, UPIC Dehradun.
5. Students bagged prizes in national level competitions and published international papers.

2.2.1.3. Initiatives and implementation details of Encouraging Bright Students

- The ACS College of Engineering always had the culture of encouraging bright students by providing them necessary guidance and moral support.
- Class Toppers will be provided by certificate and cash prize.
- The bright students are identified based on their overall performance and their orientation towards Academics.
- Encouraged to attend conferences, workshops and publish papers.

- Encouraged to take up innovative projects and apply for funding.
- Encouraged to participate in various competitions.
- The bright students having high academic track records are encouraged by faculties to achieve university ranks, also encouraged to take up competitive examinations like GATE, GRE etc.,
- The bright students having orientation to research are encouraged by faculties to publish their work in National & International conferences & Journals.

2.2.1.4. Initiatives and implementation details of Assisting Weak Students

1. The department has a well-defined process of monitoring, guiding and assisting slow learners (weak students).
2. Care is taken by the faculties in monitoring the performance of slow learners, the students
3. deviations from studies is observed by the respective section coordinators and corrective measures
4. are suggested.
5. The faculties also go a step ahead and have periodic interaction with the parents about the performance of slow learners.
6. A blended motivation and responsibility from both parents and faculty will create a positive mindset and will help to overcome the inabilities and hurdles faced by the slow learners.
7. Every parent is informed about the IA marks and the attendance by a system.
8. Additional coaching is given to slow learners through Remedial classes, simplified exam oriented coaching and materials are provided to them.
9. A special counseling and tutorial classes are conducted by the faculty for those students who have failed in any subject.

2.2.1.5. Impact analysis

1. The observable impact of assisting weak students is reduced number of identifiable weak students.
2. Improved results and less number of failures in each subjects.

2.2.2. Quality of internal semester Question papers, Assignments and Evaluation (20)

2.2.2.1. Initiatives and Implementation details for improving the quality of Internal Semester Question papers (Internal Assessment Test)

- The department conducts three internal assessment tests at 6th, 12th and 14th week respectively.
- Each test covers one third of the syllabus.
- The tests are conducted for a maximum of 25 marks. (No minimum marks criteria from the university).
- The duration of the test is one hour and question paper are set to make the student to learn time management.

I. Question Papers:

- For each subjects, question bank is prepared.
- While setting the question paper all previous university exam papers are taken into consideration.
- According to level of toughness the questions are prepared (viz., analyzing the problems, implementation of modern tools, formulating the problems etc), which is termed as Bloom's Taxonomy.
- The questions will be of three categories:
- One third of the questions is straight and can be answered by all students.
- One third of the questions need analysis and use of content covered as per syllabus.
- Remaining one third of the questions is not straight. Certain amount of thinking, analysis and mathematical knowledge are required to resolve.

II. Assignments:

- Assignment issue and submission dates are announced by the respective faculty members.
- Assignment questions are prepared using Bloom's Taxonomy process.
- Surprise tests, quizzes, video links are provided.
- In order to bridge the gap in curriculum , bright students are given some assignment beyond syllabus

III. Evaluation:

- The faculties after every internal assessment test they explain the solution of the questions in the class which will enable them to perform well in the final examination.
- For any genuine reasons, if a student was unable to perform well in the given three internal assessment tests, improvement test is given to him/her.

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- The average of the marks obtained from any best two test is chosen for the award of internal assessment marks.
- If a candidate remains absent for all the tests conducted, the Internal assessment marks are marked as "Absent" in the result.
- Assignments are used as a tool for practice and evaluation is based purely on Internal Assessment Test.



ACS COLLEGE OF ENGINEERING

Mysore Road, Bengaluru- 560074
Department of Biomedical Engineering
Internal Test – 3 2016-17(Odd Sem)

<u>Reg No</u>									<u>Year/Sem</u>	III	V
<u>Subject Code & Name</u>	10AL51	Management and entrepreneurship							Date	24/11/16	
<u>Staff Name</u>	Gayatri Joshi							Time			

Max Marks: 50

Answer any 5 questions choosing atleast two questions from each part.



PART A					
Q.No	Questions	Marks	CO's	PO's	BT
1	What is an organization? explain the nature and purpose of organization?	10	2,3	3,4	L1
2	Briefly explain the steps in selection procedure.	10	3	2,3	L3
3	What is a span of control and explain the factors affecting it.	10	2	1,2	L2
4	What are the advantages of decentralization?	10	1	4,5	L1
PART B					
Q.No	Questions	Marks	CO's	PO's	BT
5	What are the main features of staffing and Explain.	10	3,4	3,4	L2
6	Write a brief note on the following i)MBO ii) MBE.	10	2	1,2	L3
7	Discuss any two types of organization structures with highlighting their merits and demerits.	10	1	1	L4



ACS COLLEGE OF ENGINEERING

Mysore Road, Bengaluru- 560074
Department of Biomedical Engineering
Assignment – 3 2016-17(Odd Sem)

							Year/Sem	3 rd	4 th
Subject Code & Name	10BM52	8086 Microprocessor and Peripherals					Date	14/09/2016	
							Time		
Questions									
Q.No								CO's	
1	Draw and discuss any two modes operation of 8253 the programmable interval timer.							1	
2	With a neat block diagram explain 8259 the programmable interrupt controller.							2	
3	Explain the following terms related to 8279programmable keyboard display interface chip.							1	



ACS College of Engineering
Kambipura, Mysore Road, Bengaluru-560 074
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2.2.2.2. Impact analysis

- Very good results in Internal and External examination.
- Improvement in overall performance of students thus improves the placement and higher studies.
- The stimulating environment made students to plan their study plan for better performance.

2.2.2.3. Initiatives and implementation details of improving Quality of Laboratory Experiments

- The college organize/encourages inter collegiate contests to encourage students to demonstrate their programming skills, circuit debugging skills.
- The Electronics & Communication Engineering Laboratories are conducted in session of 3 hours, in each session the faculty explains the logic/circuit and (or) algorithm/design of the program/circuit to be experimented.
- The students will write the complete circuit/program in the observation book, and then rig up the circuit and output is obtained and analyze the results.
- For software and simulation labs the executed program with output, related theory and Algorithm or flowchart is documented in the record book by the students later.
- In each subject many students are made to work on number of additional programs for the better understanding of the subject.
- Quizzes/Viva questions are conducted at the ending of laboratory sessions to improve the programming skills of the students.
- The Laboratories are evaluated by the faculties for 25 marks based on their performance during the semester, attendance, internal test and record submission.
- The biomedical department introduced Practical lab sessions into three modules pre lab, experimental, post lab.

Pre lab would prepare the students towards the background knowledge about the experiment. Where experimental lab is referring to after conduction of the experiment would be a conventional one where the students do the experiments and tabulate the results, interpret them. Post lab module is designed to test the students understanding of the experiment.

2.2.2.4. Impact analysis

- Very good results in laboratory examination.
- Improvement in analytical abilities of students thus improves the placement.
- The stimulating environment made students to learn other programming languages apart from curriculum.

2.2.3. Quality of student projects (25)

(Quality of the project is measured in terms of consideration to factors including, but not limited to, environment, safety, ethics, cost, type (application, product, research, review etc.) and standards. Processes related to project identification, allotment, continuous monitoring, evaluation including demonstration of working prototypes and enhancing the relevance of projects. Mention Implementation details including details of POs and PSOs addressed through the projects with justification)

Initiatives

1. The student's projects are selected in line with department mission, vision and Program outcomes.
2. Students are provided with brief idea of various fields for selecting the project ideas.
3. The list of previous year projects is displayed at notice board which ensures no repetition of project work and also encourages students to enhance the previous works.
4. The faculties encourage the students to carry out in house projects and support will be provided with all necessary software and hardware.
5. The faculties encourage students to participate in project exhibitions. The project exhibition was aimed to provide common platform to exhibit their innovations and their work towards excellence in latest technology.
6. The faculties encourage students to publish their project work in reputed journals/conferences.
7. The faculties encourage students to avail the external funding schemes for their project work. (like KSCST, VTU project funding scheme)

Evaluation scheme for Final year Project

Phase-1

Sl. No.	Performance Indicator	Marks
(a)	Literature Survey / Phase 1 Report.	10
(b)	Presentation.	10
(d)	Questioner.	05

Phase-2

Sl. No.	Performance Indicator	Marks
(a)	Methodology Phase 2 Reports.	10
(b)	Presentation.	10
(d)	Questioner.	05

Phase-3

Sl. No.	Performance Indicator	Marks
(a)	Final Report	25
(b)	Demo with Presentation	15
(d)	Questioner	10

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Projects (2015-16)

Sl. No.	Name of the Mentor	Title	Name of the students	Impact
1	Mrs.Surekh Nigudgi	Wireless Interfacing of Vital signs with smart phones	Dilshad.N 1AH12BM007	Working as biomedical engineer in Columbia Asia Hospital
			Kavya.P. 1AH12BM010	
			Mohammed Shahadad P.K 1AH12BM017	
2	Mr.Naveen TS	Thermographic Analysis of diabetic Foot for disease diagnosis	Archana Sharma.B.N 1AH12BM003	Working as biomedical engineer in life cell international
			Chetan s 1AH12BM006	Working as a software engineer in Infosys
			Dushyanthi K 1AH12BM008	
3	Dr.Punal M Arabi	Computer Aided Diagnosing of Honeycomb lung disease of Idiopathic lung	Divya Hegade.M 1AH12BM010	1.Laxmi Bai presented a paper in International conference held in RRCE May 2016 Laxmi workins as research associate in JSS ,Mysore 2.Gagana is working as biomedical engineer in life cell international
			Chaitra.U.A 1AH12BM005	
			Gagana B.N 1AH12BM009	
			Lakshmi Bai.P 1AH12BM011	
4	Mrs.Gayatri Joshi	Early Diabetes Diagnosis by the thermoregulatory skin texture analysis using NIR imaging	Abhik Raj Subedi (1AH12BM001)	Abhik Raj Subedi presented a paper in International conference held in RRCE May 2016 Abhik Raj doing Higher studies in Australia Madeeha Working as biomedical engineer FinFid
			Asma Poudel Chhetri 1AH12BM004	
			Madeeha Shazeen Farooq 1AH12BM013	

NOTE: Divya Hegade.M, Chaitra.U.A, Gagana B.N, Lakshmi Bai.P bagged best project award entitled “Computer Aided Diagnosing of Honeycomb lung disease of Idiopathic lung”

DEPARTMENT OF BIOMEDICAL ENGINEERING

Project (2016-17)

Sl. No.	Name of the Mentor	Title	Name of the students	Impact
1	Mr.Naveen T S	Thermo graphic dental disease diagnosis	Deepak samanth 1AH13BM008	Presented a paper in international conference held in UPES, OCT 2017 Deepak Samantha working as biomedical engineer in Ababil healthcare systems
			Aasma dahal 1AH13BM001	
			Dinshid t ummer 1AH13BM010	
2	Mr.Hemanth Kumar G	Wireless intra-venous drip delivery system"	Harsha l singh 1AH13BM012	Got 1 st prize in National level Project exhibition held in RVCE April 2017 Harsha L Singh working as biomedical engineer in Genworks health Pvt Ltd Prerana v Prasad is doing MBA in PESIT, Bangalore
			Mushtaq ahmad reshi 1AH12BM018	
			Preethish kashyap h 1AH12BM020	
			Prerana v prasad 1AH13BM017	
3	Mrs.Nanditha Krishna	Identification of AMD using OCI images"	Ashwini .v 1AH13BM006	Presented paper in International conference held in Amrita University on August 2017 Ashwini working as biomedical engineer Kshema Medical technologies pvt.ltd Prathibha H.M is doing M.Tech in BMSCE, Bangalore
			Prathibha h.m 1AH13BM016	
4	Mrs.Vamshadeepa N	Early diagnosis of pneumonia for lung X-ray images	Akshata Urs 1AH13BM003	
			Priyanka H B 1AH13BM018	
5	Mrs.Gayatri Joshi	Robotherapist version 1	Rohith n reddy 1AH13BM021	Rohith reddy is working as application researcher in Panacea Medical Technologies
			Dhatri 1AH13BM009	Working as a biomedical engineer in McGann hospital, shimoga
6	Ms.Prathibha TP	Machine vision for diabetic foot screening using NIR foot images	Tejaswi bhat 1AH13BM025	Presented a paper in international conference held in IIT Delhi, July 2017
			Abrar ahmed 1AH13BM002	Tejaswi is working as biomedical sales manager in panacea medical technologies

DEPARTMENT OF BIOMEDICAL ENGINEERING

7	Mrs.Anitha s	A Novel Approach for Image Authentication by compression for hiding medical data	Harsha p s 1AH13BM013	Working as biomedical engineer in Sreedevi Hospital, Tumkur
			Shaurya madappa k 1AH13BM023	
			Shreya srinivas bhat 1AH13BM024	

2.2.4. Initiatives related to industry interaction (15)

(Give details of the industry involvement in the program such as industry-attached laboratories, partial delivery of appropriate courses by industry experts etc. Mention the initiatives, implementation details and im DACt analysis)

2.2.4.1. Initiatives for industry interaction

To strengthen interaction with industries and to keep our students updated with the latest trends in Biomedical, the Department has entered into an agreement with the following companies.

S.No	PROGRAMME
1	Hospital visit for the 3rd and final year students to the Department of Radiology , Rajarajeswari Medical College and Hospital on 6/11/2015
2	Hospital visit for the 2nd year students to the Department of Anatomy and Physiology , Rajarajeswari Medical College and Hospital on 6/11/2015
3	Internship for 3 rd year students from 2/2/16 to 8/2/16 at Rajarajeswari Medical College and Hospital
4	Internship for the 3 rd year students from 16/8/2016 to 22/8/2016 at Rajarajeswari Medical College and hospital
5	Internship for the 4 th year students from 3/10/2016 to 7/10/16 at Rajarajeswari Medical College and hospital
6	Internship for the 4 th year students from 3/10/2016 to 7/10/16 at Rajarajeswari Dental College and Hospital

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III year BME students visited the radiology department RRMCH



Hospital visit - II year BME students visit to anatomy lab RRMCH



Internship for 3rd year students from 2/2/16 to 8/2/16 at Rajarajeswari Medical College and Hospital

DEPARTMENT OF BIOMEDICAL ENGINEERING



Internship for the 4th year students from 3/10/2016 to 7/10/16 at Rajarajeswari Dental College and Hospital



DEPARTMENT OF BIOMEDICAL ENGINEERING

Industrial visits, hospital visits and association activities

	PROGRAMME
1	Inauguration of the Biomedical association “BLAZE” for the year 2017 on 13 th of October
2	Visit to Dental and Healthcare hospital on 16th October 2017.
3	Anatomy lab visit for the 3 rd semester students at Rarajeswari Medical College on 16th October 2017.
4	Biomedical Department Organized a Rally & awareness programme on “Say No to Crackers” in and around kengeri upanagar on October 17 th 2017.
5	Industrial visit to Rashtrorothana Blood Bank on October 24.2017.
6	Hospital visit for the second and third year students to Central Sterile Services Department (CSSD) , Rajarajeswari Medical College and Hospital on 4th November 2017.
7	Industrial visit to Skanray Technologies , Hebbal Mysore , 11th November 2017.

Biomedical Department of ACSCE Organized a Rally & awareness programme on “Say No to Crackers” in and around kengeri upanagar on October .17. 2017.



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Industrial visit to Rashtrottana Blood Bank on October 24.2017.



Industrial visit to Skanray Technologies Mysore on 11th November 2017



Health awareness program for the children of orphanage visit "MADILU" in March 6th 2017



Memorandum of Understanding with Rajarajeswari College of Physiotherapy 16th October 2017



MEMORANDUM OF UNDERSTANDING

DEPARTMENT OF BIOMEDICAL ENGINEERING

S.No	PROGRAMME
1	Memorandum of Understanding with “Rajarajeswari Medical College and Hospital” on 11 th December 2015
2	Memorandum of Understanding with “Rajarajeswari Dental College and Hospital” on 3 th March 2016
3	Memorandum of Understanding with “RajaRajeswari College of Physiotherapy” on 16 th February 2017
4	Memorandum of understanding with “Complete Dental and Healthcare” hospital on 16 th October 2017.
5	Memorandum of understanding with Rajarajeswari College of Nursing February 2018
6	Memorandum of understanding with Elite Medicals September 8 th 2017
7	Memorandum of understanding with Energia Solutions September 6 th 2017
8	Memorandum of understanding with my dental care clinic on 15 th feb 2017

Memorandum of Understanding with “Rajarajeswari Dental College and Hospital” on 3th March 2016



Memorandum of Understanding with “RajaRajeswari College of Physiotherapy” On 16th February 2017.



Memorandum of Understanding with “Complete Dental and Healthcare” hospital on 16th October 2017



DEPARTMENT OF BIOMEDICAL ENGINEERING

2.2.5. Initiatives related to industry internship/summer training (15)

List of Industrial Internships/ training

S.NO	Students	Industry name	Title of Training
1	Hospital visit for the 3rd and final year students to the Department of Radiology	Rajarajeswari Medical College and Hospital on 6/11/2015	Internship
2	Hospital visit for the 2nd year students to the Department of Anatomy and Physiology	Rajarajeswari Medical College and Hospital on 6/11/2015	Internship
3	Internship for 3 rd year students	Rajarajeswari Medical College and Hospital 2/2/16 to 8/2/16	Internship
4	Internship for the 3 rd year students	Rajarajeswari Medical College and Hospital 16/8/2016 to 22/8/2016	Internship
5	Anatomy lab visit for the 3 rd semester students	Rajarajeswari Medical College on 16th October 2017.	Hospital visit
6	All 2 nd year ,3 rd year,4 th year	Rashtrottana Blood Bank on October 24 th 2017	Industrial visit
7	Second and third year students	Central Sterile Services Department (CSSD) , Rajarajeswari Medical College and Hospital on 4th November 2017	Hospital visit
8	All 2 nd year ,3 rd year,4 th year	Skanray Technologies, Hebbal Mysore, 11th November 2017.	Industrial visit

CRITERION 3	Course Outcomes and Program Outcomes	120
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3. COURSE OUTCOMES AND PROGRAM OUTCOMES(120)

PROGRAMME OUTCOMES

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering Solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES

- An ability to apply mathematical knowledge to design, develop, and analyze Bio-medical problems and applications
- Impart basic and advanced Bio-medical knowledge needed for the student to excel as Bio-medical engineer with strong, ethical and Environmental concerns.

3.1. Establish the correlation between the courses and the Program Outcomes (PO's) and Program Specific Outcomes (PSO's) (20)

PSO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO11	PO12
PSO1	3	3	3	3	2				1		2
PSO2	3	3	3	3	3	3	3	3	3	3	3

Subjective to criteria 3.1.1, number of outcomes desired has to be around 6 - ACS college of engineering developed the Course Outcomes before the revised SAR was disseminated/ published in the NBA website. Number of Course Outcomes of Biomedical engineering is defined according to faculty and peers knowledge and experience in teaching field.

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8TH SEMESTER SUBJECTS

Name: DBMS

Subject code: 10BM81

CO-1	To master the basic concepts and understand the applications of database systems.
CO-2	To construct an Entity-Relationship (E-R) model from specifications and to perform the transformation of the conceptual model into corresponding logical data structures.
CO-3	Able to construct queries and maintain a simple database using SQL and Able to understand the basic database storage structures and access techniques.
CO-4	Able to apply database transaction management and database recovery.

Name: MIS

Subject code: 10BM82

CO-1	Learn the basic principles of the major medical imaging techniques.
CO-2	Learn the mode of operation and medical applications of the major medical imaging techniques.
CO-3	Understand the advantages and disadvantages of the major imaging techniques, including potential hazards for patients.
CO-4	Make use of sample software (or implement simple algorithm) for displaying and basic processing of biomedical images.

Name: Lasers & optical fibres in medicine

Subject code: 10BM831

CO-1	To impart the fundamental knowledge in the field of lasers in medicine
CO-2	To understand the use of lasers in therapy & diagnosis.
CO-3	Make the students to gain relevant knowledge about fundamentals and principles of optics & fibro scopes & endoscopic etc.
CO-4	To impart knowledge about fiber optics laser system in clinical application system

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Name: Bio- Mems

Subject code: 10BM841

CO-1	To Learn the basic concepts and applications of micro systems including the types of microsensors and microactuators
CO-2	To Illustrate the various principles of operations and processes of mems various design issues, fabrication and packaging technologies
CO-3	To Learn scaling laws of mems and materials used in mems
CO-4	To understand the emerging trends in biomedical applications

Name: Seminar

Subject code: 10BM85

CO-1	To enhance the presentation skills.
CO-2	To horn the communication skills.
CO-3	To train them in technical writing.

Name: Project

Subject code: 10BM86

CO-1	Problem identification and problem solving methodology.
CO-2	Train the students in team willing & in working with different teams.
CO-3	To kindle research interest & quest for lifelong learning.

Name: CCN

Subject code: 10BM71

CO-1	Independently understand basic computer network technology and explain Data Communications System and its components.
CO-2	Identify the different types of network topologies and protocols.
CO-3	Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
CO-4	Identify and understand the different types of network devices and their functions within a network and building the skills of sub netting and routing mechanisms.

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Name: BMDSP

Subject code: 10BM72

CO-1	Learning the basics of biomedical signals and the difficulties encountered during the analysis with characteristics of EEG and processing the neurological signals.
CO-2	Learning the characteristics of ECG with methods and cancellation of the cardio logical signals..
CO-3	Learning the various algorithms for compressing the signal.
CO-4	Learning the basics of MATLAB with interfacing , graphics and programming

Name: Embedded system

Subject code: 10BM73

CO-1	Explain different embedded systems and their design metrics.
CO-2	Understand and integrate new knowledge within the field.
CO-3	Illustrate accessing I/O devices, direct memory access, buses, and interface circuits.
CO-4	Evaluate interrupt latency, context switching and different interrupt handling mechanisms.

Name: Medical Image Processing

Subject code: 10BM74

CO-1	The fundamentals of digital image processing
CO-2	Image transformations and Segmentation techniques used in digital image processing
CO-3	Image enhancement and color image processing techniques used in digital image processing
CO-4	Image compression and restoration techniques used in digital image processing

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Name: Medical Informatics

Subject code: 10BM753

CO-1	To understand the need & advantage of MI & its applications
CO-2	Imparting the relevant knowledge to work effectively with communication, computer & informatics specialist to design develop & implement healthcare, public health programs.
CO-3	To use information technology effectively for hospital management & automation
CO-4	TO make them capable of adapting themselves to recent developments & research in the field of MI.

Name: Ergonomics

Subject code: 10BM763

CO-1	Identify, explain and evaluate the impact of various personal attributes (anatomical, physiological, anthropometric and psychological) on proper safe working practice
CO-2	Assess the effect of physical environment factors on comfort and performance
CO-3	Apply principles of good ergonomic design of work areas and equipment to a range of occupational settings
CO-4	Explain the influence of ergonomic principles on work organisation and culture.

Name: Biomedical DSP lab

Subject code: 10BML77

CO-1	Static ECG, moving ECG, Sampling rate conversions, signal averaging, correlation and convolution of two signals.
CO-2	Different compression techniques, and also filters

Name: MIP lab

Subject code: 10BML78

CO-1	Image acquisition, image transformations
CO-2	Image enhancement, filtering and segmentation techniques.

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6th SEMESTER SUBJECTS

Name: Communication systems

Subject code: 10BM61

CO-1	Learning the basics of Communication Systems and the difference between analog and digital communication systems with various modulation and de-modulation schemes
CO-2	Learning the performance of time domain and frequency domain analysis with detailed study of linear and non-linear Phase locked loops
CO-3	Learning the concepts of basic signal processing operations, sampling process, quantization, coding, different M-array techniques
CO-4	Learning the role of communication in telemedicine and telemetry for medical applications.

Name: C++ & data structures

Subject code: 10BM62

CO-1	To learn the fundamental programming concepts and methodologies which are essential to building good C/C++ programs.
CO-2	To practice the fundamental programming methodologies in the C/C++ programming language via laboratory experiences. Microsoft Visual Studio is the programming environment that will be used.
CO-3	To code, document, test, and implement a well-structured, robust computer program using the C/C++ programming language.
CO-4	Provide a solid introduction to the topic of file structure design and Discuss, in detail, the data structures necessary for achieving its efficiency objectives.

Name: DSP

Subject code: 10BM63

CO-1	Ability to understand sampling and reconstruction of Discrete Time signals, relationship of the DFT to other transforms, properties of DFT
CO-2	comparison between DFT and FFT, FFT algorithms
CO-3	Design of IIR and FIR filters
CO-4	Ability to understand quantization process errors, analysis and reduction of round off errors. Applications of DSP

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Name: API

Subject code: 10BM64

CO-1	Understand the working principle of Colorimeters, Spectrophotometers and spectrophotometric measurements, Beer lambert law, absorption and interference filters
CO-2	Study of automated analysis, continuous flow system & different types of Gas Analyzers, Blood gas analyzer, blood pCO ₂ , blood PH measurement.
CO-3	Basics of Chromatography, Gas chromatography and Liquid Chromatography.
CO-4	Principle of fluorescence , Raman Spectrometer Raman effect & study of NMR Spectrometers

Name: CI-II

Subject code: 10BM65

CO-1	Understand the working principle of EEG 10-20 System, EEG Sleep patterns, EEG telemetry system, higher cortical functions , cranial nerves, lumbar puncture
CO-2	Study the working principle of EMG system, jolly test , nerve conduction and neuromuscular stimulation (NMS).
CO-3	Study the pathology of fractures and fracture healing, patterns of fracture and radiographic examination. Principle of fracture treatment , external fixation , internal fixation and types
CO-4	Understand the working principle of anesthesia, components of anesthesia. Classification of breathing systems Mapleson A, Mapleson D with and without control ventilation. HP gas analyzer , Riken Gas indicator , Raman spectroscopy.

Name: Biomaterials & artificial organs

Subject code: 10BM663

CO-1	Explain the principle and biology underlying the design of implants and artificial organs.
CO-2	Differentiate classes of materials used in medicine.
CO-3	Discuss the application of biomaterials in medicine.
CO-4	Discuss concept of biocompatibility and the methods of biomaterial testing. Discuss the design process in some of the prominent artificial organs.

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Name: CI-II lab

Subject code: 10BML67

CO-1	Design and study the sample and hold circuit, Analyze and study the generation and detection of ASK & FSK, PAM , PWM,ADC , DAC
CO-2	Measurement of unknown concentration of a solution using Colorimeter, Measurement of pH using pH meter, determination of conductivity using Conductivity meter, able to calibrate and test the working of syringe infusion pump, understand the working of DC defibrillator, baby incubator, ventilator, heart lung machine, pacemaker, Snell's chart, ophthalmoscope, Recording of pulse & oxygen saturation using pulse oximeter.

Name: C++ & DS lab

Subject code: 10BML68

CO-1	Learn fundamental features of object oriented language, Linear data structures and their applications such as stacks, queues and lists
CO-2	Non-Linear data structures and their applications such as trees and graphs , Sorting and searching algorithms

5th SEMESTER SUBJECTS

Name: Management & Entrepreneurship

Subject code: 10AL51

CO-1	Understand various characteristics of management , scope of management , functional areas of management ,
CO-2	Understand the role of a manager , early and modern management approach.
CO-3	Understand planning , importance of planning, objectives of planning, Decision making
CO-4	Different stages of entrepreneurial process , qualities of entrepreneur. Development of Entrepreneurship, barriers of entrepreneurship and functions of woman entrepreneur, classification , identification and contents of project report.

Name: 8086 Microprocessor

Subject code: 10BM52

CO-1	Able to understand the architecture and organization of microprocessor along with instruction coding formats.
CO-2	Able to understand, write structured and well-commented programs in assembly language.
CO-3	Able to understand the memory and addressing concepts for interfacing I/O devices to the microprocessor.
CO-4	Able to understand software/ hardware interrupts and further write programs to perform I/O using handshaking and interrupts.

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Name: Signals & systems

Subject code: 10BM53

CO-1	Understand the mathematical description of continuous and discrete time signals and systems.
CO-2	Analyze the signals in time domain using convolution, difference/differential equations
CO-3	understand and analyse Fourier transform and Z-transform for continuous time and discrete time signals
CO-4	Understand realization of digital systems

Name: VLSI

Subject code: 10BM54

CO-1	Learning the basics of VLSI circuit design and technologies with IC era and various methods of fabrication with different modes of transistor action
CO-2	Learning basic circuit concepts as applied to VLSI design and scaling of Basic MOS circuits
CO-3	Learning the general constraints for design of subsystems in order to design data paths for microprocessors that includes adders, subtractors, ALU
CO-4	To design combination circuit delay with RC delay models and the design of layout, stick diagrams with basic design rules

Name: CI-1

Subject code: 10BM55

CO-1	Able to describe human anatomy & physiological systems.
CO-2	Able to distinguish recording and monitoring instruments.
CO-3	Able to design of bio potential amplifier
CO-4	Able to illustrate instruments used in clinic.

Name: Biomedical Equipments

Subject code: 10BM56

CO-1	Acquiring basic knowledge about biomedical equipments and their use
CO-2	Learning about various diagnostic and therapeutic equipments
CO-3	Learning about electromagnetic interferences to biomedical equipments
CO-4	Gaining knowledge about the electrical safety while using equipments

DEPARTMENT OF BIOMEDICAL ENGINEERING

Name: 8086 Microprocessor lab

Subject code: 10BML57

CO-1	Understanding of the Intel 8086 architecture. Knowledge of the 8086/8088 instruction set and ability to utilize it in programming. To familiarize with the assembly level programming
CO-2	Ability to interface various devices to the microprocessor

Name: CI-1 lab

Subject code: 10BML58

CO-1	Make the right choice of an IC and design the circuit for a given application, and Design and analyze the performance of instrumentation amplifier, LPF, HPF, DAC and oscillators using linear IC.
CO-2	Understand the applications of Linear IC for addition, integration and 555 timer operation to generate signals/pulses.

4th SEMESTER SUBJECTS

Name: Engineering Mathematics

Subject code: 10MAT41

CO-1	Identify and use appropriate methods for first and second order differential equation.
CO-2	Understand the complex analysis and able to establish the relationship between real and Imaginary parts.
CO-3	Analyse, classify and interpret the given data in a probabilistic and statistic approach.
CO-4	Have ability in predicting the happening of an event.

Name: Microcontrollers

Subject code: 10ES42

CO-1	Learn the basic difference between the microprocessors and microcontroller with the family information.
CO-2	Learn the architecture and basic function of the microcontroller.
CO-3	Learn the programming tools which is used for the programming of the microcontroller.
CO-4	Learn the 8051 microcontroller assembly language and C language instructions and program logic. Learn hardware interface of the microcontroller with the actual devices like stepper motor, LCD etc.

DEPARTMENT OF BIOMEDICAL ENGINEERING

Name: Control systems

Subject code: 10ES43

CO-1	understand the basic concepts and mathematical modelling of systems
CO-2	Draw the blockdiagram and reduction for a given system and also obtain transfer function by signal flow graph techniques
CO-3	analyse the system response in time and frequency domain
CO-4	understand and design of control systems using state space analysis

Name: BMT

Subject code: 10BM44

CO-1	Gain the knowledge of working principle and construction details of Biomedical Transducers.
CO-2	Acquire the knowledge of transducer applications to access the biological signals.
CO-3	Access the performance of various Biomedical Transducers.
CO-4	Requirements for measurement ranges

Name: HDL

Subject code: 10EC45

CO-1	Learn the structure of HDL module, data types , operators and comparison between VHDL and Verilog.
CO-2	write HDL codes for combinational and sequential circuits using data flow , behavioural and structural description
CO-3	Write the HDL description using procedure, loop functions and sequential assignment statements.
CO-4	Learn mixed language description, synthesis basics and component mapping process in the hardware domain.

Name: LIC

Subject code: 10EC46

CO-1	Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.
CO-2	Elucidate and design the linear and non-linear applications of an opamp and special application Ics.
CO-3	Classify and comprehend the working principle of data converters.
CO-4	Illustrate the function of application specific ICs such as Voltage regulators, PLL and its application in communication

DEPARTMENT OF BIOMEDICAL ENGINEERING

Name: Microcontroller lab

Subject code: 10ESL47

CO-1	Able to understand the basic architecture of a stored-program computer, addressing modes, assembly-language instructions of a microcontrollers. Able to write assembly level language programs
CO-2	Able to understand the interfacing between the processors and peripheral devices.

Name: HDL lab

Subject code: 10ECL48

CO-1	Students learns the basics of HDL and will be able to write and demonstrate the simple programs for combinational circuits. Students are expected to apply their knoweledge in writing and demonstrating the programs on sequential circuits
CO-2	Students are able to write and demonstrate the interfacing programs(DC motorStepper Motor,external lights using relays,Different waveforms like sine,square,triangle, ramp,sawtooth etc using DAC)

3rd SEMESTER SUBJECTS

Subject: Engg. Mathematics - III

Subject code: 10MAT31

CO-1	Identify and use appropriate methods to solve algebraic and transcendental equations.
CO-2	Analyze, solve and interpret the given data.
CO-3	Solve the standard PDE of the forms heat equation, wave equation, Laplace equation both Analytically and numerically.
CO-4	Evaluate the standard integrals.

Subject: AEC

Subject code: 10ES32

CO-1	To understand and design the wave shaping circuits using diodes like clipper, clamper, rectifiers, etc.
CO-2	To analyze and design simple circuits containing non-linear elements such as BJT / FETS using the concepts of load lines, operating points and incremental analysis.
CO-3	Incorporate the design concepts of single stage, multistage amplifiers, Darlington pair and bootstrap circuit with frequency responses.
CO-4	Measuring the performance characteristics of negative feedback in electronic circuits and positive feedback in oscillator circuits

DEPARTMENT OF BIOMEDICAL ENGINEERING

Subject: Logic design

Subject code: 10ES33

CO-1	The students will be able to design, simulate, built and debug complex combinational circuits based on an abstract functional specification and An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
CO-2	An ability to understand the different switching algebra theorems and apply them for logic functions
CO-3	An ability to understand the bitable element and the different latches and flip-flops.
CO-4	An ability to understand sequential circuits, like counters and shift registers, and to perform simple projects with them.

Subject: Network Analysis

Subject code: 10ES34

CO-1	Analyze complex circuits to simple ones using basic network reduction techniques, mesh and node analysis method.
CO-2	Obtain the solution of circuit using Network Topology and Solve AC & DC circuits using theorems.
CO-3	Derive expression for resonant frequencies and bandwidth for series and parallel circuits and Solve problems relating to transient and steady state currents in RL, RC and RLC circuits under AC and DC excitations.
CO-4	Analyze given two port networks using Z, Y and H parameters/models and Solve problems related networks using Laplace transforms.

Subject: Electronic Instrumentation

Subject code: 10IT35

CO-1	Impart with the knowledge of generalized measurement systems. Learn the characteristics of various types of measurement systems and errors in measuring instruments.
CO-2	Understand the concepts of Ammeters, Voltmeter and Multimeters
CO-3	Analyze the circuits for the measurement of Resistance, Capacitance, Inductance, and Frequency.
CO-4	Impart with the basic concepts of CRO and its usage for the measurement of various parameters. .

Subject: Human anatomy and Physiology

Subject code: 10BM36

CO-1	Analyze and describe the structures and functions of human anatomy and physiology from a regional perspective for the following regions: head and neck, thoracic, abdominopelvic, and upper and lower extremities.
CO-2	Discuss in depth the physiology of the nervous, musculoskeletal, respiratory, and cardiovascular systems.

DEPARTMENT OF BIOMEDICAL ENGINEERING

CO-3	Recognize the major organs and components of the respiratory system and understand their functions. .
CO-4	Recognize the major organs and vessels of the cardiovascular system and understand their functions. Learn briefly the basic components and functions of the digestive, urinary, and endocrine systems.

Name: AEC lab

Subject code: 10ESL37

CO-1	understand , design and test the RC coupled amplifier, Darlington emitter follower circuit, RC phase shift, 100oolean, colpitt's and crystal
CO-2	Understand, design and test diode clipper, clamper, FWR with and without filters, class-B push pull amplifier circuit, amplifier circuits.

Name: Logic design lab

Subject code: 10ESL38

CO-1	Students are able to realize 100oolean expressions, adders using basic gates and universal gates.
CO-2	Students are able to realize multiplexer and De-multiplexer and comparators ,decoders ,encoders using respective IC's and Students are able to realize different Flip flops and also realize different counters, shift registers using respective IC's. Students are able to realize different Flip flops and also realize different counters, shift registers using respective IC's

3.1.2. CO-PO matrices of courses selected in 3.1.1 (six matrices to be mentioned; one per semester from 3rd to 8th semester) (05)

Subject Code	Cos	Program Outcomes (Pos)											
		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
10MAT31	CO1	2	2	3		2							1
	CO2	2	2	3		2							1
	CO3	2	2	3		2							1
	CO4	2	2	3		2							1
10ES32	CO1	2	2	2	2	2			-	2	-	2	1
	CO2	2	2	2	2	2			-	2	-	2	1
	CO3	2	2	2	2	2			-	2	-	2	1
	CO4	2	2	2	2	2			-	2	-	2	1
10ES33	CO1	1	2		2							1	1
	CO2	2	1		2	1						2	1
	CO3	1	1	2	2	1						1	1
	CO4	1	2	3					1	1	1	2	1
10ES34	CO1	3	3	1	2	-	-	2	-	-	-	-	1
	CO2	3	3	2	2	-	-	1	-	-	-	-	1
	CO3	2	2	3	1	-	-	1	-	-	-	-	1
	CO4	2	2	2	1	-	-	1	-	-	-	-	1

DEPARTMENT OF BIOMEDICAL ENGINEERING

10IT35	CO1	1	2	1	1	2		1	1				1
	CO2	2	2	2	2	1				1		1	
	CO3	2	2	1	1								
	CO4	1	2	2	1					1			
10BM36	CO1	1			1		2		1		1		
	CO2	1			1		2		1		1		
	CO3	1			1		2		1		1		
	CO4	1			1		2		1		1		
10ESL37	CO1	3	2	2	1	2				2		1	2
	CO2	3	2	2	1	2				2		1	2
10ESL38	CO1	2	1	1	2	1						1	1
	CO2	1	2	2	2	1						2	
10MAT41	CO1	2	2	1		1							1
	CO2	2	2	3		3							1
	CO3	2	2	3		3							1
	CO4	2	3	2		3							1
10ES42	CO1	1	2	2	2	1	-	-	-	-	-	1	-
	CO2	1	2	2	1	1	-	-	-	-	-	1	-
	CO3	1	2	2	2	1	-	-	-	-	-	-	-
	CO4	2	2	1	1	1	-	-	1	-	-		-
10ES43	CO1	3	3	2	2	1						2	
	CO2	2	3	2	1	1						1	1
	CO3	3	3	2	2	1						1	1
	CO4	3	3	1	1	1						1	
10BM44	CO1	2	2	2	2	2		1		1		2	1
	CO2	2	2	2	2	1	2			1		2	2
	CO3	2	2	1	1	1				1		2	1
	CO4	3	2	1	1	1				1		2	1
10EC45	CO1	1	2	2	2		-	-				-	
	CO2	1	1	2	2		-	-				-	
	CO3	1	1	1	2		-	-				-	
	CO4	1	1	1	1		-	-				-	
10EC46	CO1	1	2	1	2	-	-	-	-	-	-	1	
	CO2	2	1	1	2		-	-	-	-	-	2	1
	CO3	1	1	1	2		-	-	-	-	-	1	1
	CO4	1	2	1	-	-	-	-	-	-	1	2	1
10ESL47	CO1	2	1	2	2	1						1	
	CO2	1	2	2	2	1						1	
10ECL48	CO1	3	2	3	3	1							
	CO2	3	2	3	3	1							
10AL51	CO1					1	1	2	1	3	2	3	2
	CO2					1	1	1	2	3	2	3	2



DEPARTMENT OF BIOMEDICAL ENGINEERING

	CO3					1	1	1	2	3	2	3	2
	CO4					1	1	1	2	3	3	3	2
10BM52	CO1	1	2	2	1	1							
	CO2	3	2	1	1	2							
	CO3	2	2	2	2	1							
	CO4	2	2	2	1	2							
10BM53	CO1	3	2		1	1							
	CO2	3	3	2	1								
	CO3	3	3	3	3	2							1
	CO4	2	1	1									
10BM54	CO1	2	2	1	1	1		1				2	2
	CO2	3	3	3	2	3	1			1		2	2
	CO3	3	3	3	2	3	1			1		2	2
	CO4	3	3	3	2	3	1			1		2	2
10BM55	CO1			1			1						
	CO2	1	1	1		1	1					-	
	CO3	2	2	2	1		2				1		
	CO4	1	1	2		3	2	1	1	1	1	1	2
10BM56	CO1	1	1	1	1								1
	CO2	2	2	3	3	1	1	2	2				2
	CO3	2	2	2	2		3		1				
	CO4			2	1		3	1	3				1
10BML57	CO1	2	2	1	2	1				2		2	1
	CO2	2	1	1	1	1				2		2	1
10BML58	CO1	2	2	1	1	2				1	1	1	
	CO2	2	2	2		2				1	1	2	1
10BM61	CO1	1	1			1	1						1
	CO2	2	1		2	2						1	
	CO3	3	2	2	1	2							
	CO4		1	2		2	2	1	1		3	2	1
10BM62	CO1		1	1	3	1							
	CO2	1				2	1			1	1	1	1
	CO3			2	1	2				1	1	1	1
	CO4			2	2	2	1			1	1		1
10BM63	CO1	3	3	2									
	CO2	3	2	1	1								
	CO3	3	1	2	1	1							
	CO4	3	2	2	2	2							1
10BM64	CO1	1	2	2	2	2			2		1		2
	CO2	1	2	3	2	2			1	1			2
	CO3	1	2	2	1	1			1	1			2

DEPARTMENT OF BIOMEDICAL ENGINEERING

	CO4	1	1	1	2	1			1	1	1		3
10BM65	CO1	1	1		2	2	1		1		1		
	CO2	2	1	2	2	3	1		1		1		
	CO3	1	1	2		3	1		1				
	CO4	2	1	2	3	3	1		1		1		
10BM663	CO1	1	2	1	1	1	2						
	CO2	1	1	2	2		1						
	CO3	1	2	2	2								1
	CO4	1	2	2	2								1
10BML67	CO1	1	2	2		2			1	1		1	
	CO2	1	1	2	1	2	1			1	1	1	1
10BML68	CO1	1	1	2	1				1	2			
	CO2	1	1	2	1				1	1			
10BM71	CO1	2	2	1		1				1	2	2	
	CO2	1	1	1		2					2		
	CO3	1		2		2				2	2	2	
	CO4	1		2							2	1	
10BM72	CO1		3	2	2								1
	CO2	2	3	3	3	2					2		1
	CO3	3	3	3	3	3							2
	CO4	3	3	3	3	3				2	1		1
10BM73	CO1	1	2	2	2	2							
	CO2	2	1	2	2	1							1
	CO3	1	2	2	1	1							1
	CO4	2	2	2	1	1							1
10BM74	CO1	3	1	2	1	1						1	
	CO2	3	2	2	3	2						2	1
	CO3	2	3	2	3	2						1	1
	CO4	3	3	3	2	2						1	1
10BM753	CO1			1	1		1	1	1				1
	CO2	3	2	3	3	1	2	2	2				1
	CO3	3	3	3	3	3	2	1	2	3	3	3	3
	CO4	3	3	3	3	3	2	2	3	3	2	3	3
10BM763	CO1	3	2	2	2	1	2	2	-	-	-	1	1
	CO2	2	3	3	2	2	-	2	2	1	1	2	2
	CO3	3	3	3	3	3	2	2	3	3		2	3
	CO4	2	1	2	2	3		3	3	1		2	2
10BML77	CO1	3	2	2	3	2				2		2	1
	CO2	3	2	2	3	2				2		2	1
10BML78	CO1	3	3	3	3	1				2	1	2	2
	CO2	3	3	3	3	1				2	1	2	2

DEPARTMENT OF BIOMEDICAL ENGINEERING

10BM81	CO1	1	3	2	2	2						1	
	CO2	1	2	3	2	1				1		2	1
	CO3	2	2	2	1	2		2	2			2	
	CO4	2	2	3	2	2				2		2	1
10BM82	CO1	2	2	1		2	-	-			1		
	CO2	1		2		2	2	-		1	1	1	
	CO3	1		2	2	2	-	-			2	2	1
	CO4			2		2	1	-		1	1	1	1
10MB831	CO1	2	1	1	1		1		1				1
	CO2		1	2	1	1	2		2		1	1	1
	CO3	3	3	2	1				2		1	1	1
	CO4	3	3	3	3	1			3		1	1	1
10BM841	CO1	3	2	1	1	1							1
	CO2	3	2	3	2	2				1		2	1
	CO3	3	2	3	2	2				1		2	1
	CO4	3	3	3	3	2	2			1		3	1
10BM85	CO1	2	3	3	3	2	1				3	1	1
	CO2		3			2	3			3	3	3	2
	CO3	3	3	3	3	3	3				3	3	3
10BM86	CO1	3	3	3	3	3	3	3	3	3	3	3	3
	CO2	3	3	3	3	3	3	3	3	3	3	3	3
	CO3	3	3	3	3	3	3	3	3	3	3	3	3

CO-PSO Mapping

Subject Code	COs	Program Specific Outcomes (PSOs)	
		PSO-1	PSO-2
10ES32	CO1	3	2
	CO2	3	3
	CO3	3	1
	CO4	2	3
10ES33	CO1	3	2
	CO2	3	2
	CO3	3	2
	CO4	3	2
10ES34	CO1	3	2
	CO2	3	2
	CO3	3	2
	CO4	3	2
10IT35	CO1	3	3

DEPARTMENT OF BIOMEDICAL ENGINEERING

	CO2	3	3
	CO3	3	3
	CO4	3	3
10BM36	CO1	2	3
	CO2	2	3
	CO3	3	3
	CO4	2	3
10BML37	CO1	2	3
	CO2	3	2
	CO3	2	3
10BML38	CO1	3	2
	CO2	2	3
	CO3	3	2
10ES42	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ES43	CO1	3	2
	CO2	3	2
	CO3	3	2
	CO4	3	2
10BM44	CO1	2	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10EC45	CO1	1	2
	CO2	1	2
	CO3	1	2
	CO4	1	2
10EC46	CO1	3	2
	CO2	3	2
	CO3	3	2
	CO4	3	2
10ESL47	CO1	3	2
	CO2	3	2
	CO3	3	2
10ECL48	CO1	3	2
	CO2	3	2
10AL51	CO1	1	2
	CO2	1	2
	CO3	1	2



DEPARTMENT OF BIOMEDICAL ENGINEERING

	CO4	1	2
10BM52	CO1	2	1
	CO2	2	1
	CO3	2	1
	CO4	2	1
	CO4	2	1
10BM53	CO1	3	2
	CO2	3	2
	CO3	3	2
	CO4	3	2
10BM54	CO1	3	3
	CO2	2	3
	CO3	3	3
	CO4	2	3
10BM55	CO1	2	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BM56	CO1	2	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BML57	CO1	2	1
	CO2	2	1
	CO3	2	1
	CO4	2	1
10BML58	CO1	2	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BM61	CO1	2	2
	CO2	2	2
	CO3	2	2
	CO4	3	3
10BM62	CO1	2	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BM63	CO1	3	2
	CO2	3	2
	CO3	3	2
	CO4	3	2



DEPARTMENT OF BIOMEDICAL ENGINEERING

10BM64	CO1	2	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BM65	CO1	2	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BM663	CO1	3	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BML67	CO1	1	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BML68	CO1	2	3
	CO2	2	3
10BM71	CO1	3	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BM72	CO1	3	3
	CO2	2	3
	CO3	3	3
	CO4	2	3
10BM73	CO1	3	3
	CO2	2	3
	CO3	2	3
	CO4	3	3
10BM74	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10BM753	CO1	3	2
	CO2	3	3
	CO3	2	3
	CO4	2	3
10BM763	CO1	2	3



DEPARTMENT OF BIOMEDICAL ENGINEERING

	CO2	2	3
	CO3	2	3
	CO4	2	3
10BML77	CO1	2	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BML78	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10BM81	CO1	1	3
	CO2	1	2
	CO3	1	3
	CO4	1	2
10BM82	CO1	2	3
	CO2	2	3
	CO3	2	3
	CO4	2	3
10BM831	CO1	3	3
	CO2	2	3
	CO3	3	3
	CO4	2	3
10BM841	CO1	3	3
	CO2	2	3
	CO3	3	3
	CO4	2	3
10BM85	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10BM86	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3



DEPARTMENT OF BIOMEDICAL ENGINEERING

3.1.3 Program level Course-PO matrix

Semester III

S. no	Subject code	PO's											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
1	10ES32	2	2	2	2	2	-	-	-	2		2	1
2	10ES33	2	2	3	2	1	-	-	1	1	1	2	1
3	10ES34	3	3	2	2	-	-	2	-	-	-	-	1
4	10IT35	2	2	2	2	2	-	1	1	1	-	1	1
5	10BM36	1			1		-	-	1	-	1		
6	10ESL37	3	2	2	1	2				2		1	2
7	10ESL38	2	2	2	2	1						2	1

Semester IV

S. no	Subject code	PO's											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
1	10ES42	1	2	2		1			1			1	
2	10BM44	3	2	2	2	2	-	-	-	1	-	2	2
3	10EC45	1	2	2	2		-	-				-	
4	10EC46	2	2	1	2		-	-	-	-	1	2	1
5	10ESL47	2	2	2	2	1						1	
6	10ECL48	3	2	3	3	1							

Semester V

S. no	Subject code	PO's											
		PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
1	10AL51					1	1	2	2	3	3	3	2
2	10BM52	2	2	2	1	2							
3	10BM53	3	3	2	3	2	-	-	-	-	-	-	1
4	10BM54	3	3	3	2	3	1	1		1		2	2
5	10BM55	2	2	2	1	2	2	1	1	1	1	1	2
6	10BM56	2	2	2	2	1	3	-	2			-	2
7	10BML57	2	2	1	2	1				2		2	1
8	10BML58	2	2	2	1	2				1	1	2	1

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Semester VI

Sl.no	Subject code	PO's											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
1	10BM61	2	2	2	2	2		1	1		3	2	1
2	10BM62	1	1	2	2	2	1			1	1	1	1
3	10BM63	3	2	2	2	2	-	-	-	-	-	-	1
4	10BM64	1	2	2	2	2	-	-	2	1	1		3
5	10BM65	2	1	2	3	3	-	-	1		1		
6	10ME663	1	2	2	2	1	2						1
7	10BML67	1	2	2	1	2	1		1	1	1	1	1
8	10BML68	1	1	2	1				1	2			

Semester VII

S. no	Subject code	PO's											
		PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
1	10BM71	2	2	2		2					2	2	
2	10BM72	3	3	3	3	3	-	-		2	-		2
3	10BM73	2	2	2	2	2	-	-					1
4	10BM74	3	3	3	3	2	-					2	1
5	10BM753	3	3	3	3	3	2	2	2	3	3	3	2
6	10BM763	3	3	3	3	3	2	3	3	2	1	2	2
7	10BML77	3	2	2	3	2				2		2	1
8	10BML78	3	3	3	3	1				2	1	2	2

Semester VIII

S. no	Subject code	PO's											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
1	10BM81	2	3	3	2	2	-	2	2	2		2	1
2	10BM82	2	2	2	2	2	-	-		1	2	2	1
3	10BM831	2	2	2	2	1	3	1	1	2	1	2	1
4	10BM841	3	2	2	2	2	2	-		1		2	1
5	10BM85	3	3	3	3	3	3	3	3	3	3	3	3
6	10BM86	3	3	3	3	3	3	3	3	3	3	3	3

3.2 Attainment of course outcomes

3.2.1 Describe the assessment process used to gather the data up on which the evaluation of courses outcome based (10)

The program outcomes are assessed with the help of course outcomes of the relevant courses through direct and indirect methods. Direct measures are provided through direct examinations or observations of student knowledge or skills against measureable course outcomes.

The knowledge and skills described by the course outcomes are mapped to specific problems on internal exams/home assignment/group task. Throughout the semester the faculty records the performance of each student on each course outcome. The assessment process used to evaluate course outcome is mainly internal assessment and university examination of theory and practical in which weightage of 80% to university examination and 20% to internal test. Assignment and quizzes are given to improve the internal and university exam result. They are not considered for attainment of Cos, POs and PSOs .

Attainment of course outcomes- Assessment process

- 1) For every subject course outcomes are defined in line with PO.
- 2) PO-CO mapping is done .
- 3) Attainment of COs is assessed by students performance in internal assessment exams and university exams
- 4) Internal assessment Examination :The internal question paper is framed using blooms taxonomy ,the questions are mapped with COs.
- 5) The IA marks are analyzed with respect COs using the spread sheet designed for the purpose.
- 6) Based on the target set the attainment of COs is calculated for weightage of 20%
- 7) External Assessment is done by students performance in university exams
- 8)For university marks a target level is set for every subject and CO attainment is calculated for weightage of 80%
- 9)PO attainment is calculated using CO-PO mapping.

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Direct Assessment methods	
For some of the POs that are abstract, rubrics has been designed using performance indicators and shared with the students in advance. This helps students understand against which parameter their work will be judged with the “scoring rules”. These rubrics can be used by students in, revising, and judging their own work and progress.	
Process & Tools	Quality & Relevance
Internal Assessment	<ul style="list-style-type: none"> ➤ Three Internal Assessment Conducted per semester ➤ Question Paper for all Internal Assessments are set in accordance with Blooms Taxonomy level. ➤ Valuation is done in Accordance with Scheme supplied. ➤ Marks are collected in the Excel Sheet to map against CO. ➤ Attainment and Target levels are Analysed ➤ Gaps are Identified & Corrective actions are taken.
End Semester Exams (Theory)	<ul style="list-style-type: none"> ➤ Collecting the External Marks and entered in the Excel sheet ➤ Result Analysis is carried out.
Assignments	Innovative Assignment for students beyond the syllabus and to obtain the Students Interest and to know the understanding of students.
Quiz	<ul style="list-style-type: none"> ➤ Quiz Will be conducted at the end of the class or Starting of the class to know the students understanding capability. ➤ To Assess the Communication Skill and immediate response to the questions
Class test	<ul style="list-style-type: none"> ➤ Fortnightly test is conducted for students to practice them for university examinations. Class tests will be of Open book test or closed book test.
Group discussion / Brainstorming	<ul style="list-style-type: none"> ➤ To Assess the team work and Individual Contributions in ➤ Clarity, Ability to explain <p>This is designed to assess student’s analytical capacity along with the capability to communicate with others.</p>
Lab Evaluation	<ul style="list-style-type: none"> ➤ Every Lab session will be a viva session for students after completing the Experiments. <p>Viva in the lab will be helpful to get the practical applications easily.</p>
Course Evaluation	At the end of every semester, students give feedback for the course taught to them. In this feedback survey students tell how effective course was in order to achieve POs.
Indirect Assessment methods	
Alumni Survey	Collect variety of information about program satisfaction, from graduate’s end every year.
Employer Survey	Provide information about our graduate’s skills and capability. – after every 2 years
Student exit survey	To evaluate the success of program by providing exit survey forms to students to achieve the Outcomes Every year.
Student feedback Survey	To evaluate teaching learning process.
Extra Curricular Activities	Activities and Participation of Students in State, National and International levels will be helpful in understanding of Application oriented things.
Co-Curricular Activities	Apart from Activities students are also encouraged and guided to participate in Academic related Activities like workshops, seminars, Industrial Visits, Guest Lectures, Symposiums etc.

3.2.2 Record the attainment course outcomes of all courses with respect to set attainment levels

Process for Attainment of CO

Weightage:	University Exam	- 80%
	Internal Exam	- 20%

PO Attainment

1. PO and CO are mapped.
2. Final assessment is calculated by 20% of internal marks and 80% of university exam marks.
3. Using CO PO mapping attainment is carried out.

Action plan:

Weak student's academic program:

Tutorials are conducted to find out the understanding level and guide them. Also extra classes are conducted to revise difficult concepts for weak students. Assignments are given so that the students will learn the concepts and seek clarification from teachers.

3.3 Attainment of Program Outcomes and Program Specific Outcomes

3.3.1 Describe assessment tools and processes used for measuring the attainment of each of the Program Outcomes and Program Specific Outcomes (10)

Direct Assessment methods	
For some of the POs that are abstract, rubrics has been designed using performance indicators and shared with the students in advance. This helps students understand against which parameter their work will be judged with the "scoring rules". These rubrics can be used by students in, revising, and judging their own work and progress.	
Assignments	Innovative Assignment for students beyond the syllabus and to obtain the Students Interest and to know the understanding of students.
Quiz	Quiz Will be conducted at the end of the class or Starting of the class to know the students understanding capability.
Class test	Fortnightly test is conducted for students to practice them for university examinations. Class tests will be of Open book test or closed book test.
Group discussion / Brainstorming	This is designed to assess student's analytical capacity along with the capability to communicate with others.
Internal Exams	Internal Exams and Semester End examination are metric for assessing whether all the POs are attained or not. Examination is more focused on attainment of course outcomes and program outcomes using a descriptive exam
End Semester Exams (Theory)	
Lab practical	Every Lab session will be a viva session for students after completing the Experiments. Viva in the lab will be helpful to get the practical applications easily.
Course Evaluation	At the end of every semester, students give feedback for the course taught to them. In this feedback survey students tell how effective course was in order to achieve POs.

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Indirect Assessment methods	
Programme outcomes assessment report	At the end of every academic year annual report is developed where the statistics of students who have participated in professional bodies/ student chapters /workshops/seminars/conferences/paper presentations / internships /industry visit etc..is prepared. This statement is considered to indirectly assess the POs.
Alumni Survey	Collect variety of information about program satisfaction, from graduate's end every year.
Employer Survey	Provide information about our graduate's skills and capability. – after every 2 years
Student exit survey	To evaluate the success of program by providing exit survey forms to students to achieve the Outcomes Every year.
Student feedback Survey	To evaluate teaching learning process.
Extra Curricular Activities	Activities and Participation of Students in State, National and International levels will be helpful in understanding of Application oriented things.
Co-Curricular Activities	Apart from Activities students are also encouraged and guided to participate in Academic related Activities like workshops, seminars, Industrial Visits, Guest Lectures, Symposiums etc.

Sample survey forms:

- Graduate exit survey
- Alumni survey

3.3.2. Provide results of evaluation of each PO & PSO (40)

ANSWER:

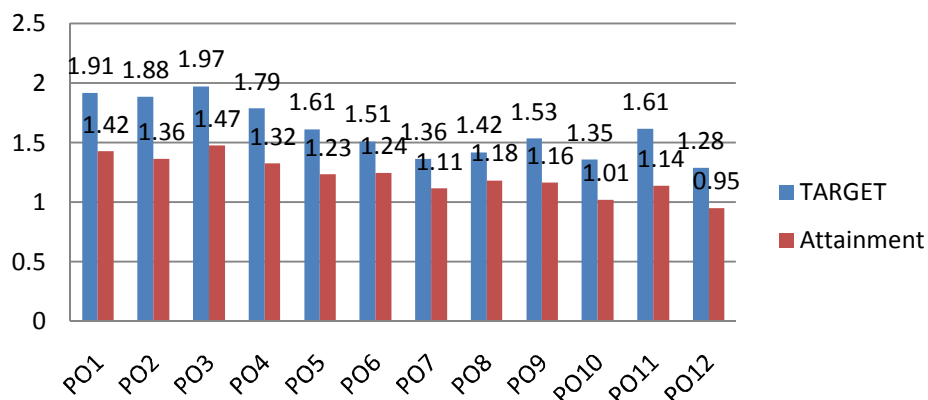
The following table shows the Program Outcome attainment level for the Academic year i.e. 2013-17.

SUBJECT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
10ES32	0.92	0.92	0.92	0.92	0.92			-	0.92	-	1.03	0.46
10ES33	0.76	0.92	1.56	1.20	0.60	-	-	0.64	0.64	0.64	0.92	0.61
10ES34	0.90	0.90	0.71	0.54	-	-	0.44	-	-	-	-	0.35
10IT35	0.52	0.68	0.51	0.43	0.53	-	-	-	0.33	-	0.35	0.35
10BM36	0.79			0.79		1.58	-	0.79	-	0.78		
10ESL37	2.24	1.49	1.49	0.75	1.49				1.49		0.75	1.49
10ESL38	1.0	1.0	1.0	1.3	0.7						1.0	0.3
10ES42	1.39	1.86	1.86	1.24	1.24	-	-	0.66	0.77	-	0.62	
10ES43												
10BM44	1.70	1.52	1.14	1.14	0.96				0.76	-	1.52	0.94
10EC45	0.54	0.66	0.79	0.94		-	-				-	
10EC46	0.48	0.59	0.39	0.77		-	-	-	-	0.40	0.58	0.39
10ESL47	1.2	1.2	1.6	1.6	0.8						0.8	
10ECL48	2.0	1.4	2.0	2.0	0.7							
10AL51					0.89	0.89	1.11	1.33	2.67	2.00	2.67	1.78

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10BM52	2.07	1.87	1.67	1.47	1.24							
10BM53	2.26	1.85	1.63	1.38	1.25							0.82
10BM54	2.06	2.06	1.87	1.31	1.87	0.71			0.74		1.50	1.50
10BM55	1.03	1.03	1.54	0.78	1.53	1.53	0.76		0.76	0.76	0.76	1.53
10BM56	0.96	0.96	1.15	1.01	0.57	1.36	-	1.16			-	0.86
10BML57	1.7	1.3	0.8	1.3	0.8				1.7		1.7	0.8
10BML58	0.6	0.6	0.5	0.3	0.6				0.3	0.3	0.5	0.3
10BM61	1.80	1.12	1.82	1.35	1.57	-	0.91	0.91		2.72	1.35	0.89
10BM62	0.74	0.74	1.22	1.47	1.28	0.73			0.73	0.73	0.73	0.73
10BM63	2.22	1.49	1.29	0.98	1.10	-	-	-	-	-	-	0.73
10BM64	0.94	1.64	1.88	1.65	1.42	-	-	1.43	0.94	0.96		2.12
10BM65	1.42	0.95	1.89	2.21	2.61	-	-	0.94		0.91		
10BM663	0.95	1.67	1.66	1.66	1.96	1.46				-		0.94
10BML67	1.0	1.0	1.9	1.0				1.0	1.4			
10BML68	0.9	1.3	1.8	0.9	1.8	0.9		0.9	0.9	0.9	0.9	0.9
10BM71	0.56	0.68	0.66		0.75	-	-			0.88	0.75	
10BM72	1.79	2.03	1.86	1.86	1.79	-	-		1.34	-		0.85
10BM73	1.13	1.31	1.50	1.12	1.13	-	-			-		0.75
10BM74	1.90	1.56	1.56	1.55	1.21	-					0.69	0.69
10BM753	2.79	2.48	2.32	2.32	2.17	1.86	1.38	1.85	2.79	2.34	2.79	1.86
10BM763	1.97	1.77	1.97	1.77	1.77	1.59	1.77	2.10	1.32	0.77	1.38	1.58
10BML77	2.6	1.7	1.7	2.6	1.7				1.7		1.7	0.9
10BML78	3.0	3.0	3.0	3.0	1.0				2.0	1.0	2.0	2.0
10BM81	1.08	1.61	1.79	1.26	1.26	-	1.41	1.41	1.08		1.25	0.72
10BM82	0.56	0.80	0.76	0.90	0.86	-	-		0.45	0.43	0.59	0.45
10BM831	1.97	1.47	1.46	1.09	0.72	1.08		1.46		0.73	0.73	0.73
10BM841	2.57	1.93	2.17	1.73	1.51		-		0.87		2.05	0.85
ATTAINMENT	1.425	1.36	1.471	1.321	1.231	1.243	1.113	1.18	1.16	1.015	1.136	0.948

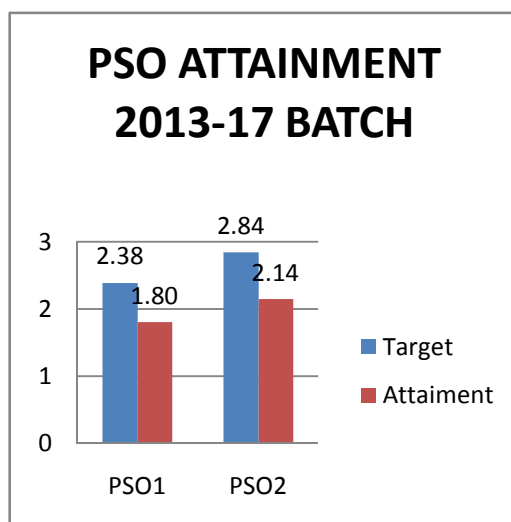
PO ATTAINMENT 2013-17 BATCH



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The following table shows the Program Outcome attainment level for the Academic year i.e. 2013-17.

Subject code	Attainment	Attainment
	PSO1	PSO2
10ES33	1.83	1.52
10BM36	1.78	2.38
10BM44	1.52	2.27
10BM53	2.47	1.64
10BM55	1.54	2.31
10BM56	1.15	1.72
10BM63	2.22	1.48
10BM64	1.88	2.83
10BM65	1.9	2.85
10BM663	1.75	2.32
10BM72	1.7	2.03
10BM74	1.72	2.07
10BM753	2.31	2.55
10BM763	1.97	2.36
10BM82	0.86	1.3
10BM831	1.83	2.19
10BM841	2.12	2.57
total	1.797058824	2.14058824



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CRITERIA 4

Students' Performance

150

4.1 Enrolment Ratio

Item (Information to be provided cumulatively for all the shifts with explicit headings, wherever applicable)	CAY- 2017-18	CAY _{m1} 2016-17	CAY _{m2} 2015-16
Sanctioned intake of the program (<i>N</i>)	60	60	60
Total number of students admitted in first year <i>minus</i> number of students migrated to other programs/institutions plus no. of students migrated to this program (<i>N1</i>)	35	31	22
Number of students admitted in 2nd year in the same batch via lateral entry (<i>N2</i>)	-	-	1
Separate division students, if applicable (<i>N3</i>)	2	3	3
Total number of students admitted in the Program (<i>N1</i> + <i>N2</i> + <i>N3</i>)	37	34	26

Year of entry	<i>N1</i> + <i>N2</i> + <i>N3</i> (As defined above)	Number of students who have successfully graduated without backlogs in any semester/year of study (Without Backlog means no compartment or failures in any semester/year of study)			
		I Year	II Year	III Year	IV Year
CAY(17-18)	37	-			
CAY _{m1}	33	14			
CAY _{m2}	26	8	7		
CAY _{m3}	39	7	5	4	
CAY _{m4} (LYG)	27	12	3	3	3
CAY _{m5} (LYG _{m1})	24	6	5 1	4	4
CAY _{m6} (LYG _{m2})	4	1	0	0	0



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Item (Students enrolled at the First Year Level on average basis during the period of assessment)	Marks
$\geq 90\%$ students enrolled	
$\geq 80\%$ students enrolled	
$\geq 70\%$ students enrolled	
$\geq 60\%$ students enrolled	
$\geq 50\%$ students enrolled	12
Otherwise	

Enrolment Ratio (20M)

$$\text{Enrolment Ratio} = N1/N = 12$$

$$N1 = 37+34+26 = 97$$

$$N = 60+60+60 = 180$$

$$N1/N = 53.88$$

4.2 Success Rate in the stipulated period of the program (40)

4.2.1 Success rate without backlogs in any semester/year of study (25)

SI = (Number of students who have graduated from the program without backlog)/(Number of students admitted in the first year of that batch and admitted in 2nd year via lateral entry and separate division, if applicable)

Average SI = Mean of Success Index (SI) for past three batch Success rate without backlogs in any year of study = $25 \times \text{Average SI}$

Item	Latest Year of Graduation, LYG (CAYm3)	Latest Year of Graduation minus 1, LYGm1 (CAYm4)	Latest Year of Graduation minus 2, LYGm2 (CAYm5)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	27	24	04
Number of students who have graduated without backlogs in the stipulated period	5	4	0
Success Index (SI)	0.185	0.16	0
Average SI	0.115		

$$\text{Study} = 25 \times 0.115 = 2.875$$

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4.2.2 Success rate Success Rate with Backlogs in stipulated period (15)

$SI = (\text{Number of students who graduated from the program in the stipulated period of course duration}) / (\text{Number of students admitted in the first year of that batch and admitted in 2nd year via lateral entry and separate division, if applicable})$

Average SI = mean of Success Index (SI) for past three batches Success rate = 15

× Average SI

Item	LYG (CAYm3)	LYGm1 (CAYm4)	LYGm2 (CAYm5)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	27	24	4
Success Rate with Backlogs	12	8	2
Success Index (SI)	0.44	0.33	0.5
Average Success Index	0.424		

$$15 \times 0.424 = 6.372$$

4.3 Academic Performance in Third Year (15)

Academic Performance = 1.5 * Average API (Academic Performance Index)

$API = ((\text{Mean of 3rd Year Grade Point Average of all successful Students on a 10 point scale}) \text{ or } (\text{Mean of the percentage of marks of all successful students in Third Year}/10)) \times (\text{number of successful students}/\text{number of students appeared in the examination})$

Successful students are those who are permitted to proceed to the final year

Academic Performance	CAY	CAYm1	CAYm2
Mean of CGPA or Mean Percentage of all successful students (X)	64.74	65.99	68.96
Total no. of successful students (Y)	25	20	13
Total no. of students appeared in the examination (Z)	29	22	14
$API = X * (Y/Z)$	5.57	5.99	6.403
Average API = (AP1 + AP2 + AP3)/3	5.987		

$$\text{Academic Performance} = 1.5 \times 5.987 = 8.9805$$

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4.4 Academic Performance in Second Year (15)

*Academic Performance Level = 1.5 * Average API (Academic Performance Index)*

API = ((Mean of 2nd Year Grade Point Average of all successful Students on a 10 point scale) or (Mean of the percentage of marks of all successful students in Second Year/10)) x (number of successful students/number of students appeared in the examination)

Successful students are those who are permitted to proceed to the Third year

Academic Performance	CAY	CAY _{m1}	CAY _{m2}
Mean of CGPA or Mean Percentage of all successful students (X)	5.27	6.47	5.228
Total no. of successful students (Y)	13	25	18
Total no. of students appeared in the examination (Z)	19	29	24
API = X* (Y/Z)	3.605	50577	3.921
Average API = (AP1 + AP2 + AP3)/3	4.368		

Academic Performance Level = 1.5*4.368 = 6.55

4.5. Placement, Higher Studies and Entrepreneurship (40)

Assessment Points = 40 × average placement

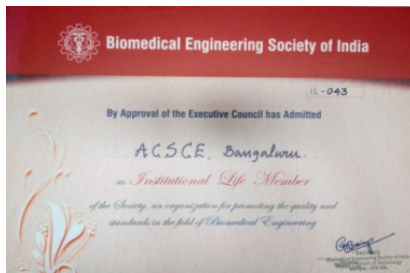
ITEM	CAY 2016-17	CAY _{m1}	CAY _{m2}
Total No. of Final Year Students (N)	20	13	2
No. of students placed in companies or Government Sector (x)	7	8	1
No. of students admitted to higher studies with valid qualifying scores (GATE or equivalent State or National Level Tests, GRE,	3	1	1
No. of students turned entrepreneur in engineering/technology (z)			
$x + y + z =$	10	9	2
Placement Index : $(x + y + z)/N$	0.5	0.69	1
Average placement= $(P1 + P2 + P3)/3$	0.73		

Assessment Points = 40 * 0.73= 29.2

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4.6 Professional Activities: (20)

4.6.1 Professional Societies/ Chapters and organizing events (5)

SI No	Professional Societies	Event
1	Biomedical engineering society of india	As institutional society member
		



Biomedical Engineering Society of India

Receipt

No: A 859

Date: 24-11-2015

Received from ACS College of Engineering, Bangaluru, A sum of Rupees Fifteen Thousand One Hundred only, vide Demand Draft no. 004201, Drawn on 16-11-2015, on account of Institutional membership subscription.

Rs. 15100.00

IL-043

Secretary
Biomedical Engineering Society of India
Manipal Institute of Technology
Manipal - 576 104.

For Biomedical Engineering Society of India



ACS College of Engineering
Kambipura, Mysore Road, Bengaluru-560 074
Affiliated to VTU, Belgaum, Approved by AICTE, New Delhi & Govt. Of Karnataka



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1. National Conference 2

<p>1st National Conference “Biomedical Signal and Image processing” (NCBSI) 11/11/2016</p>		<p>Resource Person Dr. Usha S Hod Dept of RRCE. Dr. Malathy M Associate Professor RRCE Dr. C S Pillai Professor Dept of CSE RRCE</p>
<p>2nd National Conference On “Biomedical Signal, Image Processing & Power Engineering” (NCBSIPE-2017) 21st November 2017</p>		<p>Chief Guest: Dr. Rajashekhar P. Mandi, Ph.D , Professor & Director, School of Electrical & Electronics Engineering , REVA University</p>

2. SYMPOSIUM 3

<p>1st National Level Technical Symposium "CLONELECTRIC" 29/10/2015</p>		<p>Chief Guest: Rajeev Ramachandra Chief Technology Officer Mistral Solutions Pvt. Ltd.</p>
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DEPARTMENT OF BIOMEDICAL ENGINEERING

**1st National Level
Technical
Symposium
"CLONELECTRIC"
29/10/2015**



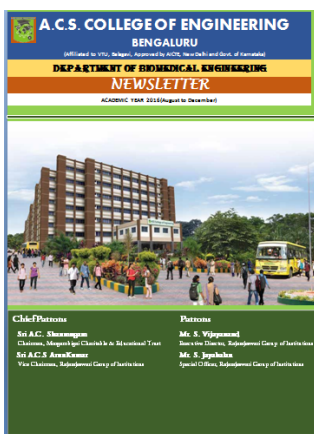
**Chief Guest:
Rajeev Ramachandra
Chief Technology Officer
Mistral Solutions Pvt. Ltd.**

**1st National Level
Technical
Symposium
"CLONELECTRIC"
29/10/2015**



**Chief Guest:
Rajeev Ramachandra
Chief Technology Officer
Mistral Solutions Pvt. Ltd.**

4.6.2 Publication of technical magazines, newsletters (5)



Biomedical Department

ABOUT BIOMEDICAL DEPARTMENT

Biomedical engineers work at the intersection of engineering, the life sciences and healthcare. These engineers take principles from applied science (including mechanical, electrical, chemical and computer engineering) and physical sciences (including physics, chemistry and mathematics) and apply them to biology and medicine.

Although the human body is a more complex system than even the most sophisticated machine, many of the same concepts that go into building and programming a machine can be applied to biological structures and diagnostic and therapeutic tools. The goal is to better understand, replace or fix a target system to ultimately improve the quality of healthcare.

BME NEWSLETTER

PROGRAMME ORGANIZED IN THE DEPARTMENT

1. Inauguration for the 1st year students from 16/9/2016 to 22/9/2016 at Rajarajeswari Medical College and Hospital.
2. Workshop on research methodology on July 27 and 28/9/2016.
3. One day Technical talk and hands on conducted on Local biotech pattern by Dr. M. Madhavi, Associate Professor, Dept. of Computer Science and Engineering, Rajarajeswari College of Engineering on 29/9/2016.
4. "Chemical Science Quiz" held at Indian Institute of Science Bangalore.
5. National level Technical competition "TechnoChallenge" on 24/10/16.
6. Personality development program for the 1st year students on 1/10/2016, 1:30-4:00 pm in the AICTE Seminar Hall 3.
7. Photography class was conducted on 29/10/2016 Friday 10:00 am to 12:00 pm in Seminar Hall 1.
8. Inauguration for the 4th year students from 1/10/2016 to 7/10/16 at Rajarajeswari Dental College and Hospital.
9. One day National Conference on "Biomedical Signal and Image processing (BIOBSI)" on 11/11/16.

STAFF ACHIEVEMENTS

Dr. S. Jayashree, Head of the Department, has been awarded the Best Teacher Award for the year 2015-16 by the Government of Karnataka. She has also been awarded the Best Teacher Award for the year 2014-15 by the Government of Karnataka.

STAFF ACHIEVEMENTS

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STUDENT ACHIEVEMENTS

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BME NEWSLETTER

PROGRAMME ORGANIZED IN THE DEPARTMENT

1. Technical talk on "Thyroid and its Applications" by M. Senthil U., Thyroid application specialist, Srinivas India Pvt Ltd. on 7th February 2016.
2. Technical talk on "Tissue in ITT delivery for Biomedical" by Mrs. Rajeshwari Reddy, Senior Test Analyst, Oracle Healthcare Systems Pvt Ltd on 5th March 2016.
3. Technical talk on "Recent trends in Biomedical" by Dr. M. Madhavi, Associate Professor, Dept. of Computer Science and Engineering, Rajarajeswari College of Engineering on 10th March 2016.
4. Technical talk on "Industrial experience on sensors" by Dr. M. Anandachandran, Prof. & HOD, Dept. of Electrical and Electronics Engineering, Rajarajeswari College of Engineering on 10th March 2016.
5. Technical talk on "Thyroid and its applications" by Prof. Srinivas Reddy, Associate Professor, Department of Medical Electronics, Srinivas India Pvt Ltd on 10th March 2016.
6. Technical talk on "AI/ML system on health field" by Dr. S. Srinivas Reddy, Associate Professor, Department of Medical Electronics, Srinivas India Pvt Ltd on 10th March 2016.
7. Technical talk on "Genetic Engineering" by Dr. S. Srinivas Reddy, Associate Professor, Department of Medical Electronics, Srinivas India Pvt Ltd on 10th March 2016.
8. Three day National conference on Signal Processing and Computer Networks on 21st & 22nd April 2016.

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TECHNICAL TALK

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DEPARTMENT OF BIOMEDICAL ENGINEERING

A.C.S. COLLEGE OF ENGINEERING
BENGALURU
(Affiliated to VTU, Belgaum, Approved by AICTE, New Delhi and Govt. of Karnataka)

DEPARTMENT OF BIOMEDICAL ENGINEERING
NEWSLETTER
ACADEMIC YEAR 2017 (February to July)



Chief Patron:
Sri A.C. Shanmugam
Chairman, Mangalgaon Charitable & Educational Trust

Patron:
Mr. S. Vijayamurthy
Executive Director, Rajarajawari Group of Institutions

Chief Patron:
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Biomedical Department

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BME NEWSLETTER

PROGRAMME ORGANIZED IN THE DEPARTMENT

S. No	PROGRAMME
1	Memorandum of Understanding with "Rajarajawari College of Physiotherapy" on 16th February 2017.
2	Workshop on NS-1 by Mr. Nitesh K. Project consultant, Impulse systems
3	Hospital visit for the 3rd and final year students to the Department of Radiology, Rajarajawari Medical College and Hospital.
4	Health awareness program for the children of orphanage "MAJULI" Kanak Road, Magadi Main Road-Gubbalur, Behind San Valley Club" Bangalore on 04 May 2017.

STUDENT ACHIEVEMENTS




1st Semester: Kumar S. Shweta, 2nd Year: Manjula, 3rd Year: Manjula participated in project paper presentation competition & won 1st prize in the 3rd Biomedical Engineering students and engineering team by 2017 college of Engineering and Technology, Bangalore.




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DEPARTMENT OF BIOMEDICAL ENGINEERING
NEWSLETTER
ACADEMIC YEAR 2017 (August to December)



Chief Patron:
Sri A.C. Shanmugam
Chairman, Mangalgaon Charitable & Educational Trust

Patron:
Mr. S. Vijayamurthy
Executive Director, Rajarajawari Group of Institutions

Chief Patron:
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Biomedical Department

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BME NEWSLETTER

PROGRAMME ORGANIZED IN THE DEPARTMENT

S. No	PROGRAMME
1	National Level Technical Symposium "Tanna Vidhana" on 21st and 22nd September 2017.
2	Inauguration of the Biomedical association "BLAZE" for the year 2017 on 13th of October.
3	MOU with Complete Dental and Healthcare on 16th October 2017.
4	Anatomy lab visit for the 3rd semester students at Rajarajawari Medical College on 16th October 2017.
5	Biomedical Department Organized a Rally & awareness programme on "Say No to Crackers" in and around Kengeri upganga on October 17th 2017.
6	Technical session on "Electromagnetic Technology" by Mr. Nishal Promod, Sales and service Engineer, Elite Medica on 29th October 2017.
7	Industrial visit to Rasthottana Blood Bank on October 24 2017.
8	Hospital visit for the second and third year students to Central Sterile Services Department (CSSD), Rajarajawari Medical College and Hospital on 4th November 2017.
9	Industrial visit to Skanary Technologies, Hebbal, Mysore, 11th November 2017.
10	One day workshop on Electronics and microcontrollers in Biomedical Engineering by Mr. Raju Lal, CEO, Eneaga Solutions on 13th November 2017.
11	The department of Biomedical Engineering & Department of Electrical Engineering jointly organized a one day National Conference on "Biomedical Signal, Image Processing & Power Engineering" (NBSEPE-2017) 21-November 2017.
12	Workshop on research methodology on 24th & 25th November 2017.

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DEPARTMENT OF BIOMEDICAL ENGINEERING
NEWSLETTER
ACADEMIC YEAR 2015-16 (December to February)



Chief Patron:
Sri A.C. Shanmugam
Chairman, Mangalgaon Charitable & Educational Trust

Patron:
Mr. S. Vijayamurthy
Executive Director, Rajarajawari Group of Institutions

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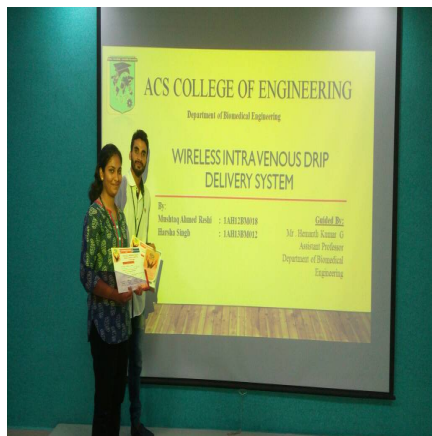
DEPARTMENT OF BIOMEDICAL ENGINEERING

4.6.3. Participation in inter-institute events by students of the program of study (at other institutions) 10

- A. Events within the state (2)
- B. Events outside the state (3)
- C. Prizes/awards received in such events (5)

A. Events within the state (2)

1) The project entitled “Wireless intra-venous drip delivery system “won the First place in Embedded system projects at a state level project exhibition/competition held -2017 at RVCE,Bangalore,8 th sem students Harsha L Singh and Mushtaq Ahmed Reshi(VII sem) guided by Hemanth kumar G.



2) Tejaswi Bhat and Harsha L Singh got best paper award entitled “Identifying suitable enhancement techniques for thermal and non thermal diabetic foot images” in International conference held at RRCE -2016.



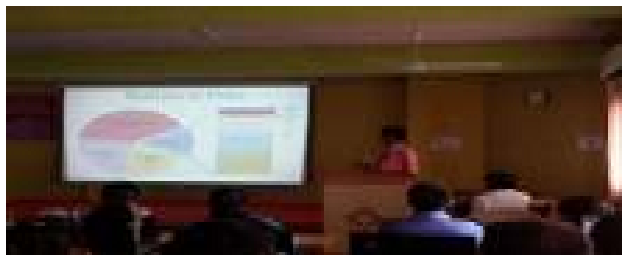
DEPARTMENT OF BIOMEDICAL ENGINEERING

3) Deepak Samantha and aasma dahal won best paper award entitled Distinguishing staghorn and struvite kidney stones using GLCM and Pixel Intensity Matrix Parameters in national conference organized in biomedical department (NCBSI-2016)

4) Harsha L shing Secured 1St place in technical debate at VTU fest during year 2016



"Tejaswi Bhat of 7th semester presented a paper on 22nd September 2016 National Conference on "Recent Technologies in Computer Engineering" NCRTEE-2016

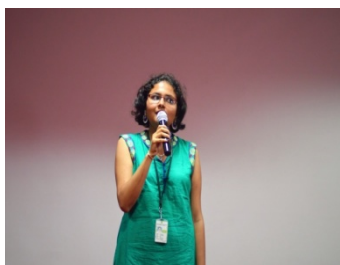


Rohith Reddy.N of 7th semester presented a paper on 22nd September 2016 National Conference on "Recent Technologies in Computer Engineering" NCRTEE-2016

5) M R Ramya got 1st prize in Quiz conducted by CSIA, ACSCE during the year 2015.

6) Drushya G.K is runner for quiz conducted by CSIA during the year 2016.

7) M R Ramya, Varini Chinnabhandar, varsha stood first place in singing competition held in RRMCH during the year 2017



DEPARTMENT OF BIOMEDICAL ENGINEERING

8) Abrar ahmed and divyasusheel won best paper award entitled Computer Aided Diagnosis of Osteoporosis Using 1st Order Texture Parameters in national conference organized in biomedical department (NCBSI-2016)

9) Divya susheel won best paper award entitled Non-invasive measurement of intracranial pressure in National conference organized in biomedical department (NCBSIP-2017)



10) Rohit N Reddy, Dhatri, Raveena B Prashanth , Akshay Das M won best paper award entitled Diagnosis to classify healthy lung and ground glass lung” at (NCBSIPE-2017) on 21st November 2017.



11) Ms.Ramya &Mr.Sanjay Pandey 7th Semester won the 1st best paper award for “Lung Cancer Nodule Segmentation and Feature Extraction “ at (NCBSIPE-2017) on 21st November 2017.



12) Ms.Divyashree , Ms.Indu , Ms.Lavanya G Dev won 2nd prize for best out of trash in National Level Technical Symposium “Yantra Vedanta” 22nd September 2017.



B. Events outside the state (3)

1) M.R Ramya, Sanjaya Pandey presented a paper on entitled “Wearable sweat wire sensors and its biomedical applications” in national level symposium conducted in Adhiyamaan college of engineering, Hosur, Tamil nadu-2017



2) Harsha.L.Singh presented a paper on entitled “Smart sensors” in national level symposium conducted in Adhiyamaan College of engineering, Hosur, Tamil nadu-2017



3) Abhik Raj Subedi and Lakshmi Bai of 8th semester biomedical presented a paper on 27 & 28th February at AEEICB 2016 International Conference, Prathyusha college of engineering, Chennai



4) Ms.Varini Chinnabhandar presenting a paper on “Automatic Screening Method For Diagnosing Bone Health” at NGCT 2017 , Dehradhun on October 30 2017



5) Deepak Samantha Presented a paper on “ Machine Vision for screening of age related Macular Degeneration using fundus Images.

6) Mr.Tejaswi Bhat Presenting a paper on “Investigations on diabetic foot impairment using NIR images and Thermoregulatory behaviour” at 8th ICCCNT 2017,IIT Delhi.



Mr.Tejaswi Bhat Presenting a paper on “Investigations on diabetic foot impairment using NIR images and Thermoregulatory behavior” “at 8th ICCCNT 2017 , IIT Delhi.

C. Prizes/awards received in such events (5)

1) M.R Ramya ,sanjaya pandey got best paper award entitled “ Wearable sweat wire sensors and its biomedical applications” in national level symposium conducted in Adhiyamaan college of engineering, Hosur, Tamil nadu-2017



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DEPARTMENT OF BIOMEDICAL ENGINEERING



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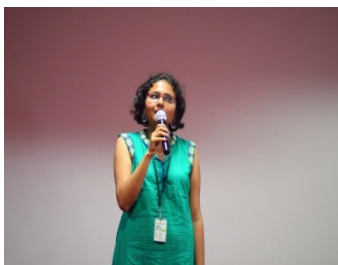
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DEPARTMENT OF BIOMEDICAL ENGINEERING

CRITERIA 5

Faculty Information and Contributions

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Faculty List - CAY 2017-2018

Sl.No	Name of the Faculty Member	Qualification			Designation (All the designation since joining the institution)	Date of Joining the institution	Distribution of Teaching load				Academic Research			Specialization
		Degr ee(St artin g from High est degr ee)	University	Year of Graduation			1st Year	UG		P G	Facult y Recev ing Ph.D during the Asses ment Years	Ph.D Guidance	Research Paper Publications	
								In Program	Other Program					
1	Dr. Punal M Arabi	Ph.D	CEG, Anna	2012	Professor & Head	20/07/2015		100%				5	50	Medical Electronic s
		M E	Annamalai	1990										Power systems
		BE	Annamalai	1985										Electronic s & Instrumen tation
2	Dr Anitha S	Ph.D	Dr. MGR educationa l and Research Institute	2013	Professor	6/2/2017		100%				2	9	Electronic s & Instrumen tation
		M Tech	VTU	2002										BioMedic al Instrumen tation
		BE	BU	1999										Medical Electronic s
3	Dr Arul Nambi Dhamod aran	Ph.D	Oregon State University	2017	Associate Professor	26/02/2018		100%					10	Electrical and Computer Engineeri ng
		Mast er of Scie nce	Oregon State University	2011										Electrical and Computer Engineeri ng



DEPARTMENT OF BIOMEDICAL ENGINEERING

		BE	Anna University	2008									ECE
4	Mrs Gayathri Joshi	(Ph. D)	VTU	Pursuing (registered 2016)	Associate Professor	23/07/2013	100%					12	Image Processing
		M.Tech	VTU	2009									BioMedical Instrumentation
		BE	JNTU Hyderabad	2006									EC
5	Mrs.Surekha Nigudgi	(Ph. D)	VTU	Pursuing (registered 2015)	Assistant Professor	23/7/2014	100%					10	Image Processing
		M. Tech	VTU	2012									BME & II
		BE	VTU	2003									IT
6	Mrs T P Prathibha	(Ph. D)	VTU	Pursuing (registered 2016)	Assistant Professor	23/07/2013	100%					4	Image Processing
		M. Tech	VTU	2011									BME & II
		BE	VTU	2009									Medical Electronics
7	Mrs Nandhitha Krishna	(Ph. D)	VTU	Pursuing (registered 2015)	Assistant Professor	25/7/2014	100%					4	Image Processing
		M. Tech	VTU	2011									BMSP & I
		BE	VTU	2009									IT
8	Mr T S Naveen	(Ph. D)	VTU	Pursuing (registered 2016)	Assistant Professor	9/2/2015	100%						Image Processing
		M. Tech	VTU	2013									BMSP & I
		BE	VTU	2011									ML
		Diploma	DOTe	2007									EC

DEPARTMENT OF BIOMEDICAL ENGINEERING

9	Mrs. N Vamsha Deepa	(Ph. D)	VTU	Pursuing (registered 2016)	Assistant professor	22/07/2015		100%					7	Speech Processin g
		M Tech	VTU	2012										BMSP & IT
		B E	VTU	2009										EC
10	Mr Hemanth Kumar G	(Ph. D)	VTU	Pursuing (registered 2016)	Assistant Professor	1/8/2016		100%					3	Embedde d Systems
		M Tech	VTU	2012										VLSI & Embedde d systems
		B E	VTU	2009										Med. Electronic s
11	Mr Bipin Lal	B E	Anna Univeristy	2006	Assistant Professor	3/10/2017		100%						ECE
12	Nikhil Pramod Anjanaiah	MB A	University of Glochester London	2015	Assistant Professor	3/10/2017		100%						Markettin g
		P.G Dplo ma	University of Dandi	2012										Medical Electronic s
		B E	NIT, Raipur	2010										BME
13	Mr. Siddarth Nair	M E	Anna Univeristy	2014	Assistant Professor	1/8/2016		100%						Medical Electronic s
		B E	Affiliated to Anna Univeristy	2011										BME

DEPARTMENT OF BIOMEDICAL ENGINEERING

CAYm1 2016-2017

Sl.No	Name of the Faculty Member	Qualification			Designation (All the designation since joining the institution)	Date of Joining the institution	Distribution of Teaching load			Academic Research			Specialization		
		Degree(Starting from Highest degree)	University	Year of Graduation			1st Year	UG		PG	Faculty Receiving Ph.D during the Assessment	Years		Ph.D Guidance	Research Paper Publications
								In Program	Other Program						
1	Dr. Punal M Arabi	Ph.D	CEG, Anna University	2012	Professor & Head	20/07/2015		100%			5	50	Medical Electronics		
		M E	Annamalai University	1990									Power systems		
		BE	Annamalai University	1985									Electronics & Instrumentation		
2	Dr Anitha S	Ph.D	Dr. MGR educational and Research Institute	2013	Professor	6/2/2017		100%			2	9	Electronics & Instrumentation		
		M Tech	VTU	2002									BioMedical Instrumentation		
		BE	BU	1999									Medical Electronics		
3	Mrs Gayathri Joshi	(Ph.D)	VTU	Pursuing (registered 2016)	Associate Professor	23/07/2013		100%				12	Image Processing		
		M.Tech	VTU	2009									BioMedical Instrumentation		
		B E	JNTU Hyderabad	2006									EC		
4	Mrs.Surekha Nigudgi	(Ph. D)	VTU	Pursuing(registered 2015)	Assistant Professor	23/7/2014		100%					Image Processing		

DEPARTMENT OF BIOMEDICAL ENGINEERING

		M. Tech	VTU	2012								10	BME & II
		B E	VTU	2003									IT
5	Mrs T P Prathibha	(Ph. D)	VTU	Pursuing (registered 2016)	Assistant Professor	23/07/2013		100%				4	Image Processing
		M. Tech	VTU	2011									BME & II
		B E	VTU	2009									Medical Electronics
6	Mrs Nandhitha Krishna	(Ph. D)	VTU	Pursuing (registered 2015)	Assistant Professor	25/7/2014		100%				4	Image Processing
		M. Tech	VTU	2011									BMSP & IT
		B E	VTU	2009									IT
7	Mr T S Naveen	(Ph. D)	VTU	Pursuing (registered 2016)	Assistant Professor	9/2/2015		100%				2	Image Processing
		M. Tech	VTU	2013									BMSP & I
		B E	VTU	2011									Med. Electronics
		Diplo ma	DOT E	2007									EC
8	Mrs. N Vamsha Deepa	(Ph. D)	VTU	Pursuing (registered 2015)	Assistant Professor	22/07/2015		100%				7	Speech signal processing
		M Tech	VTU	2012									BMSP & I
		B E	VTU	2009									EC
9	Mr Hemanth Kumar G	(Ph.D)	VTU	Pursuing (registered 2016)	Assistant Professor	1/8/2016		100%				3	Embedded Systems
		M Tech	VTU	2012									VLSI & Embedded systems
		B E	VTU	2009									Med. Electronics

DEPARTMENT OF BIOMEDICAL ENGINEERING

10	Ms Vivardhini Veera Kumar	M.Tech	SRM University	2015	Assistant Professor	1/2/2016		100 %						BME
		B Tech	Satyabama University	2012										BME
11	Mrs Vishnupriya Murali	M. Tech	Amrita Vishwa vidyapeetham University	2015	Assistant Professor	1/2/2016		100%						Nano Sc. & Technology
		B Tech	Satyabama University	2010										BME
12	Mr Mahesh Ramegowda				Assistant Professor	1/8/2016		100%						
		B E	Gulbarga University	1997										E & I
13	Mr Siddarth Nair	M E	Anna University	2014	Assistant Professor	1/8/2016		100%						Medical Electronics
		B E	Affiliated to Anna University	2011										BME

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CAYm2 2015-2016

Sl.No	Name of the Faculty Member	Qualification			Designation (All the designation since joining the institution)	Date of Joining the institution	Distribution of Teaching load				Academic Research			Speciliza tion
		Degree(Starting from Highest degree)	university	Year of Graduation			1st Year	UG In Program	Other Program	PG	Faculty Recevin g Ph.D during the Assessm ent Years	Ph.D Guidance	Research Paper Publications	
1	Dr. Punal M Arabi	Ph.D	CEG, Anna	2012	Professor & Head	20/07/2015		100%				5	50	Medical Electroni cs
		M E	Annamalai	1990										Power systems
		BE	Annamalai	1985										Electroni cs & Instrume ntation
2	Prof. K R Vishwan ath	M Tech	IIT Kharagpur	1970	Professor	25/7/2014		100%						ECE
		B E	Madras University	1967										Electrical Engg.
3	Dr. A Arun Kumar	Ph.D	St. Peter's University, Chennai		Professor	2/2/2015		100%						ECE
		ME	Anna University	2005										Medical Electroni cs
		B E	Madras University	2002										ECE
4	Dr. Harish Kumar Ravi	Ph.D	University Bern	2013	Associate Professor	2/2/2015		100%						Chemistr y and Molecula r Science
		M Sc	Stockholon University	2009										BioInfor matics
		B Etech	Anna University	2007										Industrial Biotechn ology

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5	Prof. M M Ramakrishna	M. Tech	Bharath Institute of Higher Education and Research Deemed University	2006	Assistant Professor	15/11/2010		100%						Instrumentation and control engineering
		B E	Madras University	2003										E&I
6	Mrs Gayathri Joshi	(Ph.D)	VTU	Pursuing(registered 2016)	Assistant Professor	29/7/2013		100%					12	Image Processing
		M. Tech	VTU	2009										BioMedical Instrumentation
		B E	JNTU Hyderabad	2006										EC
7	Mrs Surekha Nigudugi	(Ph.D)	VTU	Pursuing(registered 2015)	Assistant Professor	23/7/2014		100%					10	Image Processing
		M. Tech	VTU	2012										BME & II
		B E	VTU	2003										IT
8	Mrs Prathibha T	(Ph.D)	VTU	Pursuing(registered 2016)	Assistant Professor	29/7/2013		100%					4	BME & I
		M. Tech	VTU	2011										
		B E	VTU	2009										ME
9	Mrs N Vamsha Deepa	M. Tech	VTU	2012	Assistant Professor	22/07/2015		100%					7	BMSP & I
		B E	VTU	2009										EC
10	Mr T S Naveen	M. Tech	VTU	2013	nt Profess	9/2/2015		100%						BMSP & I

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		B E	VTU	2011									Med Electroni cs
		Diplo ma	DOTE	2007									EC
11	Mr D Munikri shna	M. Tech	Sri Siddhartha University	2011	Assistant Professor	23/07/2013		100%				2	Embedde d and VLSI Design
		B E	VTU	2007									Telecom and electronic s engineeri ng
12	Mrs. Nandith a Krishna	M. Tech	VTU	2011	Assistant Professor	25/7/2014		100%				4	BMSP & IT
		B E	VTU	2009									IT
13	Mr. Karthike yan V	M. Tech	Anna		Assistant Professor	25/7/2014		100%					
		B E											
14	Mr Vishnu Priyan S	M. Tech	VIT		Assistant Professor	2/2/2015		100%					BME
		B E	Madras University										ECE

5.1.STUDENT-FACULTY RATIO (SFR) (20)

Year	CAY			CAYm1			CAYm2		
	2017-2018			2016-2017			2015-2016		
	Regular	Lateral Entry Admitted	Total	Regular	Lateral Entry Admitted	Total	Regular	Lateral Entry Admitted	Total
U1.1	60	0	60	60	0	60	60	0	61
U1.2	60	1	60	60	1	61	60	0	60
U1.3	60	0	60	60	0	60	60	0	60
UG1	181			181			180		
Total No. of Students in the Department	181			181			180		
No. of Faculty in the Department	13			13			14		
Student Faculty Ratio	13.92			13.92			12.86		
Average SFR	13.57								

Student Teacher Ratio(STR)=S/F= 13.57

5.2. FACULTY CADRE PROPORTION (25)

The Reference Faculty Cadre Proportion is 1(F1) : 2(F2) : 6(F3)

The Reference Faculty Cadre Proportion is 1(F1) : 2(F2) : 6(F3)

F1 : Number of professors required = $1/9 \times$ Number of faculty required to comply with 15 : 1 Student – Faculty Ratio Based on no. of students(N) as per 5.1

F2 : Number of Associate professors required = $2/9 \times$ Number of faculty required to comply with 15 : 1 Student – Faculty Ratio Based on no. of students(N) as per 5.1

F3 : Number of Assistant professors required = $6/9 \times$ Number of faculty required to comply with 15 : 1 Student – Faculty Ratio Based on no. of students(N) as per 5.1

Note: If AF1 = AF2 = 0 Then Zero Mark

Maximum marks to be limited if it exceeds 25

Year	Professors		Associate professor		Assistant professor	
	Required F1	Available F1	Required F2	Available F2	Required F3	Available F3
CAY(2017-2018)	1	2	2	2	9	9
CAYm1(2016-2017)	1	2	3	1	8	10
CAYm2(2015-2016)	1	3	3	2	8	9
Average Numbers	RF1 =1	AF1 =2.33	RF2 =2.67	AF2 =1.67	RF3 =8.33	AF3 =9.33

Cadre Ratio Marks = $((AF1/RF1) + ((AF2/RF2) * 0.6) + ((AF3/RF3) * 0.4)) * 12.5$

Cadre Ratio Marks = $\{(2.33/1) + [(1.67/2.67) \times 0.6] + [(9.33/8.33) \times 0.4]\} \times 12.5$

Cadre Ratio Marks = 39.35

5.3 FACULTY QUALIFICATION (25)

FQ = $2.5 * [(10X + 6Y)/F]$ Where X is no. of regular faculty with Ph.D., Y is no. of Regular faculty with M.Tech. F is no. of regular faculty required to comply 1:15 Student ratio.

Year	X	Y	F	FQ = $2.5 * [(10x + 6y)/F]$
CAY(2017-2018)	3	9	12	17.5
CAYm1(2016-2017)	2	10	12	16.67
CAYm2(2015-2016)	3	11	12	20.00
Average assessment				18.06

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5.4. FACULTY RETENTION (25)

No. of regular faculty members in				
	CAYm2=14	CAYm1=07	CAY=07	
Item	Marks	CAY (2017-2018)	CAYm1 (2016-2017)	CAYm2 (2015-2016)
>=90% of required Faculty Retained During the Period of assessment Keeping CAYm2 as base Year	25			25
>=75% of required Faculty Retained During the Period of assessment Keeping CAYm2 as base Year	20			
>=60% of required Faculty Retained During the Period of assessment Keeping CAYm2 as base Year	15			
>=50% of required Faculty Retained During the Period of assessment Keeping CAYm2 as base Year	10	10	10	
<50% of required Faculty Retained During the Period of assessment Keeping CAYm2 as base Year	0			

Year	Retained Faculty's	%
CAYm 2017-18	07	50
CAY m1 2016-17	07	50
CAY m2 2015-16	14	100

5.5. INNOVATIONS BY THE FACULTY IN TEACHING AND LEARNING (20)

The faculties are using multimedia elements LCD projectors in the Class room. It will help the faculties to represent the content in a more meaningful way using different media elements.

Various multimedia tools used are:

Tools	Methods	Metaphor
Power Point Presentation by referring to E learning videos	Easy to prepare and it can be prepared with many of the popular multimedia technique's.	Slide based
Smart Class Room	Teaching through Smart boards	Interactive based
Demonstration Videos and Lectures	Easy to prepare and download	Web Based learning
Lab sessions	a. Pre-lab would prepare them to prepare and understand the background, aim, experimental procedure and outcome of the procedure. b. Post lab is designed in such a way to test their understanding of the lab exercise and to prepare them towards self and lifelong learning.	Lab based experimentation
Internship	Students are guided to take up internship with specific syllabus	Practical based exposure in hospitals
Research club	To quindle the research interest and make them capable of self and lifelong learning.	Technical talks and publications
Equipment servicing/Product Development lab	Lab is set up to give equipment service training towards bridging institute industry gap.	Practical based

5.6. FACULTY AS PARTICIPANTS IN FACULTY DEVELOPMENT / TRAINING

ACTIVITIES / STTPs (15)

- A Faculty scores maximum five points for participation
- Participation on 2 to 5 days Faculty development program: 3 points
- Participation > 5 days faculty development program: 5points

Name of the Faculty	Max. 5 per Faculty		
	CAY (2017-18)	CAYm1 (2016-2017)	CAYm2 (2015-2016)
Dr Punal M Arabi	5	3	3
Dr Anitha S	5	3	-
Dr Arul Nambi Dhamadaran	5	-	-
Mrs Gayathri Joshi	5	3	3
Mrs Surekha Nigudgi	5	3	3
Mrs T P Prathiba	5	3	3
Mrs Nanditha Krishna	5	3	3
Mr T S Naveen	5	3	3
Mrs N Vamsha Deepa	5	3	3
Mr. Hemanth Kumar G	5	3	-
Ms Vivardhini Veera Kumar	-	3	-
Mr Vishnupriya Murali	-	3	-
Prof. K R Vishwanath	-	-	3
Dr. A Arun Kumar	-	-	3
Dr. Harish Kumar Ravi	-	-	3
Prof. M M Ramakrishna	-	-	3
Mr. Karthikeyan V	-	-	3
Mr Vishnu Priyan S	-	3	3
Sum	50	33	39
RF= Number of Faculty required to comply with 15:1 Student-Faculty ratio as per 5.1	12	12	12
Assessment=(3 X(Sum/0.5*RF))	25	16.5	19.5
Average assessment over three years (Marks limited to 15) = 20.33			

5.7. Research and Development (30)

5.7.1. Academic Research (10)

- Academic research includes research paper publications, Ph.D. guidance, and faculty receiving Ph.D. during the assessment period.
- Number of quality publications in refereed/SCI Journals, citations, Books/Book Chapters etc. (6)
- Ph.D. guided /Ph.D. awarded during the assessment period while working in the institute (4)
- All relevant details shall be mentioned.

Ph D Guidance

Research guide	Name of the scholar	Research Area	University and year of registration	status
Dr Punal M Arabi	Gayathri Joshi	Image Processing	VTU, 2016-2017	Registered and awaiting course work
	Prathiba T P	Image Processing	VTU, 2016-2017	Registered and awaiting course work
	Naveen T S	Image Processing	VTU, 2016-2017	Registered and awaiting course work
	Nagesha H B	Signal Processing	VTU, 2017-2018	Registered and awaiting course work
	Partha R	Bio Impedance	VTU, 2017-2018	Registered and awaiting course work
Dr Anitha S	Chiranjeevi Vijay Bhaskar	Image Processing	VTU, 2017-2018	Registered and awaiting course work
	Niveditha	Image Processing	VTU, 2017-2018	Registered and awaiting course work

Faculty pursuing Ph D

Faculty Name	Research Area	University & Year of registration	Guide	Status
Gayathri Joshi	Image processing	VTU, 2016-2017	Dr.Punal M Arabi	Awaiting Course Work
Prathiba T P	Image processing	VTU, 2016-2017	Dr.Punal M Arabi	Awaiting Course Work
Naveen T S	Image processing	VTU, 2016-2017	Dr.Punal M Arabi	Awaiting Course Work
Hemanth Kumar G	EC	VTU, 2016-2017	Dr.Monisha Joshi	Awaiting Course Work

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Vamshadeepa N	Signal Processing	VTU, 2016-2017	Dr. M Mathivanan	Awaiting Course Work
Surekha Nigudgi	Image Processing	VTU, 2015-2016	Dr G M Patil	Course wok in progress
Nanditha Krishna	Image processing	VTU, 2015-2016	Dr Nagamani K	Course work in progress

Quality Publications in Refereed / SCI journals, Citations, Books / Book Chapters

CAY-2017-18

Name of the Teacher	Title of the Paper	Name of the Journal/Publication Citation	Date/Year of Publication	National or International Journal	DOI
Dr Punal M Arabi	Automatic screening method for bone health diagnosis	International (yet to published in Springer)	October 30-31 ,2017	International	
	Categorizing kidney stones using region properties and pixel intensity matrix	International (yet to published in Springer)	December 20 and 21,2017	International	
	Automatic screening method for bone health diagnosis	International (yet to published in Springer)	October 30-31 ,2017	International	
	Categorizing kidney stones using region properties and pixel intensity matrix	International (yet to published in Springer)	December 20 and 21	International	
	Feasibility study of NIR,DSLR imaging techniques for automatic diabetic foot screening	International (yet to published in Springer)	October 30-31 ,2017	International	

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	Categorizing kidney stones using region properties and pixel intensity matrix	International (yet to published in Springer)	December 20 and 21 2017	International	
	Feasibility study of NIR, DSLR imaging techniques for automatic diabetic foot screening	International (yet to published in Springer)	October 30-31 ,2017	International	
	Automatic screening method for bone health diagnosis	International (yet to published in Springer)	October 30-31 ,2017	International	
Dr Anitha S	Empirical analysis of user position for various conditions using GNSS Single Frequency Receiver	IEEE Xplore Pg: 408 - 411	2017	International	DOI: 10.1109 ICEECCOT 2017.8284538
	Analysis of filtering and novel technique for noise removal in MRI and CT Images	IEEE Xplore Pg 1-8	2017	International	DOI: 10.1109 ICEECCOT 2017.8284618
	Novel multicarrier transmission technique for channel estimation in the world of wireless transmission	IEEE Xplore DOI: 10.1109 ICEECCOT 2017.8284574 Pg:1-3	2017	International	DOI: 10.1109 ICEECCOT 2017.8284574
	Lung Cancer Module Segmentation and feature extraction	IJANA(yet to be published)	2018	International	

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Mrs Gayathri Joshi	Automatic screening method for bone health diagnosis	International (yet to published in Springer)	October 30-31 ,2017	International	
	Categorizing kidney stones using region properties and pixel intensity matrix	International (yet to published in Springer)	December 20 and 21	International	
Mrs Surekha Nigudgi	Feasibility study of NIR,DSL R imaging techniques for automatic diabetic foot screening	International (yet to published in Springer)	October 30-31 ,2017	International	
	Categorizing kidney stones using region properties and pixel intensity matrix	International (yet to published in Springer)	December 20 and 21 2017	International	
Mrs T P Prathiba	Feasibility study of NIR,DSL R imaging techniques for automatic diabetic foot screening	International (yet to published in Springer)	October 30-31 ,2017	International	
Mrs Nanditha Krishna	Feature Extraction and Classification of X-ray lung images using Haralick Texture Features	International (yet to published in Springer)	October 30-31 ,2017	International	
Mr T S Naveen	Automatic diagnosis of dental diseases	International (yet to published in Springer)	31st october -2017	International	
Mrs N Vamsha Deepa	Feature Extraction and Classification of X-ray lung	International (yet to published in Springer)	October 30-31 ,2017	International	

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	images using Haralick Texture Features				
	Automatic Diagnosis of Dental Diseases	International (yet to published in Springer)	October 30-31 ,2017	International	

CAYm1-2016-17

Name of the Teacher	Title of the Paper	Name of the Journal/Publication Citation	Date/Year of Publication	National or International Journal	DOI
Dr Punal M Arabi	An investigation on diabetic skin images by Different imaging modalities For diabetes diagnosis	National conference (NCRTCE), RRCE,Bangalore, International Journal of computer information systems Vol.12,No.5,Pg. No.99-101	September 22 nd 2016	International Journal	
	Machine vision to identify malignant melanoma by asymmetry analysis	Yet to published in narosa(book chapter)	December 28 and 29,2016	International	
	Distinguishing normal and abnormal eye images based on pixel intensity Level	Int.J. of Advanced Networking and Applications Journal. Vol.No.8,Issue No.4,Pg.No.52-56	November 11,2016	International	
	Categorising normal skin, oily skin and dry skin using 4-connectivity and 8 connectivity region properties	Int.J. Advanced Networking and Applications Journal. Vol.No.8,Issue No.4,Pg.No.13-15	Nov 11 2016	International	
	Distinguishing staghorn and	IJANA Vol.8 , issue-4, Pg. No.	Nov 11 2016	International	

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	struvite kidney stone using GLCM and pixel intensity matrix method	1-4			
	Evaluation of GLCM and pixel intensity matrix for liver Cirrhosis	IJANA Vol.8 , issue-4, Pg. No. 72-74	Nov 11 2016	Inter national	
	Diagnosis of ground glass opacity in HRCT lung images using high intensity pixels	Springer book chapter.Advances in electronics, communication and computing, LNEE, vol 443, pp 2 521-528	Dec-16	Inter national	10.1007/978-981 10-4765-7_55
	Accuracy analysis of vision mission for identifying malignant melanoma using pixel intensity matrix parameters	ETAEERE (Springer book chapter) Springer book chapter.Advances in electronics, communication and computing, LNEE, vol 442, pp 2 181-188	Dec 2016	Inter national	10.1007/978-981 10-4762-6_17
	Machine vision to identify malignant melanoma by asymmetry analysis	Yet to published in springer book chapter	Dec 28-29 2016 ACE Conference , Trivandrum	Inter national	
	Feasibility study of machine vision for diagnosis of multiple sclerosis	IEEE Explore	July 3 rd -5 th 2017	Inter national	10.1109/ICCCNT 2017.8203942
	Categorizing healthy, osteopenic and osteoporotic bones by white pixel calculation	IEEE Explore	July 3 rd -5 th 2017	Inter national ICCCNT 2017	10.1109/ICCCNT 2017.8203941
	EEG & EMG Controlled Driving Aid for	IJANA, ,Vol . 8, issue-4, pp. 41-48	2016	Inter national	

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Dr Anitha S	Electric Wheelchairs: Review				
	Developing and Ethernet interface using a General purpose Microcontroller and Ethernet controller for power amplifier	IEEE Explore (yet to be published)	2017	international	
Mrs Gayathri Joshi	An investigation on diabetic skin images by Different imaging modalities For diabetes diagnosis	International Journal of computer information systems Vol.12,No.5,Pg.No.99- 101	September 22 nd 2016	Inter national	
	Accuracy analysis of machine vision for detection of malignant melanoma using pixel intensity matrix parameters	ETAERE Springer book chapter.Advances in electronics, communication and computing, LNEE, vol 442, pp 2 181-188	December 16th 2016	Inter national	10.1007/978-981 10-4762-6_17
	Machine vision to identify malignant melanoma by asymmetry analysis	Yet to published in narosa(book chapter)	December 28 and 29,2016	Inter national	
	Distinguishing normal and abnormal eye images based on pixel intensity Level	Int.J. Advanced Networking and Applications Journal. Vol.No.8,Issue No.4,Pg.No.52-56	November 11,2016	Inter national	
	Categorizing healthy, osteoporotic bones by white	IEEE 40222 Pg 1-4	July 2017	Inter national	DOI:10.1109 ICCNT.2017.82039 41

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	pixel calculation				
	Categorizing normal skin, oily skin and dry skin using 4-connectivity and 8 connectivity region properties	Int.J. Advanced Networking and Applications Journal. Vol.No.8,Issue No.4,Pg.No.13-15	Nov 11,2016	Inter national	
	Feasibility study of machine vision for diagnosis of multiple sclerosis	IEEE Explore	July 3 rd -5 th 2017	ICCCNT 2017 International	DOI:10.1109 ICCNT.2017.8203942
Mrs Surekha Nigudgi	Investigations on diabetic foot impairment using NIR images and thermoregulatory behavior	IEEE Explore Page no: 1-5	July 2017	Inter national	DOI:10.11.1109 ICCNT.2017.8204102
	Performance Evaluation of filtering techniques for cancerous Lung Images	IJANA Journal Page no 20-22 Volume no:8	Nov 2016	Inter national	
	Accuracy analysis of vision mission for identifying malignant melanoma using pixel intensity matrix parameters	ETAEERE (Springer book chapter) Springer book chapter.Advances in electronics, communication and computing, LNEE, vol 442, pp 2 181-188	Dec 2016	Springer Journal	10.1007/978-981 10-4762-6_17
Mrs Nanditha Krishna	Diagnosis of ground glass opacity in HRCT lung images using high intensity pixels	Springer book chapter	Dec-16	Inter national	doi.org/10.1007/978 981-10-4765-7_55

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	A comparison of OCT and retinal fundus images for age related macular degeneration.	ICCCNT IEEE explore	July 3 rd -5 th 2017	Inter national	
Mrs N Vamsha Deepa	Accuracy analysis of machine vision for detection of malignant melanoma using pixel intensity matrix parameters	Springer book chapter	Dec-16	Inter national	10.1007/978-981 10-4762-6_17
	Diagnosis of ground glass opacity in HRCT lung images using high intensity pixels	Springer book chapter	Dec-16	Inter national	doi.org/10.1007/978 981-10-4765-7_55
	Computer Aided Diagnosis of Osteoporosis using 1 st order texture parameters	Int. J. Advanced Networking and Applications Volume No: 8, Issue No: 4(Jan-Feb 2017), Special Issue- NCBSI-2016	November 2016	Inter national	
	Feasibility study of machine vision for diagnosis of multiple sclerosis	ICCCNT IEEE explore	July 3 rd -5 th 2017	Internationa l	DOI:10.1109 ICCNT.2017.8203942
	A comparison of OCT and retinal fundus images for age related macular degeneration.	ICCCNT IEEE explore	July 3 rd -5 th 2017	Inter national	
	Machine Vision for Screening of Age-related Macular Degeneration	ICCCNT IEEE Explore	July 3 rd -5 th 2017	Inter national	

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Mr Naveen T S	Machine vision for Screening for Age-related Macular Degeneration using fundus images	yet to be published in IEEE	1st july - 2017	Inter national	
Mrs T P Prathiba	Feasibility study of machine vision for diagnosis of multiple sclerosis	ICCCNT IEEE Explore	July 3 rd - 5th 2017	Inter national	DOI:10.1109/ ICCCNT.2017.82039 42
	Distinguishing staghorn and struvite kidney stone using GLCM and pixel intensity matrix method	IJANA Vol.8 , issue-4, Pg. No. 1-4	Nov 11 2016	Inter national	
	Classification of Ground glass lung Lung opacity by hard thresholding	International Journal of computer information systems Vol.12, No.5, 20 16	September 22 nd 2016	Inter national	
	Diagnosis of ground glass opacity in HRCT lung images using high intensity pixels	Springer book chapter. Advances in electronics, communication and computing, LNEE, vol 443, pp 2 521-528	Dec-16	Inter national	DOI:10.1007/978- 981-10-4765-7_55

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CAYm2 2015-16

Name of the Teacher	Title of the Paper	Publication Citation	Date/Year of Publication	National or International Journal	DOI
Dr Punal M Arabi	Computer vision for diagnosis of malignant melanoma by pixel intensity matrix parameters	International (IEEE,explore)	Jan-16	International	10.1109/ISCO 2016.7726915
	Identification of ground glass structure in lung CT images by CAD technique	IEEE Explore	Jan-16	International	10.1109/ISCO 2016.7726916
	Identifying honeycombing structure in hrct lung images by high intensity pixel pattern	IEEE Explore-	Feb-16	International	10.1109/AEEICB 2016.7538336
	Statistical Analysis Of Lung CT Images For Ground Glass Diagnosis	IEEE Explore	Feb 2016	International	10.1109/AEEICB 2016.7538306
	Performance evaluation of GLCM and pixel intensity matrix for skin texture analysis	Elsevier Perspectives in Science ,Volume 8, September 2016, Pages 203–206	Mar-16	International	10.1016/j.pisc 2016.03.018
	Certain Investigation on Filter	Int.J. Advanced Networking	May-16	International	

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	Performance for Skin Texture Analysis	and Applications Journal. Pg.No-289-291 ISSN:0975-0282			
	Identifying Suitable Enhancement Technique for Thermal & Non Thermal Diabetic Foot Image	Int.J. Advanced Networking and Applications Journal.Pg.No-335-338 ISSN:0975-0282	May-16	International	
	Categorising healthy, osteopenic and osteoporotic bones using region properties	Springer Book Chapter Yet to be published in springer book chapter	March 23 rd 2016	International	
Mrs Gayathri Joshi	Computer vision for diagnosis of malignant melanoma by pixel intensity matrix parameters	IEEE,explore	January 2016	International	10.1109/ISCO.2016.7726915
	Performance evaluation of GLCM and pixel intensity matrix for skin texture analysis	Elsevier Perspectives in Science ,Volume 8, September 2016, Pages 203–206	March-2016	Elsevier(science direct journal)	10.1016/j.pisc.2016.03.018
	Certain investigations on filter performance for skin texture analysis	Int.J. Advanced Networking and Applications Journal. Pg.No-289-291 ISSN:0975-0282	May 2016	Int.J. Advanced Networking and Applications Journal	

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	Identifying suitable enhancement technique for thermal and non thermal diabetic foot images	Int.J. Advanced Networking and Applications Journal.Pg.No-335-338 ISSN:0975-0282	May 2016	Int.J. Advanced Networking and Applications Journal	
	Classification of Kidney Stone Using GLCM“	IJANA journal ISSN:0975 0282	May 2016	International	
Mrs T P Prathiba	Diagnosis of ground glass opacity in HRCT lung images using high intensity pixels	Springer book chapter.Advances in electronics, communication and computing, LNEE, vol 443, pp 2 521-528	Dec-16	International	10.1007/978-981 10-4765-7_55
	Identifying honeycombing structure in hrct lung images by high intensity pixel pattern	IEEE Explorer	Feb-16	International	10.1109/AEEICB 2016.7538336
Mrs Nanditha Krishna	Identification of ground glass structure in lung CT images by CAD technique	IEEE Explorer	2016	International	DOI: 10.1109/ISCO 2016.7726916
	Statistical Analysis Of Lung CT Images For Ground Glass Diagnosis	IEEE ExPLORE	Feb-16	International	DOI: 10.1109/AEEICB 2016.7538306
Mrs N Vamsha Deepa	Performance evaluation of GLCM and pixel intensity matrix for skin texture	Elsevier Perspectives in Science ,Volume 8, September 2016, Pages 203–206	March-2016	Elsevier(science direct journal)	10.1016/j.pisc 2016.03.018

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analysis					
Computer vision for diagnosis of malignant melanoma by pixel intensity matrix parameters	IEEE,Explore	January 2016	International	10.1109/ISCO 2016.7726915	
Identification of ground glass structure in lung CT images by CAD technique	IEEE Explore	2016	International	DOI: 10.1109/ISCO 2016.7726916	
Statistical Analysis Of Lung CT Images For Ground Glass Diagnosis	IEEE XPLORE	Feb-16	International	DOI: 10.1109/AEEICB 2016.7538306	
Identifying honeycombing structure in hrct lung images by high intensity pixel pattern	IEEE XPLORE	Feb-16	International	10.1109/AEEICB 2016.7538336	
Manual Segmentation of HRCT Lung Image Using GAP Filling Technique	Int.J. Advanced Networking and Applications Journal. Pg.No-360-362 ISSN:0975-0282	May 2016	International		

5.7.2. Sponsored Research (5) -nil

Funded research:

(Provide a list with Project Title, Funding Agency, Amount and Duration) Funding amount

(Cumulative during assessment years):

Amount > 20 Lacs – 5 Marks

Amount >= 16 Lacs and <= 20 lacs – 4 Marks

Amount >= 12 Lacs and < 16 lacs – 3 Marks

Amount >= 8 Lacs and < 12 lacs – 2 Marks

Amount >= 4 Lacs and < 8 lacs – 1 Mark

Amount < 4 Lacs – 0 Mark

Funded research - Nil

5.7.3. Development activities (10)

Provide detail

Product Development

Research laboratories

Instructional materials

Working models/charts/monograms etc.

Product Development

Product development and equipment servicing laboratory

1. Automated saline tripping device
2. Ultrasonic waist belt for path detection for the visually impairment
3. Knee Jerk Monitoring Device (under development)

5.7.3. Development activities (10)

Biomedical Research Laboratory

Sl. No	Forum	Research members
1	Diabetes research forum	Dr. Punal M Arabi, & team
2	Kidney research forum	Surekha Nigudgi & team
3	Lung research forum	Prathibha & team

WORKING MODELS/CHARTS/MONOGRAMS;

- Lab Description Charts
- Lab manuals

DEPARTMENT OF BIOMEDICAL ENGINEERING

5.7.4. Consultancy (From Industry) (05)

The department has MoU's with various Companies.

Memorandum of Understanding

S.No	PROGRAMME
1	Memorandum of Understanding with “Rajarajeswari Medical College and Hospital” on 11 th December 2015
2	Memorandum of Understanding with “Rajarajeswari Dental College and Hospital” on 3 th March 2016
3	Memorandum of Understanding with “RajaRajeswari College of Physiotherapy” on 16 th February 2017
4	Memorandum of understanding with “Complete Dental and Healthcare” hospital on 16 th October 2017.
5	Memorandum of understanding with Rajarajeswari College of Nursing February 2018
6	Memorandum of understanding with Elite Medicals September 8 th 2017
7	Memorandum of understanding with Energia Solutions September 6 th 2017
8	Memorandum of understanding with my dental care clinic on 15 th feb 2017

DEPARTMENT OF BIOMEDICAL ENGINEERING

5.8. Faculty performance appraisal and Development system (FPADS) .(30)

ACS COLLEGE OF ENGINEERING
FACULTY PERFORMANCE APPRAISAL FORM
(FOR ASSISTANT / ASSOCIATE PROFESSOR)
FOR THE ACADEMIC YEAR – 2015-16

SELF – APPRAISAL FORM "Form A"

Note: All the information furnished in the self-appraisal should contain the information / achievements / contribution made by the faculty member during the performance appraisal period – Academic Year 2015-16 (except the question of publication in refereed journals / wherever required). Previous year information will not be entertained.
 Pls fill in the form electronically and submit the soft copy to the principal at principal.acs@gmail.com

Name: _____ Emp. Code: _____
 Date of Joining: _____ Email id: _____
 Present Designation and from which date: _____ Dept: _____
 Address and Phone No.: _____ Date of Birth: _____

Name of Nominor: _____ relation: _____

A. Qualification:

Degree	Class / Grade	% of Marks	University	Year of completion	Field of Specialization

Paste your Color Photo

Form: Performance Appraisal – Asst / Asso Prof – 2015-16 – Form 'A'

Valuation by the Head of the Department

(a) Please rate the below listed attributes and give your rating between 1 to 5
 5 – Outstanding, 4 – Very Good, 3 – Good, 2 – Fair, 1 – Poor

S. No	Attributes	Rating
1	Initiative: A Self-starter; able to work without constant supervision	
2	Responsibility: Understands duties, accepts responsibilities readily	
3	Punctuality: arrives on time. Generally available for students during working hours	
4	Commitment: Committed to his / her work	
5	Loyalty: Supports and follows Institute's Policies and Guidelines	
6	Development: Keeps knowledge up-to-date	
7	Oral Communication: Speaks effectively with supervisor, colleagues and students	
8	Written Communication	
9	Team Work: Effective Team-player	
10	Leadership: Gives clear directions and listens to co-staff	
11	Relationship with fellow faculty and staff	
12	Maturity	
13	Temperament	
14	Motivation Level	
15	Relationship with students	
TOTAL SECURED MARKS		
MAXIMUM MARKS		75
% VALUE		

(b) Comments by the Head of the Dept justifying the Grade:

Date: _____ Signature of H O D _____

Form: Performance Appraisal – Asst / Asso Prof – 2015-16 – Form 'A'

The Faculty Performance is Evaluated by HOD for every Academic year With the use of appraisal Form

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College of Engineering
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(ISO 9001:2008)

STAFF APPRAISAL ON HOD

STAFF Dept: _____

Strongly agree – 5 Agree – 4 Neither agree nor disagree – 3 Disagree – 2 Strongly Disagree – 1

Sl No	Evaluation Criteria	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
HOD						
1	Provides clear direction and purpose	✓				
2	Models ethical work place behavior	✓				
3	Demonstrates influencing skills by setting goals	✓				
4	Empowers subordinates to achieve objectives		✓			
5	Acts to motivate, coach and develop subordinates	✓				
6	Provides able administration		✓			
7	Good at communication skill	✓				
8	Possess delegation skills		✓			
9	Possess knowledge on equipment/machinery	✓				
10	Meeting deadlines/commitments		✓			
11	Good ability in problem solving and decision making	✓				



ACS

(ISO 9001:2008)

College of Engineering

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Ref: VP/HOD/15/1

Date: 14.06.2016

360° DEGREE FEEDBACK SYSTEM

HOD APPRAISAL ON VICE PRINCIPAL

Please do not mention the Department Name

Strongly agree – 5 Agree – 4 Neither agree nor disagree – 3 Disagree – 2 Strongly Disagree – 1

Sl No	Evaluation Criteria	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
VICE PRINCIPAL(ACADEMIC)						
1	Works in adherence to vision and mission of the organization.					✓
2	Provides able Planning, budgeting & forecasting					✓
3	Organizes & distributes equal work among subordinates					✓
4	Secures resources & audits their effective use					✓
5	Monitors, documents & evaluates employee conduct & performance					✓
6	Provides appropriate & timely feedback / Meeting					✓
7	Maintains a safe & healthy work Place					✓
8	Builds a team that reflects high, morale, Clear focus & group identity					✓
9	Encourages & provides opportunities for subordinates to obtain & apply new skill & knowledge					✓



ACS College of Engineering

Kambipura, Mysore Road, Bengaluru-560 074

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DEPARTMENT OF BIOMEDICAL ENGINEERING

5.9. Visiting / Adjunct / Emeritus Faculty Etc. (10)

S.No	Academic Year	Name of the Resource person
1.	CAY (2017-2018)	1.Mr. Bipin Lal, CEO at Energia Tech Solutions, Bangalore
		2.Nikhil Pramod Anjanaiah, Elite Medical, Bangalore
		3.Mr. Siddarth Nair,B E ,M.Tech, (Ph.D), Founder & Director, Fyrsta Innovations, Bangalore-47.
2	CAYm1 (2016-2017)	1. Mr. Mahesh Ramegowda, Engg. Manager, Thales Group Bangalore
		2. Mr. Siddarth Nair,B E ,M.Tech, (Ph.D), Founder & Director, Fyrsta Innovations, Bangalore-47.
3	CAYm2 (2015-2016)	-----



DEPARTMENT OF BIOMEDICAL ENGINEERING

CRITERIA 6

FACILITIES AND TECHNICAL SUPPORT


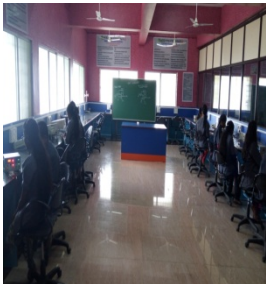


80

6.1. Adequate and well equipped laboratories, and technical manpower (30)

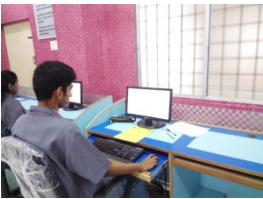

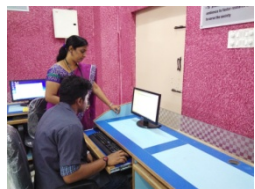
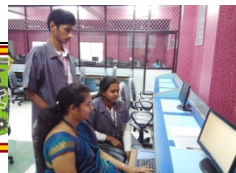
Sl. No.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status (all the courses for which the lab is utilized)	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
1	Analog Electronics lab 15BML37 Room no: 317 	Max 15/batch	Dual Power Supply Oscilloscope(30M Hz Dual Channel), Function Generator (3 MHz), Electronic Component Tester, Ammeter, Voltmeter,	6 hours	Ms.Priya	Tutor	M.Sc
2	Digital design and HDL lab 15BML38 Room no : 318 	Max 15/batch	Digital IC Trainer Kit, Digital IC Tester, 7-Segment Display	6 hours	Mrs. Soumya Bagojikoppa	Instructor	Diploma
3	Embedded controllers lab 15BML47 Room no : 322 	Max 15/batch	8051 Microcontroller Atmel Kit: Model No: ALSEMB-EVAL-04, Stepper Motor Kit, DC Motor Kit, LCD & Key Board Kit, Seven Segment Kit,USB to Serial Converter	6 hours	Mrs. Soumya Bagojikoppa	Instructor	Diploma



DEPARTMENT OF BIOMEDICAL ENGINEERING

4	<p>Biomedical Transducers and measurement lab 15BML48 Room no : 317</p> 	Max 15/ba tch	<p>Fixed Power Supply($\pm 5V, \pm 12V$), Electronic Component Tester/Universal Tester: Multifunction Digital BP Meter, Thermistor Trainer Kit, LVDT Trainer Kit, LDR Trainer Kit, Oscilloscope(30M Hz Dual Channel)</p>	6 hours	Ms.Pushp alatha V	Instru ctor	Diploma
5	<p>Clinical Instrumentation –I lab 10BML58 Room No:316</p> 	Max 15/ba tch	<p>Sphygmomanomet er, Digital BP Machine, LVDT, Strain gauge, Thermistor Kits, Oscilloscopes, Function Generators, Power supplies</p>	6 hours	Ms.Pushp alatha V	Instru ctor	Diploma
6	<p>Signal Conditioning Circuits and Data Acquisition Lab - 15BML57 Room no : 317</p> 	Max 15/ba tch	<p>Dual Power Supply, Electronic Component Tester, Oscilloscope(30M Hz Dual Channel), Function Generator(3 MHz)</p>	6 hours	Ms.Pushp alatha V	Instru ctor	Diploma
7	<p>Clinical Instrumentation Lab 15BML58 Room No:316</p> 	Max 15/ba tch	<p>Dual Power Supply, Electronic Component Tester, Oscilloscope(30M Hz Dual Channel), Function</p>	6 hours	Ms.Priya	Tutor	M.Sc

DEPARTMENT OF BIOMEDICAL ENGINEERING

			Generator				
8	<p>C++ & Data structures lab 10BML67 Room no: No:323</p> 	Max 15/batch	<p>Brand Lenovo intel I3 processor, RAM 4GB, HDD 500 GB, Keyboard Acer 107 keys, optical mouse, monitor TFT 18.5 inches C++ software</p>	6 hours	Mrs. Soumya Bagojikoppa	Instructor	Diploma
9	<p>Clinical Instrumentation –II 10BML68 Room No:316</p> 	Max 15/batch	<p>Calorimeter, pH-Meter, Conductivity Meter, Sample & Hold Circuit(Kit), ASK & FSK Modulation Trainer, ASK & FSK Demodulation Trainer, PAM-PWM Modulation/Demodulation Techniques- Model: Scientech 2110</p>	6 hours	Ms. Pushpalatha V	Instructor	Diploma
10	<p>Biomedical Digital Signal Processing Lab 10BML77 Room No:323</p> 	Max 15/batch	<p>Lenovo, intel I3 processor, RAM 4GB, HDD 500 GB, Keyboard Acer 107 keys, optical mouse, monitor TFT 18.5 inches Mat lab Software version R2102a</p>	6 hours	Ms. Pushpalatha V	Instructor	Diploma
11	<p>Medical Image Processing Lab 10BML78 Room No:322</p> 	Max 15/batch	<p>Lenovo, intel I3 processor, RAM 4GB, HDD 500 GB, Keyboard Acer 107</p>	6 hours	Ms. Priya M	Tutor	M.Sc



DEPARTMENT OF BIOMEDICAL ENGINEERING

			keys,optical mouse,monitor TFT 18.5 inches Mat lab Software version R2102a				
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**** Digital design and HDL lab shared with Department of Electronics and Communication Engineering.**



Analog Electronics Lab
15BML57



Digital design and HDL Lab
15BML38



Embedded controllers lab
15BML47



Biomedical Transducers and
measurement lab
15BML48



Signal Conditioning Circuits and Data
Acquisition Lab - 15BML57



Clinical Instrumentation Lab –
15BML58

DEPARTMENT OF BIOMEDICAL ENGINEERING



Clinical Instrumentation I Lab -10BML58



C++ & Data structures lab-10BML67



C++ & Data structures lab
10BML67



Biomedical Digital Signal Processing
Lab
10BML77





Medical Image Processing Lab
10BML78




6.2. Additional facilities created for improving the quality of learning experience in laboratories (25)

S. No	Facility	Focus
1	Tie up with Rajarajeswari Medical College and Hospital	To give practical exposure, Undergo internships ,carry out in house projects & research activities
2	Tie up with Complete Dental and Healthcare clinic	To give practical exposure, Undergo internships ,carry out in house projects & research activities
3	Tie up with Rajarajeswari Dental College and Hospital	To give practical exposure, Undergo internships ,carry out in house projects & research activities
4	Tie up with Rajarajeswari College of Physiotherapy	To give practical exposure, Undergo internships ,carry out in house projects & research activities
5	Tie up with Rajarajeswari college of Nursing	To give practical exposure, Undergo internships ,carry out in house projects & research activities
6	Tie up with Energia Solutions	To bridge the industry institute gap , For better understanding of concepts and to instill entrepreneurial skills
7	Tie up with Elite Medicals	To bridge the industry institute gap , For better understanding of concepts and to instill entrepreneurial skills
8	Research and Development lab	To kindle the research interest and publish the research papers.
9	Biomedical servicing and training lab	In-depth learning about the equipments and kindle the research interest



DEPARTMENT OF BIOMEDICAL ENGINEERING

Sl. No.	Facility Name	Details	Reason(s) for creating facility	Utilization	Areas in which students' are expected to have enhanced learning	Relevance to POs/PSOs
1	Internship at Rajarajeswari Medical College and hospital 	<p>The students of biomedical engineering will be provided internship for a period of 15 days at Rajarajeswari medical college and hospital</p> <p>The internship syllabus is framed by faculty of Biomedical Engineering department.</p>	To help the students to gain practical and hands on training of various biomedical equipments like MRI, CT,X-ray ,Mammography , Anesthetic equipments	15 days	CT , MRI Ultrasound Short wave Diathermy ,Microwave Diathermy , Critical care equipments	PO – 1,2,3,4 ,5,11,12 PSO-1,2
2	Hospital visit 	<p>The students of biomedical engineering visited Radiology department, Anatomy and Physiology department of Rajarajeswari Medical Hospital.</p> <p>Dental X-ray in Rajarajeswari Dental College and Hospital</p>	To help the students to gain practical knowledge on various biomedical equipment such as MRI, CT,X-ray ,Mammography, Ultrasound, Short wave Diathermy Microwave Diathermy, Critical care equipments	Once in a semester	The students were able to see various human organs such as Heart , Kidney, Lungs, Brain, Stomach, Bones, Small Intestine, Large Intestine, Liver etc.	PO – 1,2,3,4 ,5,12 PSO-1,2

DEPARTMENT OF BIOMEDICAL ENGINEERING



			The students were able to see various human organs such as Heart , Kidney, Lungs, Brain, Stomach, Bones, Small Intestine, Large Intestine, Liver etc.			
3	Research and Development lab 	1. Machine vision for disease diagnosis group 2. Central nervous system and spine group 3. Embedded systems in biomedical applications group 4. Diabetic diagnosis group 5. Image group 6. Lung kidney disease 7. diagnosis group Student's projects are guided by our faculty members.	Real time application To create innovative ideas To build the creative skills Increase the interest on research	Complete semester is opened to utilize	Innovation Creativity Skill development Entrepreneurship Ideas generation	PO – 1,2,3,4,5,11,12 PSO- 1,2

DEPARTMENT OF BIOMEDICAL ENGINEERING

4	<p>Department Library</p> 	<p>Apart from the college library department is also having collection of Text Books, Reference Books for staff and students Project / seminar report.</p>	<p>To meet the needs of the students and faculties. To provide reference facilities. To refer advanced information for seminar, laboratory, projects To know about the past research activities undertaken by the students</p>	<p>Complete semester is opened to utilize</p>	<p>Human anatomy and physiology, Analog Circuits and design Control Systems Handbook of Biomedical Equipments</p>	<p>PO – 1,4 PSO- 1</p>
5	<p>Seminar Hall</p> 	<p>Fully equipped seminar hall with Computer, Projector, Student Desk, White Board, Air conditioner, Fan, Cushion chair, Mic, Speaker, LED lights, Podium</p>	<p>For better understanding of concepts. providing e-learning through online Web courses and Video Guest lecturers of advance topics in Engineering, Sciences, Technology Seminars and project review of students</p>	<p>Complete semester is opened to utilize</p>	<p>Guest lectures on advanced topics of science and Engineering 1. Ultrasound and Its Applications 2. Neural Networks and its applications 3. Genetic Engineering 4. Hospital workflow</p>	<p>PO – 1,6,7,11,12 PSO- 1,2</p>



DEPARTMENT OF BIOMEDICAL ENGINEERING

					5. Recent trends in Biometric	
6	Biomedical servicing and training lab 	<p>Equipment servicing and training lab is setup to give equipment servicing training towards bridging institute industry gap</p>	<p>To bridge the industry institute gap To increase the placement opportunity To instill entrepreneurial skills</p>	<p>Complete semester is opened to utilize.</p>	<p>In-depth learning about the equipments and kindle the research interest</p>	<p>PO – 1,2,3,4,5,11,12 PSO-1,2</p>
7	E Journals facility	<p>IEEE, Springer, J-gate, Nimbus</p>	<p>For research and project activities. To know about recent trends in science and technology</p>	<p>Complete semester is opened to utilize</p>	<p>Research activity Recent trends in engineering Project activity</p>	<p>PO – 1,6 PSO- 1</p>
8	Smart class 	<p>Fully equipped shared Smart Class room with LCD projector and software's with the seating capacity of 60. Comfortable desks, chairs and teaching aids. Glass</p>	<p>In Smart classes, we use all interactive modules like videos/ presentations and these visually attractive methods of</p>	<p>Per Semester 10 hours</p>	<p>Subject like Human anatomy and Physiology where the students can easily visualize the</p>	<p>PO5</p>

DEPARTMENT OF BIOMEDICAL ENGINEERING

		board, Fan, Tube light, chalk board	teaching becomes appealing to students who are already struggling with the traditional method of teaching in a classroom.		different organs of a human body.	
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Internship for 3rd year students at Rajarajeswari Medical College and Hospital



Internship for the 3rd year students at Rajarajeswari Medical College and hospital



DEPARTMENT OF BIOMEDICAL ENGINEERING

III year BME students visited the radiology department RRMCH



Hospital visit - II year BME students visit to anatomy lab RRMCH .



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DEPARTMENT OF BIOMEDICAL ENGINEERING

Second year Biomedical Engineering students in Anatomy lab RRMCH

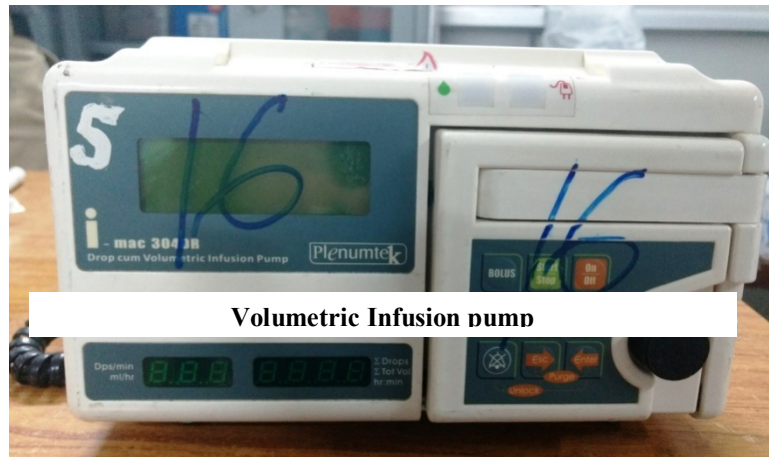


Hospital visit for the second and third year students to Central Sterile Services Department (CSSD) ,
Rajarajeswari Medical College and Hospital .

Biomedical equipment servicing and training lab



Defibrillator



Volumetric Infusion pump



Patient Monitor



Infusion Pump




Syringe Pump



DEPARTMENT OF BIOMEDICAL ENGINEERING

Department of Biomedical Engineering Research program approval letter by VTU

 **Visvesvaraya Technological University**
"Jnana Sangama", Belagavi - 590 018, Karnataka State

Dr. H. N. Jagannath Reddy B.E., M.E., Ph. D.
Registrar

Phone: (0831) 2405468
Fax: (0831) 2405467

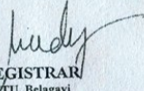
Ref: VTU/Aca-Res-Cen/2016-17/7936(a) Date: 16 JAN 2017

NOTIFICATION

Sub: Grant of Recognition to the Department of *Biomedical Engineering* of ACS College of Engineering, Bengaluru to offer Ph.D/M.Sc. (Engg.) by research regl..

Ref: Executive Council Resolution No. 2.3.1, dated 16-12-2016.

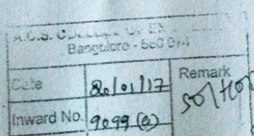
Pursuant to the Resolution of Executive Council referred to the above, it is hereby notified that the Department of *Biomedical Engineering* of ACS College of Engineering, Bengaluru is permitted under section (41) of the VTU act 1994, to offer Ph.D/M.Sc. (Engg) by Research programs in accordance with the Regulations and Guidelines in force (visit our VTU website www.vtu.ac.in for Regulations & Guidelines). This permission for Fresh Department is valid for *one academic year* starting from 2016-17.


REGISTRAR
VTU, Belagavi

To,
The Principal,
ACS College of Engineering,
Bengaluru.

Copy to:

1. The Secretary to VC, VTU, Belagavi for kind information.
2. The Registrar (Evaluation), VTU, Belagavi for kind information.
3. The Special Officers of all Regional offices of VTU for kind information.


Date: 20/01/17
Inward No. 9099 (a)
Remark: 507 HOD / office.
22/01/2017

6.3. Laboratories: Maintenance and overall ambience: (10)

Maintenance of Laboratory Equipments:-

- Regular check up of equipment is carried out at the end of every semester.
- Breakdown register is maintained in the laboratories.
- As per the requirement minor repairs are carried out by the lab assistant of faculty member.
- Maintenance of computers is taken care by centralized computer department of the institute.
- Major repairs are outsourced by following the procedure of the institute.

Overall Ambience:-

- All laboratories are equipped with modern equipments to meet the requirement of curriculum.
- The courses which have practical work will be provided labs every week.
- Conditions of chairs/benches are in good condition. Chair with desk are provided for individual students in Labs.

DEPARTMENT OF BIOMEDICAL ENGINEERING

- Sufficient number of windows is available for ventilation and natural light and every lab has one exit
- Laboratory manuals are prepared and are available in soft and hard copy.
- All laboratories are well furnished.
- Laboratories kept open beyond office hours as per the need.
- All laboratories have sufficient natural light, good ventilation with tubes and fan arrangement.
- Emergency light connections available in Lab in case of power failure.
- Overall ambience of laboratory is good.
- Each Lab is equipped with white/black board, computer, Internet, and such other amenities.
- Research laboratory is available 24X7 for all faculties and students to carry research work and projects.

Sr. No.	Name of Lab	Size (Sq. M)
1	Analog Electronics Lab 15BML37	89
2	Digital design and HDL Lab 15BML38	89
3	Embedded controllers Lab 15BML47	89
4	Biomedical Transducers and Measurement 15BML48	89
5	8086 Microprocessor Lab 10BML57	89
6	Clinical Instrumentation-I Lab 10BML58	89
7	Signal Conditioning Circuits and Data Acquisition Lab 15BML57	89
8	Clinical Instrumentation Lab 15BML58	89
9	C++ & Data structures Lab 10BML67	89
10	Clinical Instrumentation Lab –II 10BML68	89
11	Biomedical DSP Lab 10BML77	89
12	Medical Image Processing Lab 10BML78	89

Availability of adequate and qualified technical supporting staff for program specific labs

Technical staff assists teaching faculty, preparation and arrangement of experimental setup.

Technical staff also takes care of minor maintenance of laboratory equipments.

6.4. Project Laboratory (5)

Facilities & Utilization

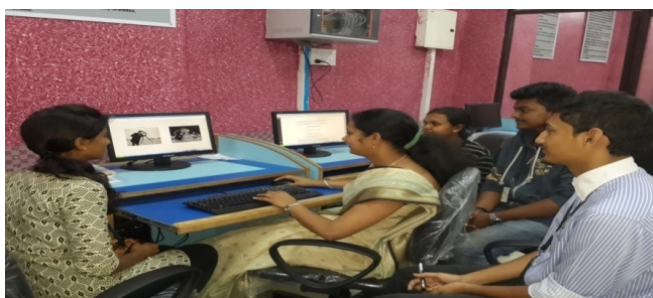
6.4.1. Facilities

SL. NO	FACILITIES
1.	Computer systems
5.	Projector with screen
6.	Desk
8.	Microcontroller software (KEIL vision 3.0)
	Microprocessor software (MASM 6.0)
7.	TURBO C/C++
8.	MATLAB Version 2012a software
9.	Cathode ray oscilloscope
10	Power supply
12.	Multi-meters

Utilization:

- Project lab is utilized for two days 3hours each by 8th semester students.
- Students will carry out their project work under the guidance of their faculty as well as technical faculty.
- Above mentioned all project lab facility is provided to all students according to their project necessities.

➤ Awards and Recognition



Biomedical Final Year Students **Harsha L singh** and **Mustaq Ahmad Reshi** under the guidance of **Hemanth Kumar G**, Assistant professor of **BME department**, ACSCE, participated in project paper presentation competition & won **1st place** in state level Engineering students project exhibition and competition hosted by RV college of Engineering and organised by ABVP, Karnataka.

DEPARTMENT OF BIOMEDICAL ENGINEERING

Mustaq Ahmad receiving **1st Prize** from VTU vice chancellor **Dr. Karisiddappa**.



Harsha L singh and Mustaq Ahmad Reshi During the presentation



DEPARTMENT OF BIOMEDICAL ENGINEERING

Project 2015-16

Sl. No.	Name of the Mentor	Title	Name of the students	Impact
1	Mrs.Surekh Nigudgi	Wireless Interfacing of Vital signs with smart phones	Dilshad.N 1AH12BM007	Working as biomedical engineer in Columbia Asia Hospital
			Kavya.P. 1AH12BM010	
			Mohammed Shahadad P.K 1AH12BM017	
2	Mr.Naveen TS	Thermographic Analysis of diabetic Foot for disease diagnosis	Archana Sharma.B.N 1AH12BM003	Working as biomedical engineer in GM Hospital
			Chetan s 1AH12BM006	Working as a Software Engineer in Infosys
			Dushyanthi K 1AH12BM008	
3	Mrs.Vamshadeepa N	Computer Aided Diagnosing of Honeycomb lung disease of Idiopathic lung	Divya Hegade.M 1AH12BM010	Laxmi Bai presented a paper in International conference held in RRCE May 2016 Laxmi workins as research associate in JSS ,Mysore
			Chaitra.U.A 1AH12BM005	
			Gagana B.N 1AH12BM009	
			Lakshmi Bai.P 1AH12BM011	
4	Mrs.Gayatri Joshi	Early Diabetes Diagnosis by the thermoregulatory skin texture analysis using NIR imaging	Abhik Raj Subedi (1AH12BM001)	Abhik Raj Subedi presented a paper in International conference held in RRCE May 2016 Abhik Raj doing Higher studies in Australia Madeeha Working as biomedical engineer FinFid
			Asma Poudel Chhetri 1AH12BM004	
			Madeeha Shazeen Farooq 1AH12BM013	

NOTE: Divya Hegade.M, Chaitra.U.A, Gagana B.N, Lakshmi Bai.P bagged best project award entitled “Computer Aided Diagnosing of Honeycomb lung disease of Idiopathic lung”

DEPARTMENT OF BIOMEDICAL ENGINEERING

Project (2016-17)

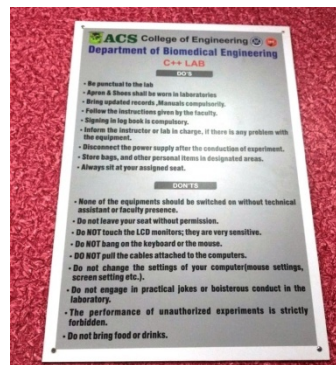
Sl. No.	Name of the Mentor	Title	Name of the students	Impact
1	Mr.Naveen T S	Thermo graphic dental disease diagnosis	Deepak Samantha 1AH13BM008	Deepak Samantha presented a paper in International conference held in UPSC Dehradun 2017. Deepak Samantha working as biomedical engineer in Ababil healthcare systems
			Aasma Dahal 1AH13BM001	
			Dinshid T Ummer 1AH13BM010	
2	Mr.Hemanth Kumar G	Wireless intra-venous drip delivery system"	Harsha L Singh 1AH13BM012	Got 1 st prize in National level Project exhibition held in RVCE April 2017 Harsha L Singh working as biomedical engineer in Genworks health Pvt Ltd Prerana v Prasad is doing MBA in PESIT, Bangalore
			Mushtaq Ahmad Reshi 1AH12BM018	
			Preethish Kashyap 1AH12BM020	
			Prerana V Prasad 1AH13BM017	
3	Mrs.Nanditha Krishna	Identification of AMD using OCI images"	Ashwini .V 1AH13BM006	Presented paper in International conference held in Amrita University on August 2017 Ashwini working as biomedical engineer Kshema Medical technologies pvt.ltd/Prathibha H.M is doing M.Tech in BMSCE,Bangalore
			Prathibha H.M 1AH13BM016	
4	Mrs.Vamshadeepa N	Early diagnosis of pneumonia for lung X-ray images	Akshata Urs 1AH13BM003	Presented a paper in international conference held in UPSC Dehradun, October 2017
			Priyanka H B 1AH13BM018	
5	Mrs.Gayatri Joshi	Robotherapist version 1	Rohith n reddy 1AH13BM021	Rohith reddy is working as application researcher in Panacea Medical Technologies
			Dhatri 1AH13BM009	Doing internship in Columbia asia hospital
6	Ms.Prathibha TP	Machine vision for diabetic foot screening using NIR foot images	Tejaswi bhat 1AH13BM025	Presented a paper in international conference held in IIT Delhi, July 2017 Tejaswi is working as biomedical sales manager in panacea medical technologies
			Abrar Ahmed 1AH13BM002	
7	Mrs.Anitha s	A Novel Approach for Image Authentication by compression for hiding medical data	Harsha P Ss 1AH13BM013	Working as biomedical engineer in Sreedevi Hospital, Tumkur
			Shaurya Madappa 1AH13BM023	
			Shreya Srinivas Bhat 1AH13BM024	

6.5 Safety measures taken in all laboratories (10)

- General Rules of Conduct in Laboratories are displayed.
- Specific Safety Rules for students displayed.
- First aid box, Fire extinguisher & Hand gloves are kept in each laboratory.
- Students are required to wear aprons.
- Well trained technical supporting staff.
- Periodical servicing of the lab equipments.



Dry powder fire extinguishers are installed in the floor



Do's and Don'ts are displayed in each laboratories



Fire Exit boards are displayed



CCTV's are installed in each floor

DEPARTMENT OF BIOMEDICAL ENGINEERING

S. No.	Name of the Laboratory	Safety Measures
1.	Analog Electronics Lab 15BML37	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited
2	Digital design and HDL Lab 15BML38	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited
3	Embedded controllers Lab 15BML47	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited • Appropriate storage areas. • Proper PC system is used

DEPARTMENT OF BIOMEDICAL ENGINEERING

4	Biomedical Transducers and Measurement Lab 15BML48	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited
5	8086 Microprocessor 10BML57	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited
6	Clinical Instrumentation Lab -1 10BML58	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited
7	Signal Conditioning Circuits and Data Acquisition Lab 15BML57	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff.

DEPARTMENT OF BIOMEDICAL ENGINEERING

		<ul style="list-style-type: none"> • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited
8	Clinical Instrumentation Lab 15BML58	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited
9	Clinical Instrumentation Lab -2 10BML68	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited
10	C++ and Data Structures Lab	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited • Appropriate storage areas.

DEPARTMENT OF BIOMEDICAL ENGINEERING

11	Biomedical Digital Signal Processing Lab 10BML77	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited • Appropriate storage areas. • Proper PC system is used
12	Medical Image Processing Lab 10BML78	<ul style="list-style-type: none"> • General Rules of Conduct in Laboratories are displayed • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipment's and provides needful equipment's and components. • Periodical servicing of the lab equipment's. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. . • Loose clothing and jewels etc. are prohibited • Appropriate storage areas. • Proper PC system is used

DEPARTMENT OF BIOMEDICAL ENGINEERING

CRITERION 7

Continuous Improvement

50

7.1 .C. Actions taken based on the results of evaluation of each of the Pos & PSOs POs Attainment levels & actions for improvement CAY (2017-18)

POs	Target level	Attainment level	Observations
PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO1	1.914583333	1.424723605	The gap between Target level and attainment level is nominal.
Actions : The action to bridge the gap is to give tutorials , special coaching and subject related workshops.			
POs	Target level	Attainment level	Observations
PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
PO2	1.882478632	1.35978087	The gap between Target level and attainment level is nominal.
Actions : The action to bridge the gap is to give tutorials , special coaching and subject related workshops.			
POs	Target level	Attainment level	Observations
PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			
PO3	1.97008547	1.471334425	The gap between Target level and attainment level is nominal.
Actions: The action to bridge the gap is to give tutorials, special coaching and subject related workshops, Innovative teaching methods.			
Pos	Target level	Attainment level	Observations
PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.			
PO4	1.785087719	1.321364622	The gap between Target level and attainment level is nominal.
Actions: The action to bridge the gap is to give tutorials , special coaching and subject related workshops, Innovative teaching methods.			
Pos	Target level	Attainment level	Observations
PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations			
PO5	1.608796296	1.231375663	The gap between Target level and attainment level is nominal



DEPARTMENT OF BIOMEDICAL ENGINEERING

Action: The action to bridge the gap is to give smart class rooms, audio visual teaching methods.			
Pos	Target level	Attainment level	Observations
PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.			
PO6	1.507576	1.243394	Attainment level does not meet the target level since VTU curriculum does not focus much in this aspect.
Action: To bridge the gap between the target and the attainment level additional workshops and Extension activities are given.			
Pos	Target level	Attainment level	Observations
PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
PO7	1.361111	1.112895	Attainment level does not meet the target level since VTU curriculum does not focus much in this aspect.
Action: To bridge the gap between the target and the attainment level additional workshops and Extension activities are given.			
Pos	Target level	Attainment level	Observations
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	1.41666667	1.17966822	There is a deviation between the target and the attainment
Actions : Extra workshops , conferences , symposia and extension activities are given to meet out these requirements.			
Pos	Target level	Attainment level	Observations
PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings			
PO9	1.53030303	1.159785887	There is a deviation between the target and the attainment
Actions : Extra workshops, conferences, symposia and extension activities are given to meet out these requirements.			
POs	Target level	Attainment level	Observations
PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			
PO10	1.35294118	1.01489423	There is a deviation between the target and the attainment
Actions: Training sessions on critical thinking are given. Periodical debates , group discussions and panel discussions are conducted on contemporary issues.			

DEPARTMENT OF BIOMEDICAL ENGINEERING

POs	Target level	Attainment level	Observations
PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.			
PO11	1.614197531	1.136097164	Attainment level does not meet the target level since VTU curriculum does not focus much in this aspect.
Actions: project & product lab has been setup and students are guided to do in house projects which would give the base for project management and finance; this would give them leadership qualities and managerial abilities to work as an individual and also In a team in multidisciplinary environments.			
POs	Target level	Attainment level	Observations
PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.			
PO12	1.283854167	0.947730245	Target level is not attained since VTU curriculum does not focus much in this aspect.
Actions: the journal writing training , students symposia, conferences would address this issue.			

PSOs Attainment levels & actions for improvement (2015-16) CAY

POs	Target level	Attainment level	Observations
PS01: An ability to apply mathematical knowledge to design develop & analyze biomedical problems & application			
PO1	2.38235294	1.79705882	Problematic subjects are few in the curriculum
Actions : Additional workshops and product development lab and equipment servicing training & internship are provided			
POs	Target level	Attainment level	Observations
PS02: Impart basic & advanced biomedical knowledge needed for the student to excel as Bioemdmical Engineer.			
PO2	2.838235294	2.140588235	There is a deviation between the target and the attainment
Actions : Additional workshops and product development lab and equipment servicing training & internship are provided			

DEPARTMENT OF BIOMEDICAL ENGINEERING

7.2. Academic Audit and actions taken thereof during the period of Assessment (10)

The Following audit agencies are visiting and conducting audit annually and giving their feedback:

1. ISO
2. NAAC
3. LIC
4. HLACT
5. IQAC



DEPARTMENT OF BIOMEDICAL ENGINEERING

The Recommendations /suggestions are being implemented '**Internal Quality Assurance Committee**' for monitoring academic activities of Department of Biomedical Engineering has been formed.

Sl.No.	Name	Designation
1	Dr. Punal M Arabi Professor & Head of Biomedical Engg.	Chairman
2	Dr. Mathivannan Professor, Dept of ECE	Member from other department
3	Dr. R Siva Subramanian, Professor, Dept of Mechanical Engg.	Member from other department
4	Mrs. Gayathri Joshi , Asst.Professor, Dept.of Biomedical Engg.	Member
5	Mrs.Surekha Nigudgi Asst.Professor, Dept.of Biomedical Engg.	Member
6	Mrs. N Vamsha Deepa Asst.Professor, Dept.of Biomedical Engg.	Member
7	Mr. Naveen T S Asst.Professor, Dept.of Biomedical Engg.	Member

DEPARTMENT OF BIOMEDICAL ENGINEERING



ACS College of Engineering Department of Biomedical Engineering

The primary activities to be monitored and controlled by the committee are as below

Sl No.	Activity	Scheduled Completion Time (Odd and Even Semesters)
1	Activities before commencement of Semester	
	a. Submission of staff requirement (if any) request to the Principal.	➤ 1 st June(ODD SEM) ➤ 1 st December (EVEN SEM)
	b. Electives selection	➤ 8 th June (ODD SEM) ➤ 8 th December(EVEN SEM)
	c. Subject assignment to faculty members	➤ 12 th June(ODD SEM) ➤ 12 th December(EVEN SEM)
	d. Lab manual preparation, if any	➤ 20 th June(ODD SEM) ➤ 20 th December(EVEN SEM)
	e. College level calendar of events	➤ 15 th July(ODD SEM) ➤ 15 th January(EVEN SEM)
	f. Departmental calendar of events	4 days after College Calendar of Events received.
	g. Time table preparation	16 th July (ODD SEM) 15 th January (EVEN SEM)
	h. Lesson plan	25 th July ODD SEM); 25 th January(EVEN SEM)
	i. List of students approved by Principal's office	28 th July (ODD SEM) 28 th January (EVEN SEM)
2	Activities after commencement of classes	
	a. Class monitoring and students' attendance registers.	Every day; Every week
	b. Class room teaching quality (theory and lab courses)	First and last week of every month and as and when needed.
	c. Performance of students in Internal Tests and actions initiated for poor performance.	After every test
	d. Students' attendance and counseling, if needed.	Every month
	e. Information on attendance and IA marks to be sent to parents / guardians	Attendance – Every month; IA Marks – Every test
	f. Display of time table for practical examinations	One week before the semester end date
	g. Finalization of IA marks and attendance	5 days before semester end date
	h. Performance in Semester End examinations	Within a week after the declaration of university results





ACS College of Engineering Department of Biomedical Engineering

To,

The Principal,
ACS College of Engineering,
Bangalore-560074

Respected Sir,

Sub: Internal Quality Assurance Committee for accessing academic activities and improving quality in the development of Biomedical engineering.reg.

The meeting held on 30th July 2015, the cell has been framed for assessing departmental academic activities. The committee consists of faculty members from within and other department. Accordingly the following committee is formed for our department.

Sl.No.	Name	Designation
1	Dr. Punal M Arabi Professor & Head of Biomedical Engg.	Chairman
2	Dr. Mathivannan Professor, Dept of ECE	Member from other department
3	Dr. R Siva Subramanyam, Professor, Dept of Mechanical Engg.	Member from other department
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6	Mrs. N Vamsha Deepa Asst.Professor, Dept.of Biomedical Engg.	Member
7	Mr. Naveen T S Asst.Professor, Dept.of Biomedical Engg.	Member

The activities to be controlled by the committee are enclosed herewith for your perusal.

This is for your kind information and approval.

DEPARTMENT OF BIOMEDICAL ENGINEERING

ACS College of Engineering

Department of Biomedical Engineering

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ACS College of Engineering
Department of Biomedical Engineering

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DEPARTMENT OF BIOMEDICAL ENGINEERING

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DEPARTMENT OF BIOMEDICAL ENGINEERING

7.3 Improvement in placements , higher studies and entrepreneurship

Academic Year (2014-15)

Sl.No	Total No of Students	placed		Higher Studies
		In the college	off Campus	1
1	2	-	1	
Sl No	USN	Name	Designation	company
1	1AH11BM004	Thanuja	Higher Studies	
2	1AH11BM002	Heena	Biomedical Engineer	Tatwadarsha hospital, Hubli

Academic Year (2015-16)

Sl.No	Total No of Students	placed		Higher Studies
		In the college	off Campus	1
1	13	6	2	
Sl No	USN	Name	Designation	company
1	1AH12BM001	Abhik Raj Subedi	Higher studies Australia	MS, Australia
2	1AH12BM006	Chetan	Software Engineer	Infosys
3	1AH12BM009	Gagana	Biomedical Engineer Trainee	Reddonatura
4	1AH12BM007	Dilshad	Biomedical Engineer	Colombia Asia Hospital
5	1AH11BM001	Divya Hegde	Biomedical Engineer	Rainbow hospital
6	1AH12BM013	Madeeha	Finance Manager(MBA)	FinFid
7	1AH12BM011	Laxmibai p	Biomedical Engineer Trainee	Reddonatura
8	1AH12BM003	Archana	Engineer	Life cell
9	1AH12BM010	Kavya P	Biomedical Engineer Trainee	Reddonatura

DEPARTMENT OF BIOMEDICAL ENGINEERING

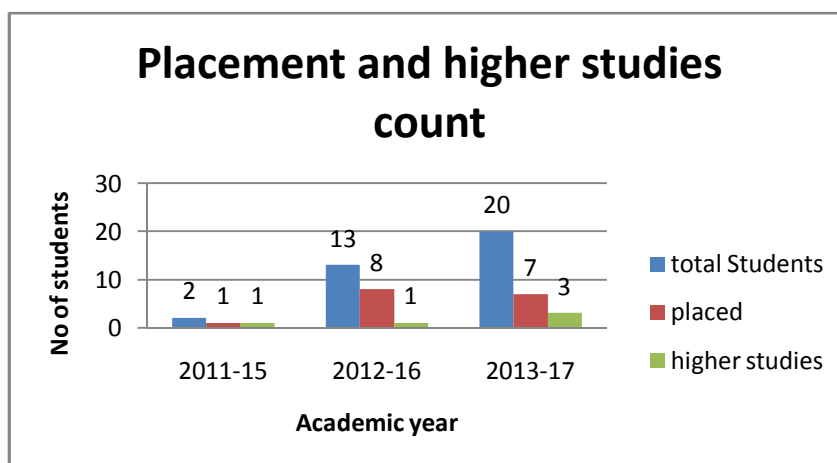
Academic Year (2016-17)

Sl.No	Total No of Students	placed		Higher Studies
		In the college	off Campus	
1	20	2	5	2

Sl No	USN	Name	Designation	company
1	1AH13BM025	Tejaswi Bhat	Biomedical Engineer trainee	Panacea Medical Technologies
2	1AH13BM021	Rohith	Apprentice Trainee	Panacea Medical Technologies
3	1AH13BM009	Dhatri	Sales & Service Engineer	OG Healthcare PVT LTD
4	1AH13BM013	Harsha P S	Biomedical Engineer	Sreedevi Hospital, Tumkur
5	1AH13BM012	Harsha L Singh	Application Specialist	GENWORKS HEALTH PVT LTD
6	1AH13BM006	Ashwini	Sales & Service Engineer	Kshema Medical technologies pvt.ltd
7	1AH12BM018	Mustaq Ahmed Reshi	IAS aspirant	
8	1AH13BM017	Prerana Prasad	Higher Studies	BMSCE
9	1AH13BM016	Prathibha	Higher Studies	PESIT
10	1AH13BM008	Deepak Samantha	Sales & Service Engineer	ABABIL

Overall Placement & Higher Studies Graph

	2011-15	2012-16	2013-17
Total	2	13	20
placed	1	8	7
Higher studies	1	1	3
Placed (%)	50	61.53846	35
Higher studies (%)	50	7.692308	15



7.4 Improvements in quality of students admitted to the program 2017-2018

Starting rank =23960

Ending Rank=115889

Average of all ranks= 57069.45

2016-2017

Starting rank =8348

Ending Rank =127047

Average of all ranks=57776.7

2015-2016

Starting rank =29129

Ending Rank=103520

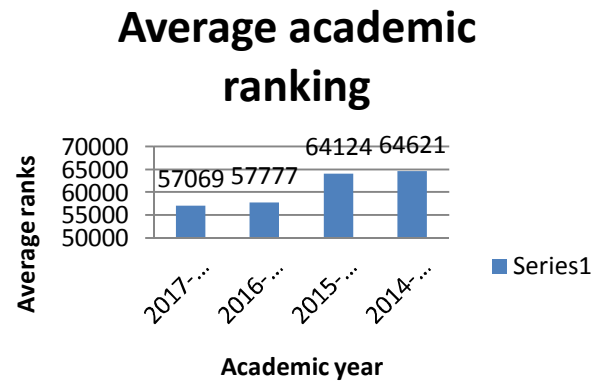
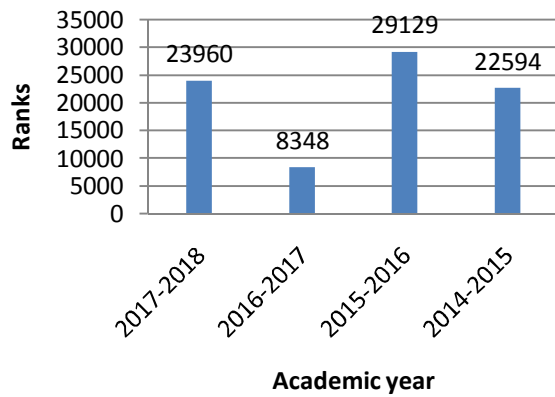
Average of all ranks=64123.6

2014-2015

Starting rank =22594

Ending Rank=121173

Average of all ranks=64620.7



CRITERION 9

STUDENT SUPPORT SYSTEMS

STUDENT SUPPORT SYSTEM

9.1 Mentoring System

- An effective Student mentoring system (SMS) has already been implemented in our college.
- All the students of the college are coming under this system from the date of joining the college.
- A complete track of the student activities like Academic, Curricular, Co curricular Extra Curricular achievements, Social activities and the details of Parent Meetings are registered in the system.
- A Mentoring Register has been distributed to all the staffs of the college .Each staff is allocated with 10- 15 students under the mentoring system.
- Faculties will have a meeting with the students periodically and their Academic progress and all his activities are discussed and noted in the register
- Any discrepancies in the student behaviour like Attendance , etc will be questioned and will be counseled with care
- Staff will be submitting the register to the high level Mentoring /Counseling committee with members like Head of the institution ,HOD
- The committees will scrutinize case by case and suggest corrective measures
- If necessary the committee will have discussions with the Parents and Medical Counselor

9.2. Feedback analysis and Rewards and Corrective Measures

Three types of Feedback system is followed

1. Direct Feedback from the Students

Every department have constituted Class Committees for Each semester with Staffs and student Members .Student members are invited to express their view on Subjects on the Academic Environment of the department and the feedback is collected by the chairman of the Committee and submitted to the HOD for further actions.

2. Interactive Feedback

Principal will be conducting interactive meeting only with the section of students regarding the Academic activities and collect the feedback from the students directly.

3. Consolidate Feedback

Feedback forms are circulated and collected from all students of the class collected

Various awards for the students based on the performance of the awards

Rewards

- College Toppers based on the academic performance
- Best outgoing Student award
- Department Toppers
- Certificate to Students having 100% Attendance
- Certificate to students securing topper in each subject

DEPARTMENT OF BIOMEDICAL ENGINEERING

9.3. Feedback on Faculties

9.3.1 INTRODUCTION

Feed back is taken through online from the academic year 2016-17 <http://campus.uno/>

Model feedback report taken during the academic year 2016-17

Feedback

Summary	2016-17 EVEN	6th Sem	AERONAUTICAL ENGINEERING	Go
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#	Faculty	Designation	Branch	Subject	Percentage
1	ELANGO VAN R R	PROFESSOR	AE SEMESTER VI - A	THEORY OF VIBRATIONS	76.06
2	Dhanya Prakash Babu	ASSOCIATE PROFESSOR	AE SEMESTER VI - A	ARICRAFT PERFORMANCE	74.39
3	Inamul Hasan	ASSOCIATE PROFESSOR	AE SEMESTER VI - A	APPLIED GAS DYNAMICS	67.00
4	Radha Krishnan	ASSOCIATE PROFESSOR	AE SEMESTER VI - A	AERO DYNAMICS 2	71.94
5	Archana.T	ASST. PROFESSOR	AE SEMESTER VI - A	STRUCTURES LAB	72.78
6	RANJAN H M	ASST. PROFESSOR	AE SEMESTER VI - A	PROPULSION LAB	66.94
			AE SEMESTER VI - A	FINITE ELEMENT ANALYSIS	64.17

Model feedback report taken during the academic year 2017-18

Feedback

Summary	2017-2018 ODD SEM	feedback after IA I	BIOMEDICAL ENGINEERING
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Summary
Details

Comments #	Faculty	Designation	Branch	Subject	Percentage
1	Prathibha T P	ASST. PROFESSOR	BME SEMESTER III - A	DIGITAL DESIGN AND HDL	100.00
			BME SEMESTER III - A	DIGITAL DESIGN AND HDL LAB	100.00
			BME SEMESTER V - A	MEDICAL PHUSICS	73.08
2	Vamsha Deepa N	ASST. PROFESSOR	BME SEMESTER V - A	FUNDAMENTALS OF SIGNALS & DSP	80.46
3	Surekha Nigudgi	ASST. PROFESSOR	BME SEMESTER III - A	ELECTRONIC INSTRUMENTATION AND MEASUREMENTS	100.00
			BME SEMESTER V - A	SIGNAL CONDITIONING AND DATA ACQUISITION LAB	81.92

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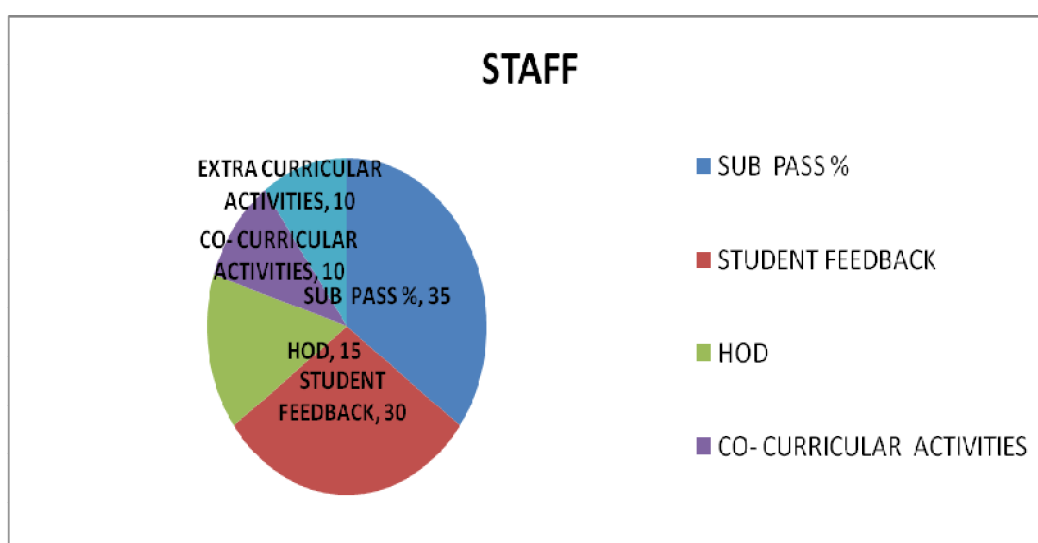
Staff appraisal report consists of the appraisal PERCENTAGE for the different entities of the College like Student, Staff and Vice Principals and the following feedback has been carried out

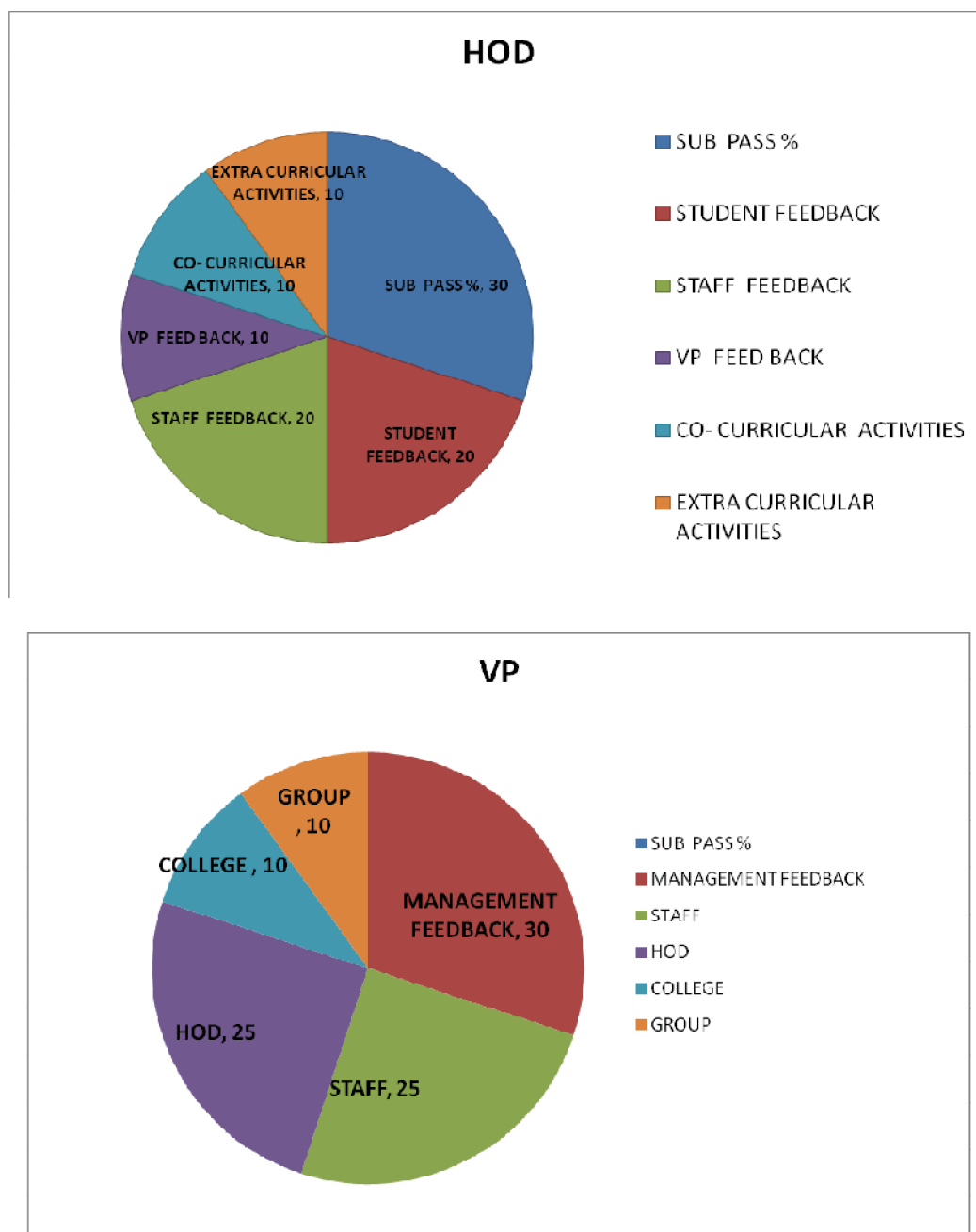
- 1) Student on Staffs
- 2) Staffs self appraisal (Department wise)
- 3) Staffs on HOD (Department wise)
- 4) Staffs on VPs Department wise on VP ADMIN VP ACADEMIC
- 5) HOD on staffs (Department wise)
- 6) HOD on VPs (Department wise)
- 7) VP's on HOD (VP ADMIN,VPACADAMIC)

9.3.2.0 Methodology of Appraisal

Based on the feedback forms carried out following methodology is adapted

Table-weight age matrix							
Category	Sub pass %	Student feedback	HOD	Co-curricular activities	Extra curricular activities		Total
Staff	35	30	15	10	10		100
Category	Sub pass %	Student feedback	Staff feedback	Vp feedback	Co-curricular activities	Extra curricular activities	
HOD	30	20	20	10	10	10	100
Category	Sub pass %	Management feedback	Staff	Hod	College	Group	
VP		30	25	25	10	10	100





9.4. Self Learning

- Wi-Fi enabled campus
- Internet access to all the computers for the benefit of students.
- Edusat Program from the university.
- Projects, Internship Modeling Webinar, Video conferring Edusat, NPTEL materials
- Accession of Journals
- Newspaper of major languages
- Open Book Test
- e-notes for all subjects of all Department
- Digital Library

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9.5 Carrier Guidance, training and Placement

Date	Sl. no	Branch/Institution	Company Name	Activity	Remarks
4/9/2015	1	Purvankara	Sherphify	Seminar 1st year students	The seminar was very informative to the students, as the students had access to get in touch with the top employers and various study materials about the employable skills.
10/9/2015	2	MGIRD	Communication Skills	Seminar 2nd year students	The seminar was very informative to the students, as we have explained the importance of Communication skills in the industries.
11/9/2015	3	NASSCOM-iPrimed	Sherphify	Seminar 3rd & 4th year students	The seminar was very informative to the students, as the students had access to get in touch with the top employers and various study materials about the employable skills.
12/9/2015	4	MGIRD	NIIT	Seminar on Industries prerequisite skills	Good and students were eager to take up the aptitude test.
15/09/2015	5	Larsen&Toubro	IOS Creative Infotech	Introduction on Prototyping and Apple application development programme affiliated with VTU.	Students were happy and wanted to take up further test on Prototyping as it's a basic requirements demanded the companies to build/work on a project.
16/09/2015	6	KPTCL	-	Soft Skills	Bhagya:-Deployed soft skills program on Importance of Communication skills
22/09/2015	7	KPTCL	IOS Finishing School	Certificate program conducted by IOS Finishing School/VTU on Prototyping	This certification program was informative also; added more value to the profile.
29/09/2015	8	KPTCL	ICFAI Business School	Seminar on Industries prerequisite skills & Aptitude test	The seminar was very informative to the students, as the students were able to get an idea of the industries requirements.
23/09/2015 to 3/10/2015	9	Larsen & Toubro	Soft Skills Training Program	Conducted 2 hours seminar on Soft skills " Importance of Communication skills/ Time Management/Critical	The students were very happy and wanted more classes on soft skills regularly.

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				thinking/ Creativity/ Documentation.	
12/10/2015	10	Larsen & Toubro	Soft Skills Training Program	Importance of Time Management for 1st year and 2nd year students	
13/10/2015	11	KPTCL	Soft Skills Training Program	Critical Thinking for final year students	
15/10/2015	12	Toonmedia-Free-Japanese Language training program	Soft Skills Training Program	Creativity for 2nd year students	
16/10/2015	13	Reddonatura	Soft Skills Training Program	Group Discussin on Current Affairs for final year students	
20/10/2015	14	IBS(ICFAI Business School)	Soft Skills Training Program	Points to be discussed during the HR rounds for Final Year students	
6/11/2015	15	Aseuro Technologies	Yellamma Dassapa Institution of Technology	Campus Recruitment	Met Mr. Ramesh Rao, requested for an invite our students for campus drive, said that the next drive will happen only in the month of Jan 2016, he'll keep us posted on the same.
7/11/2015	16	Aseuro Technologies	Seven Sense	Conducted 1 hour seminar on importance of knowing the bridge between the institutions and industries	Students were happy and wanted to take up more sessions on this aptitude test etc.
7/11/2015	17	Larsen & Toubro	Seven Sense Aptitude Test	Rajeev from Seven Sense: Conducted 1 hour Aptitude test at CS lab with 40 students were present for the test	Students were happy and wanted to take up more of aptitude test etc.
9/11/2015	18	KPTCL	T&P Initiative	Soft Skills Training Program on Communication skills for 1st Year students	Students were happy and wanted to take up more of aptitude test etc.
13/11/2015	19	Ind Expo (Karnataka CNC Tech Pvt Ltd- Rajajinagar	T&P Initiative	Off Campus Recruitment	SJBIT

DEPARTMENT OF BIOMEDICAL ENGINEERING

		-Bangalore-10)			
13/11/2015	20	ATS ELGI Industrial Sales Corporation	T&P Initiative	Soft Skills Training Program on Effective communication skills for 3rd Year students	Students were happy and wanted to take up more of sessions based on the market requirements.
14/11/2015	21	ARK Industries Singasandra Village, Begur Hobli, Bangalore South	Ashwini(HR & marketing)	Informed that they will inform about the number of candidates list in another 15days for their new project starting up shortly.	Students required from CV, ECE & EEE
14/11/2015	22	Comtron Electric(India) Jayanthi Nagar post, Bangalore-43	Sunil	Informed that they will inform about the number of candidates list in 4days for the internships and MoU's will be signed accordingly.	Students required from CV.
30/11/2015	23	Sri Vigneshwara Enterprises Rajajinagar Industrial town, Bangalore-44	Dr.Shobha Anand Reddy/ Senior Faculty	Was OK with the MoU draft and agreed to sign the MoU on 4 th Dec 2015	
1/12/2015	24	Prithvi Chemical Manufacturing Co. Pvt Ltd KSSIDC Industrial Area, Tumkur Dist-572168	Mr. Mukund Jhunjhunwala, Business Head, Operations, iPRIMED Educations Solutions,/ Mr. Santosh Abraham, Associate VP, NASSCOM Foundation, Bangalore, NAVIN KUMAR-CEO iprimed	Requested to run the Aricent Employability program at ACS College of Engineering from Feb 2016 till Mar 2016 followed with On Campus Drive in the month of April 2016 for ECE, BME and CSE departments.	In collaboration with NASSCOM and NSDC and NO's
4/12/2015	25	KASSIA Magadi Chord Road,	Executive Director-Dr.Shobha Anand Reddy	Signed MoU for 1 year	

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		Vijayanagar Bangalore-40 Small scale industries association			
8/12/2015	26	QUALIDE LS Andhrhalli Main Road, Near Peenya 2nd stage, Bangalore-91	GE. Vasanth Kumar	Redirected to Head office Kumarakrupa Road Bangalore for further Approval.	
10/12/2015	27	SECO Smart Technologies Authorised Distributers for SECO Make Cutting Tools & Accessories	Mr. Girish Rajarajeshwari Nagar	Recommended to meet AE maintenance Rajajinagar	
14/12/2015	28	JAYALAK SHMI POLY PACKS PVT LTD Manufacturers of Plastic Speciality Polyfilms & Allied Packaging Products	Mr. Girish Rajarajeshwari Nagar	Recommended to meet the chief Engineer at Anand Rao Circle	
15/12/2015	29	TIDE Technology Informatics Design Endeavour	Mr. Raghupathi.	Submitted the written application at the dispatch and gave the acknowledgement and asked to revisit after 4days.	
17/12/2015	30	KSIC A Government of India Enterprise	Sujitha	Requested to meet the HR head directly at Kumarakrupa Road	

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18/12/2015	31	MSME	Shiva Kumar Asst HR	Accepted the letter and informed to follow-up on Friday, since the HR head Mr. Vikasranjan is on vacation.	
18/12/2015	32		CE-transmission Zone/ Mrs. Mythili EE	Advised to Informed the number of students attending the industrial tour along with the specified date asked to contact the HRD-Training at Hoody for guest lecture.	
19/12/2015	33		Mr.B.G.Sreedhara	Proposed for Japan Desk, need to speak to the management about the same to take further decision.	
28/12/2015	34		Aayush Gupta	Intrested in EEE branch students, and would let us know in the near future.	
30/12/2015	35		Lima Sadhukhan	Requested to deploy industry specific training program, would be scheduled shortly.	
8/1/2016	36		Sandeep.C	Requested to organize a campus drive at ACS College of Engineering	
13/01/2016	37		Sandeep.C and team	Conducted Campus drive a ACS College of Engineering. 3students got selected for final round of interview and 1 got selected for the HR round, which is shortly to be scheduled at the clients site.	
14/01/2016	38		Sujisha (HR)	Informed that they have listed college on which they choose to permit for project works as well as campus drives and will get back if our college is	

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				been shortlisted.	
18/01/2016	39		Mr.Balachandra PS	Submitted the Xerox of the written application and requested to do the needful at the earliest. permitted to visit the station on 10th Feb 2016, got the confirmation letter to visit the Somanahalli industry visit.	
20/01/2016	40		Venkatesh R	Invited for Campus drive	
20/01/2016	41		Umesh B A	Introduced the ACS College of Engineering (Company is interested to hire ME & Automobile students)	
20/01/2016	42		Shashikiran KR	Introduced the ACS College of Engineering (Company is interested to hire ME students in future)	
20/01/2016	43		Suhail Ahmed.S	Introduced the ACS College of Engineering and requested to come for campus drive.	
21/01/2016	44		J.S Babu SS Fabrication, Boilers, Tig Welding, Railings, SS & Aluminium 3D Letters	Introduced the ACS College of Engineering (Company is interested to hire CVE students in future)	
21/01/2016	45		Ashwin D.Acharya	Introduced the ACS College of Engineering (Company is interested to hire All the branches)Dropped and email requesting for a campus drive	

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21/01/2016	46		Praveen.B Chair man	Introduced the ACS College of Engineering (Company is interested to hire All the branches)Dropped and email requesting for a campus drive	
21/01/2016	47		Ravikiran Kulkarni CEO	Introduced the ACS College of Engineering (Company is interested to hire ME students)	
21/01/2016	48		Suresh.S	Introduced the ACS College of Engineering (Company is interested to hire AE students)	
25/01/2016	49		Vinod Kumar S.B Marketing Head	Introduced the ACS College of Engineering (Company is interested to hire ME students)	
25/01/2016	50		Malleswaram Bangalore-03	Introduced the ACS College of Engineering and requested to come for campus drive.	
28/01/2016	51		Ravi Oran Asst.Manager	Introduced the ACS College of Engineering and requested to come kfor campus drive.	
28/01/2016	52		Devaraj.K MSME Development Institute Ministry of Micro, Small& Medium Enterprises. Rajajinagar- bangalore-10	Introduced the ACS College of Engineering and requested to provide the data of the SME, need to visit to collect the data in 2nd week of Feb 2016.	
1/2/2016	53		Purushotham.BV Fully Loaded Training Faculty	Introduced and requested to started the training since 2nd Feb 2016.	
3/2/2016	54		Lokesh.S Soft Skill trainer	Deployed soft skills programs based on Industry specific	



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				knowledge.	
2/2/2017	55		Kemsys	Campus Recruitment	
6/2/2017	56		Portea Medical	Campus Recruitment	
8/2/2017	57		Wurth Electronik	Campus Recruitment	
14/2/2017	58		Artech Infosystems	Campus Recruitment	
16/2/2017	59		Qspiders	Campus Recruitment	
23/02/2017	60		Cranes Software	Campus Recruitment	
1/3/2017	61		PRDC	Campus Recruitment	
9/3/2017	62		Oracle	Campus Recruitment	
14/03/2017	63		Xplore Information Technology	Campus Recruitment	
14/03/2017	64		Hyundai Polytech	Campus Recruitment	
14/03/2017	65		United Industries	Campus Recruitment	
17/03/2017	66		Hinduja Global Solutions	Campus Recruitment	
20/03/2017	67		Tech Mahindra	Campus Recruitment	
24/03/2017	68		VIT Infotech	Campus Recruitment	
27/03/2017	69		HP Inc.	Campus Recruitment	
30/03/2017	70		SRIT - Dubai	Campus Recruitment	
4/4/2017	80		JusPay	Campus Recruitment	
10/4/2017	81		Park Control & Communications	Campus Recruitment	
19/04/2017	82		Accenture through eCentric	Campus Recruitment	
21/04/2017	83		TCi Tech	Campus Recruitment	
22/04/2017	84		HP Inc. through Fidelis	Campus Recruitment	
27/04/2017	85		PneumoCare Health Pvt. Ltd.	Campus Recruitment	

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5/5/2017	86		Sedin Technologies	Campus Recruitment	
10/5/2017	87		Quinnox Consultancy	Campus Recruitment	
12/5/2017	88		Elintlabz	Campus Recruitment	
15/05/2017	89		iBridge	Campus Recruitment	
16/05/2017	90		IBM (through Collabera)	Campus Recruitment	
18/05/2017	91		Acuvate Software	Campus Recruitment	
18/05/2017	92		HP Inc.	Campus Recruitment	
5/7/2017	93		Quinnox Consultancy	Campus Recruitment	
10/7/2017	94		Trigent Software	Campus Recruitment	
12/7/2017	95		Chubba - A Wipro Company	Campus Recruitment	
14/07/2017	96		Nichi-in Softwatre	Campus Recruitment	
20/07/2017	97		Organge Business Services	Campus Recruitment	
3/8/2017	98		Ruckus Wireless	Campus Recruitment	
5/7/2017	99		Eneffen Technologies	Campus Recruitment	
2/8/2017	100		Pathfront	Campus Recruitment	
18/08/2017	101			Training	
31/08/2017	102		ASK Training Services	Training	
3/9/2017	103		Talentio	Training	
11/9/2017	104		Capgemini	Campus Recruitment Drive	
16/09/2017	105			Training	
18/09/2017	106		IDP	Career Guidance	
18/09/2017	107		Mphasis	Campus Recruitment Drive	
23/09/2017	108		Codilar Technologies	Pool Campus Drive	

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26/09/2017	109		Wissen Infotech	Campus Recruitment Drive	
6/10/2017	110		V - Tiger	Pool Campus Drive	
9/10/2017	111		Westline Shipping	Campus Recruitment Drive	
13/10/2017	112		HireMee	Online Assessment	
14/10/2017	113		BEACON India Pvt Ltd	Pool Campus Drive	
1/11/2017	114		CAE Worldwide	Off Campus Drive	
2/11/2017	115		Hindustan Unilever	Training	
7/11/2017	116		Qspiders	Training	
9/11/2017	117		Elintlabz	Pre placement Talk	
9/11/2017	117		Elintlabz	Internship Drive	
11/11/2017	119		Qspiders	Campus Recruitment Drive	
15/11/2017	120		JTP	Online Assessment	
22/11/2017	121		Directi Internet Services	Campus Recruitment Drive	

9.6 Entrepreneurship Cell

Entrepreneurship cell is established at ACS College of Mechanical Engineering and various events was organized to know the importance of being an entrepreneur and ways to get financial assistance to become an entrepreneur and at present **Entrepreneurship Awareness** programme is going to be organized between 18-20th February 2016 to create awareness to the faculty and students

9.7. Co-Curricular and Extra-Curricular Activities

1. Extra-Curriculum Activities

Sl.No	Events
1.	Rangoli
2.	Poetry Writing
3.	Sudoku
4.	Mehendi
5.	Essay Writing (English/Kannada)
6.	Debate (English/Kannada)
7.	Quiz
8.	Pick N Speak (English/Kannada)
9.	Pot Painting
10.	Sketching
11.	Cooking without fire
12.	Painting
13.	Dumb Charades
14.	Anthakshari
15.	Collage

3. Sports Facilities:

Sports Club

International Cricket Ground

Gymnasium

Foot Ball Ground

Basket Ball Ground

Volley Ball Court

Recreation Room

1. Chess
2. Carrom
3. Table Tennis

Swimming Pool

Criterion 10 Governance, institutional support & financial resources

10.1.2 GOVERNING BODY

10.2.1. List of Governing Council Members for the year 2015-2016

Sl.No	Name	Qualification	Designation
1	Sri. A. C. Shanumugam Founder, MCET	B. A., L L.B.,	Chairman
2	Dr. P.T. Manoharan Former Vice-Chancellor, University of Madras, Chennai	Ph. D	Advisor & Member
3	Sri A.C.S ArunKumar, Vice chairman, Rajarajeswari Group of Institutions	B.Tech(Honors) MBA	Member
4	Prof. Venkatachalappa .M Former Prof & Head, Dept of Maths, Central College, Bangalore	Ph. D	Advisor & Member
5	Prof R.M Vasagam Former Vice Chancellor, Anna University, Chennai	Ph. D	Advisor & Member
6	V.T.U Nominee	Ph. D	VTU Nominated Member
7	Mr. Sundramoorthy Former Scientist ISRO & Mission Director Indian Commn Satellite System, Bangalore		Member
8	Prof R.Elangovan Prof & HOD of Aeronautical Engg, ACSCE, Bangalore, Bangalore	ME	Member
9	Dr Ramesh Unni Krishnan Director cum Regional Officer, AICTE, South Western Region, Bangalore	Ph. D	AICTE Nominee & Member
10	Prof. H.U. Talwar DTE, Govt. of Karnataka, Bangalore	ME	Member
11	Dr. Dr. Punal M Arabi Professor & Head, Dept. of Bio-Medical Engg., ACS College of Engineering, Bangalore.	Ph. D	Ex-Officio Member Secretary & Principal
12	Dr.M.S.Murali Principal, ACSCE, Bangalore	Ph. D	Faculty Nominee & Member

10.2.2. List of Governing Council Members for the year 2016-2017

Sl.No	Name	Qualification	Designation
1	Sri. A. C. Shanumugam Founder, MCET	B. A., L L.B.,	Chairman
2	Dr. P.T. Manoharan Former Vice-Chancellor, University of Madras, Chennai	Ph. D	Advisor & Member
3	Sri A.C.S ArunKumar, Vice chairman, Rajarajeswari Group of Institutions	B.Tech(Honors) MBA	Member
4	Prof. Venkatachalappa .M Former Prof & Head, Dept of Maths, Central College, Bangalore	Ph. D	Advisor & Member
5	Prof R.M Vasagam Former Vice Chancellor, Anna University, Chennai	Ph. D	Advisor & Member
6	V.T.U Nominee	Ph. D	VTU Nominated Member
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9	Dr Ramesh Unni Krishnan Director cum Regional Officer, AICTE, South Western Region, Bangalore	Ph. D	AICTE Nominee & Member
10	Prof. H.U. Talwar DTE, Govt. of Karnataka, Bangalore	ME	Member
11	Dr. Dr. Punal M Arabi Professor & Head, Dept. of Bio-Medical Engg., ACS College of Engineering, Bangalore.	Ph. D	Ex-Officio Member Secretary & Principal
12	Dr.M.S.Murali Principal, ACSCE, Bangalore	Ph. D	Faculty Nominee & Member

10.2.3. List of Governing Council Members for the year 2017-2018

Sl.No	Name	Qualification	Designation
1	Sri. A. C. Shanumugam Founder, MCET	B. A., L L.B.,	Chairman
2	Dr. P.T. Manoharan Former Vice-Chancellor, University of Madras, Chennai	Ph. D	Advisor & Member
3	Sri A.C.S ArunKumar, Vice chairman, Rajarajeswari Group of Institutions	B.Tech(Honors) MBA	Member
4	Prof. Venkatachalappa .M Former Prof & Head, Dept of Maths, Central College, Bangalore	Ph. D	Advisor & Member
5	Prof R.M Vasagam Former Vice Chancellor, AnnaUniversity, Chennai	Ph. D	Advisor & Member
6	Dr.B.Manjunath, Principal & Academic senate New Horizon college of Engineering, Bangalore	Ph. D	VTU Nominated Member
7	Mr. Sundramoorthy Former Scientist ISRO & Mission Director Indian Commn. Satellite System, Bangalore		Member
8	Prof R.Elangovan Prof & HOD of Aeronautical Engg, ACSCE, Bangalore, Bangalore	ME	Member
9	Dr Ramesh Unni Krishnan Director cum Regional Officer, AICTE, South Western Region, Bangalore	Ph. D	AICTE Nominee & Member
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11	Dr. Dr. Punal M Arabi Professor & Head, Dept. of Bio-Medical Engg., ACS College of Engineering, Bangalore.	Ph. D	Ex-Officio Member Secretary & Principal
12	Dr.M.S.Murali Principal, ACSCE, Bangalore	Ph. D	Faculty Nominee & Member

10.1.2 Administrative Set-up:

We at ACSCE believe in FAMILY KIND of work culture. Basically it aims at love and affection to each and every stake-holder of the institute. In particular, the concept of process owners, which facilitates a perfect decentralization of activities and delegation of authorities, has proven itself to be a key concept in the success achieved by the institute on different counts. The working methodology basically a student centric, which is the dearest and highly responsible element of the system.

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Involvement of each and everyone in the decision-making at their respective levels is ensured through decentralization and delegation of powers. Hence there are various institutional committees consisting of faculty and staff members. Transparency associated therein also forms an important feature of the work culture. This is done through an institutional rule book and code of conduct document which is easily accessible by any one as the copies are available in the library, with the HODs and the Principal.

The institute functions with perfect decentralized administration as depicted in Figure 1 that has complete transparency in the decision making process.

Functions of Key Administrative Positions:

The functions of various key positions are depicted in Table below.

Position	Functions
Governing Council	<ul style="list-style-type: none"> • Frame directive principles and policies • Amend and approve policies from time to time • Approve budgets
Chairman/Chairman Rep i.e., Executive Director	<ul style="list-style-type: none"> • To look after the overall development of the institute • Mobilize external resources to strengthen the institute • Plan & provide for necessary facilities / equipments for development • Instill confidence and devotion in every member of the institute
Principal	<ul style="list-style-type: none"> • Design & define organization structure • Define & delegate responsibilities of various positions in the organization • Ensure periodic monitoring & evaluation, of various processes & sub- processes • Ensure effective purchase procedure • Define quality policy and objectives • Prepare annual budget • Conduct periodic meeting of various bodies such as Governing Council, LMC, Standing Committee and Grievances Redressal Committee etc • Manage accounts and finance • Employee recruitment process • Office Administration • Compliance with AICTE, DTE & University • Admission • Resource Generation • Internal and External examinations • Library Up gradation
Vice- Principal	<ul style="list-style-type: none"> • To discharge routine duty of Principal during absence of Principal • Annual Magazine • Resource Provision • Transport • Alumni interaction

DEPARTMENT OF BIOMEDICAL ENGINEERING

	<ul style="list-style-type: none"> • Housekeeping including hostels • Prepare and execute academic calendar • Oversee the teaching-learning process • Carry out result analysis and submit corrective measures to Principal • Initiate supplementary teaching measures • Co-curricular activities • Formation of student council • Cultural activities • Sports activities • Student discipline • Student health care • Student orientation
I/C Quality Management System and Estate	<ul style="list-style-type: none"> • QMS coordination as MR • Establish, implement and maintain quality management system • Arranging internal audits and MRM • Maintain up-to-date master documents with history of revision. • Oversee Employee Attendance System & Maintain the monthly attendance report • Maintaining updated building plans • Overall building maintenance
Public Relations Officer	<ul style="list-style-type: none"> • Propose admission policy • Arrange campaign • Execute the admission process • Design and print admission brochure • Maintain and update college website • Maintain softcopy of photographs • Publicity of events
I/C Alumni Association	<ul style="list-style-type: none"> • Formation of student council (SC) • Arrange periodic meetings of SC • Ensure alumni registration • Prepare alumni news letter • Arrange meet • Proposing annual budget
I/C Workshop	<ul style="list-style-type: none"> • Smooth running of college workshop • Preparing Material Requirement • Oversee the routine work • Oversee the college bus service • Oversee the generator facility
I/C Employee Development Cell, Training Officer	<ul style="list-style-type: none"> • Identifying training needs of employees • Notify the employees about various Employee Develop programmes • Arrange Employee Development Programmes • Maintain training records
Administrative Officer	<ul style="list-style-type: none"> • Liaisoning with AICTE, DTE and University • College roster • Service Books

DEPARTMENT OF BIOMEDICAL ENGINEERING

	<ul style="list-style-type: none"> • Faculty personal files • Recruitment process • Maintain minutes of meeting (all) • New proposals • Co – ordinate day to day activities of office • Purchase process • AICTE, DTE, SU committee preparation • Annual College budget • Shikshan Shulka Samiti requirements
Placement Officer	<ul style="list-style-type: none"> • Liaison with industry • Student Training and Placement • Identify and provide for training needs of students • Arrange campus interviews • Proposing annual T & P budget
I/C Library	<ul style="list-style-type: none"> • Plan and execute modus operandi of routine activity of the library • Plan and propose expansion / development • Maintain library discipline and culture • Prepare annual budget for library
I/C Counseling Cell	<ul style="list-style-type: none"> • Facilitate career guidance to students • Assist students suffering from psychological disorders • Arrange for professional counselors • Maintain record of counseling activities • Student academic counseling • Provide slow-pace programme for weaker students • Arrange remedial classes for weaker students
I/C Monitoring Cell	<ul style="list-style-type: none"> • Central time table • Monitoring of lectures and practical • Conduction of internal examinations • Students feedback • Collective attendance of students • Co-ordinate the activities of class teachers • Submission of term work and POE mark lists
I/C Student Professional Activities	<ul style="list-style-type: none"> • Organize events through students professional societies / chapters • Organize paper and design contests • Encourage student participation • Publication of technical magazine and news letters • Record of student participation and achievements in Co-curricular and extra – curricular activities • Maintain record of such events
I/C Gymnasium/ Sports	<ul style="list-style-type: none"> • Ensure smooth conduct of sports • Ensure proper use of gym • Purchasing of sport items • Encourage students to participate in zonal tournaments • Creation and upkeep of sports facilities • Proposing annual budget

DEPARTMENT OF BIOMEDICAL ENGINEERING

Head of Departments	<ul style="list-style-type: none">• Plan and execute academic activities of the department• Maintain discipline and culture in the department• Maintain the department neat and clean• Pick and promote strengths of students / faculty / staff• Monitor academic activities of the department• Propose Department Budget• Adhere to QMS Procedures• Maintain records of departmental activities and achievements
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10.1.2.3 Define Rules, Procedures, Recruitment and Promotional Policies, etc.,

- The rules and policies regarding recruitment and promotion are as per AICTE and Moogambigai Charitable and Education Trust (MCET).
- The AICTE pay scales are implemented periodically.
- Additional increments are given to staff members who excel in academics and research.

Recruitment Procedure:

- **Advertisement:** In leading News Papers requesting the eligible candidates as per AICTE norms to apply within a given time to the Principal.
- **Applications:** The applications along with the Resume and supporting documents will be collected at the office of HR, RRG, Bangalore.
- **Listing:** After the applications are received, a list will be prepared highlighting the eligibility, Qualification and experience.
- **Merit List:** Will be prepared as per the requirements of the individual department.
- **Expert Body:** An expert panel consisting of Special officer, Principal, HOD, subject expert and a University nominee will be formed.
- **Call Letters:** Eligible Candidates will be called for interview.
- **Interview:** Discussions with the candidates to know their potentials, strengths, teaching skills etc., will be conducted.
- **Selection:** Based on the performance and requirement, selection list in the order of merit will be prepared.
- **Orders:** Appointment orders are issued to selected candidates.
- **Duty report:** Selected Candidates should report to the duty on or before the given time.

10.1.3 GRIEVANCE REDRESSAL SYSTEM

Grievance Redressal Cell headed by **Dr. M.S. Murali** shall meet within a week from the date of receipt of any petition/complaint from anybody and take necessary action as deem fit and initiate necessary action for solving problem.

Grievance Redressal Committee for every academic year at ACSCE is reconstituted as under consequent on relocation of some of the faculty members.

DEPARTMENT OF BIOMEDICAL ENGINEERING

GRIEVANCE REDRESSAL COMMITTEE FOR ACADEMIC YEAR 2017-18

Sl No	Name	Designation
1.	Dr. M.S. Murali	Chairman
2.	Prof. R.R. Elangovan	Convener
3.	Dr.P.M.Suresh	Representative of Faculty
4.	Dr. Siddesha. H.S	Student Welfare Officer
5.	Respective Head of Departments	Representative of Faculty
6.	Mrs. Kavitha S	Representative of Staff
7.	Mr. Devaiah	Student Representative
8.	Ms. Rajashree	Student representative

GRIEVANCE REDRESSAL COMMITTEE FOR ACADEMIC YEAR 2016-17

Sl No	Name	Designation
1.	Dr. M.S. Murali	Chairman
2.	Prof. R.R. Elangovan	Convener
3.	Dr.P.M.Suresh	Representative of Faculty
4.	Mr. Siddesha. H.S	Student Welfare Officer
5.	Respective Head of Departments	Representative of Faculty
6.	Mrs. Kavitha S	Representative of Staff
7.	Mr. Shiva Prasad	Student Representative
8.	Ms. Mangala K	Student representative

DEPARTMENT OF BIOMEDICAL ENGINEERING

GRIEVANCE REDRESSAL COMMITTEE FOR ACADEMIC YEAR 2015-16

Sl No	Name	Designation
1.	Dr. M.S. Murali	Chairman
2.	Prof. R.R. Elangovan	Convener
3.	Mrs. Vanishree Moji	Representative of Faculty
4.	Mr. Siddesha. H.S	Student Welfare Officer
5.	Respective Head of Departments	Representative of Faculty
6.	Mrs. Usha. M	Representative of Staff
7.	Ms. Dhanya G	Student Representative
8.	Mr. Riyaz Ali Durani	Student representative

Anti-Ragging Committees for the academic year 2017-18:

The following team members are informed to act members of Anti- ragging group. Group members are informed to make surprise visits as per the schedule given below and one of the team members are requested to write a brief report after Inspection in the register. These groups are formed to prevent and to curb the menace of Ragging.

1. ANTI RAGGING COMMITTEE: (To Monitor in both in Morning & Evening)

Sl. No.	Name of the Member	Designation	Contact No
1.	Prof. R.R.Elangovan	Professor	9176602009
2.	Dr.H.B.Bhuvaneshwari	Professor	9845052590
3.	Prof.A.M.Prasanna Kumar	Associate Professor	8867590052

DEPARTMENT OF BIOMEDICAL ENGINEERING

ANTI RAGGING SQUADS (Lunch Break) Canteen, Campus, Classrooms, Library

Sl. No.	Name of the Member	Designation	Contact No
1.	Dr.M.Eswaramoorthy	Professor	8762085909
2.	Dr. Mukesh	Asso.Prof	9442288700
3.	Mr. Krishna Kumar.A	Asst.Prof	9739935544

DEDICATED CADRE OF WARDEN: Visit to Canteen, Campus, Classrooms, Hostel

Sl. No.	Name of the Member	Designation	Contact No
1.	Mr. N.A.Surendra	Hostel Warden	9900030927
2.	Mrs. Chitrakala	Hostel Warden	9900026015

PROFESSIONAL COUNSELOR: (Evening around 3 Pm) Visit to Canteen , Campus, Classrooms

Sl. No.	Name of the Member	Designation	Contact No
1.	Mr. A.M. Prasanna Kumar	Professor	8867590052
2.	Dr. H B Bhuvaneshwari	Professor	9448793156
3.	Dr. Anitha B S	Professor	9900218000
4.	Mrs. Sunitha Chalageri	Professor	9916099905

DEPARTMENT OF BIOMEDICAL ENGINEERING

In addition to the committees or bodies presented above, the college has the following Non-statutory committee

Sl. No	Committee	Headed By
1	Academic	Dr. M S Murali
2	Sports	Dr.C.S.Pillai
3	Cultural	Prof.Srinidhi Acharya
4	Placement	Ms. Ramya
5	Library	Dr. R.Siva subramaniyam
6	Hostel and canteen	Dr. C.S. Pillai
7	Transport	Mr. M.S Shivakumar
8	College Day	Prof.Hemanth
9	Student Welfare	Prof.A.M. Prasanna Kumar
10	Magazine	All Department Heads
11	Drug Abuse	Dr. H L Venkatesh Babu
12	Co-operative	Mr. Sanjeev kumar
13	Seminar	Dr.Mathivanan R
14	Workshop	Dr.T.Senthil kumar
15	Conference	Dr.Sanjeev Gadag
16	Promotion of Brand image	Dr. C.S. Pillai
17	Parent/Relation	All Department Heads
18	Disciplinary	All Department Heads
19	ISTE	Dr. Suresh R
20	EDUSAT Programme	Prof. A. M. Prasanna Kumar
21	Alumni Association	Prof. Dhanyaprakash R Babu
22	Media Co-ordinator	Dr.Mareswari R
23	NSS Co-ordinator	Dr. M.S. Shivakumar
24	Mentoring of Student Welfare	Respective Mentors
25	Counselling	Dr.B.S.Pradeep
26	Research Development	Dr. Eswaramoorthy M
27	Project Exhibition	All Department Heads
28	Estate Officer	Mr. Athipathiraj
29	NBA	Dr.R.Siva subramaniyam
30	ISO	Prof. Anand H
31	Purchase	All Department Heads
32	Journal	Mr. Ravikumar .N
33	Chairman's Vision <ul style="list-style-type: none"> • Incubation Centre • Software Development Cell • Energy Park 	Vice Principal (Academic,Admin)
34	LIC/AICTE Coordinators	Prof. Krishna Kumar A
35	Industry Institution Interaction Cell	Dr.Suresh P M
36	Red Cross	Prof. Lokanadham M
37	GD Cell	Dr. C.S. Pillai

DEPARTMENT OF BIOMEDICAL ENGINEERING

38	Attendance/ Class Teaching of Every Class/ Student Progress Communication	Individual Faculties
39	a) Cultural Club	Prof. Hemanth
	b) Heritage Club	Dr. M S Shivakumar
	c) Sports Club	Dr. R. Siva subramaniyam
	d) Green Club	Mrs. Indumathy V
	e) Creative Club	Mrs. Jyothi Metan
	f) Innovation Club	Mr. Prasad
	g) Yoga Club	Dr. C.S. Pillai
	h) Cricket Club	Prof. Sivasankar P

10.1.4 Delegation of financial power

S.no	Designation	Limit to sanction
1	Principal	2,00,000
2	Hod's	5,000

List of faculty members who are administrators/decision makers for various assigned jobs:

Sl. No.	Name	Position
1	Dr. S Vijay Anand	Executive Director
2	Dr. M. S.Murali	Principal
3	Dr.H S Siddesha	Head of Department –Mechanical Engineering
4	Dr.H L Venkatesh Babu	Head of Department –Civil Engineering
5	Dr.Punal M Arabi	Head of Department –Biomedical Engineering
6	R R Elangovan	Professor-Aeronautical Engineering
7	Dr.Bhuvaneshwari H B	Head of Department – Electronics & Communication
8	Dr. B S Pradeep	Head of Department – Computer Science & Engineering
9	Dr.Saravanan N	Head of Department – Electrical Engineering
10	Dr. C S Pillai	Head of Department – Basic Sciences
	Prof.Dhanyaprakash R Babu	In-Charge, Alumni Association
11	Dr.Eswaramoorthy M	Central Research Lab Head
12	Dr.T.Senthil kumar	Central Research Lab Head
13	Dr.R.Siva subramaniyam	NBA, VTU Coordinator
14	Dr.R.Mathivanan	NAAC Coordinator
15	Prof.Anand M H	ISO Coordinator
16	Anti-Ragging	Dr. M. S.Murali

DEPARTMENT OF BIOMEDICAL ENGINEERING

Anti-Ragging Committees for the academic year 2016-17:

1. The following team members are informed to act members of Anti- ragging group from 1.8.2014
2. Group members are informed to make surprise visits as per the schedule given below and one of the team members are requested to write a brief report after Inspection in the register. These groups are formed to prevent and to curb the menace of Ragging.

ANTI RAGGING COMMITTEE: (To Monitor in both in Morning & Evening)

Sl. No.	Name of the Member	Designation	Contact No
1.	Prof. A.M.Prasanna Kumar	Vice Principal	8867590052
2.	Mrs. Kavitha.R.J	Asso Prof	9448934042
3.	Mrs. Usha.M	Asst. Prof.	9739351724

ANTI RAGGING SQUADS (Lunch Break) Canteen, Campus, Classrooms, Library

Sl. No.	Name of the Member	Designation	Contact No
1.	Dr. M.Eswaramoorthy	Professor & HOD	9964144757
2.	Dr. Mukesh	Asso. Prof.	9442288700
3.	Mr. Krishnakumar.A	Asst. Prof	9739935544

DEDICATED CADRE OF WARDEN: Visit to Canteen, Campus, Classrooms, Hostel

Sl. No.	Name of the Member	Designation	Contact No
1.	Prof. R.R.Elangovan	HOD	9176602009
2.	Dr. Muruganandham A	Professor	9443825711
3	Mr. Sunil Raj	Asst. Prof.	9844752319

DEPARTMENT OF BIOMEDICAL ENGINEERING

**PROFESSIONAL COUNSELOR: (Evening around 3 Pm) Visit to Canteen ,
Campus, Classrooms**

Sl. No.	Name of the Member	Designation	Contact No
1.	Dr. Anand Kumar	Professor	9036624149
2.	Dr. Mathivanan	Asso. Prof.	9865008600

In addition to the committees or bodies presented above, the college has the following Non-statutory committee

Sl. No	Committee	Headed By
1	Academic	Dr. M.S.Murali
2	Sports	Dr. M. Eshwaramoorthy
3	Cultural	Mrs. Deepa
4	Placement	Mr. Shivakumar
5	Library	Dr. Selvanandham. S
6	Hostel and canteen	Dr. C.S. Pillai
7	Transport	Mr. M.S Shivakumar
8	College Day	Mr. R Sivasubramanian
9	Student Welfare	Mr. A.M. Prasanna Kumar
10	Magazine	All Department Heads
11	Drug Abuse	Dr. B.N Ravikumar
12	Co-operative	Mr. Sanjeev kumar
13	Seminar	Prof. R.R. Elangovan
14	Workshop	Prof. R.R. Elangovan
15	Conference	Prof. R.R. Elangovan
16	Promotion of Brand image	Dr. C.S. Pillai
17	Parent/Relation	All Department Heads
18	Disciplinary	All Department Heads
19	ISTE	Dr. Mukesh
20	EDUSAT Programme	Prof. A. M. Prasanna Kumar
21	Alumni Association	Mr. Dhanya Prakash R Babu
22	Media Co-ordinator	Dr. T. Senthil Kumaran
23	NSS Co-ordinator	Mr. M.S. Shivakumar
24	Mentoring of Student Welfare	Respective Mentors
25	Counselling	Mr. A.M. Prasanna Kumar
26	Research Development	Dr. M. Eshwaramoorthy
27	Project Exhibition	Prof. R. Elangovan
28	Estate Officer	Mr. Athipathiraj
29	NBA	Mr. R. Siva subramanian
30	ISO	DR. Muruganandham

DEPARTMENT OF BIOMEDICAL ENGINEERING

31	Purchase	Mr. A.M. Prasanna Kumar
32	Journal	Mr. Ravikumar .N
33	Chairman's Vision <ul style="list-style-type: none"> Incubation Centre Software Development Cell Energy Park 	Vice Principal (Academic,Admin)
34	LIC/AICTE Coordinators	Mr. Krishnakumar. A
35	Industry Institution Interaction Cell	Mr. Yogi Adarsh
36	Red Cross	Mr. Chandrashekhhar B
37	GD Cell	Dr. C.S. Pillai
38	Attendance/ Class Teaching of Every Class/ Student Progress Communication	Individual Faculties
39	i) Cultural Club	Mrs. Deepa
	j) Heritage Club	Ms. Prathibha
	k) Sports Club	Mr. R. Siva subramanian
	l) Green Club	Mrs. Gayathri Joshi
	m) Creative Club	Mr. Munikrishna D
	n) Innovation Club	Mrs. Surekha Nigudgi
	o) Yoga Club	Dr. C.S. Pillai
	p) Cricket Club	Mr. Manjunath Prasad

10.1.4 Delegation of financial power

S.no	Desgnation	Limit to sanction
1	Principal	2,00,000
2	Hod's	5,000

DEPARTMENT OF BIOMEDICAL ENGINEERING

Sl. No.	Name	Position
1	Mr. S Vijay Anand	Executive Director
2	Dr. H.B. Phaniraju	Principal
3	Prof. R.R. Elangovan	Vice Principal(Administration)
4	Mr. A.M. Prasanna Kumar	Vice-Principal
5	Dr. A. Muruganandham	Head of Department – Electronics & Communication
6	Dr. C.S. Pillai	Head of Department – Computer Science & Engineering
7	Mr. Dinakar	Head of Department – Electrical Engineering
8	Dr. Selvanandham	Head of Department – Basic Sciences
9	Mr. Dhanya Prakash. R. Babu	In-Charge, Alumni Association
10	Prof. R.R. Elangovan	In-Charge, Workshop
		In-Charge, Counseling Cell
11	Mr. A.M. Prasanna Kumar	In-Charge, Student Professional Activities Cell
12	Mr. C.S. Rajagopalan	Administrative Officer
13	Dr. Selvanandham. S	Chairman, Central Library
14	Anti-Ragging	DR. H.B. Phaniraju

List of faculty members who are administrators/decision makers for various assigned jobs

Anti-Ragging Committees for the academic year 2015-16:

1. The following team members are informed to act members of Anti- ragging group from 1.8.2015
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1. These groups are formed to prevent and to curb the menace of Ragging.
 2. **ANTI RAGGING COMMITTEE: (To Monitor in both in Morning & Evening)**

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2.	Mrs. Kavitha.R.J	Asso Prof	9448934042
3.	Mrs. Usha.M	Asst. Prof.	9739351724

DEPARTMENT OF BIOMEDICAL ENGINEERING

3. ANTI RAGGING SQUADS (Lunch Break) Canteen, Campus, Classrooms, Library

Sl. No.	Name of the Member	Designation	Contact No
1.	Dr. M.Eswaramoorthy	Professor & HOD	9964144757
2.	Dr. Mukesh	Asso. Prof.	9442288700
3.	Mr. Krishnakumar.A	Asst. Prof	9739935544

4. DEDICATED CADRE OF WARDEN: Visit to Canteen, Campus, Classrooms, Hostel

5.

Sl. No.	Name of the Member	Designation	Contact No
1.	Prof. R.R.Elangovan	HOD	9176602009
2.	Dr. Muruganandham A	Professor	9443825711
3	Mr. Sunil Raj	Asst. Prof.	9844752319

DEPARTMENT OF BIOMEDICAL ENGINEERING

In addition to the committees or bodies presented above, the college has the following Non-statutory committee

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29	NBA	Mr. R. Siva subramanian
30	ISO	DR. Muruganandham
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33	Chairman's Vision <ul style="list-style-type: none"> Incubation Centre Software Development Cell Energy Park 	Vice Principal (Academic,Admin)
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DEPARTMENT OF BIOMEDICAL ENGINEERING

38	Attendance/ Class Teaching of Every Class/ Student Progress Communication	Individual Faculties
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	r) Heritage Club	Ms. Prathibha
	s) Sports Club	Mr. R. Siva subramanian
	t) Green Club	Mrs. Gayathri Joshi
	u) Creative Club	Mr. Munikrishna D
	v) Innovation Club	Mrs. Surekha Nigudgi
	w) Yoga Club	Dr. C.S. Pillai
	x) Cricket Club	Mr. Manjunath Prasad

10.1.4 Delegation of financial power

S.no	Designation	Limit to sanction
1	Principal	2,00,000
2	Hod's	5,000

DEPARTMENT OF BIOMEDICAL ENGINEERING

Sl. No.	Name	Position
1	Mr. S Vijay Anand	Executive Director
2	Dr. H.B. Phaniraju	Principal
3	Prof. R.R. Elangovan	Vice Principal(Administration)
4	Mr. A.M. Prasanna Kumar	Vice-Principal
5	Dr. A. Muruganandham	Head of Department – Electronics & Communication
6	Dr. C.S. Pillai	Head of Department – Computer Science & Engineering
7	Mr. Dinakar	Head of Department – Electrical Engineering
8	Dr. Selvanandham	Head of Department – Basic Sciences
9	Mr. Dhanya Prakash. R. Babu	In-Charge, Alumni Association
10	Prof. R.R. Elangovan	In-Charge, Workshop
		In-Charge, Counseling Cell
11	Mr. A.M. Prasanna Kumar	In-Charge, Student Professional Activities Cell
12	Mr. C.S. Rajagopalan	Administrative Officer
13	Dr. Selvanandham. S	Chairman, Central Library
14	Anti-Ragging	DR. H.B. Phaniraju

List of faculty members who are administrators/decision makers for various assigned jobs

Anti-Ragging Committees for the academic year 2015-16:

3. The following team members are informed to act members of Anti- ragging group from 1.8.2015
4. Group members are informed to make surprise visits as per the schedule given below and one of the team members are requested to write a brief report after Inspection in the register.
1. These groups are formed to prevent and to curb the menace of Ragging.
2. **ANTI RAGGING COMMITTEE: (To Monitor in both in Morning & Evening)**

Sl. No.	Name of the Member	Designation	Contact No
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2.	Mrs. Kavitha.R.J	Asso Prof	9448934042
3.	Mrs. Usha.M	Asst. Prof.	9739351724

DEPARTMENT OF BIOMEDICAL ENGINEERING

3. ANTI RAGGING SQUADS (Lunch Break) Canteen, Campus, Classrooms, Library

Sl. No.	Name of the Member	Designation	Contact No
1.	Dr. M.Eswaramoorthy	Professor & HOD	9964144757
2.	Dr. Mukesh	Asso. Prof.	9442288700
3.	Mr. Krishnakumar.A	Asst. Prof	9739935544

4. DEDICATED CADRE OF WARDEN: Visit to Canteen, Campus, Classrooms, Hostel

5.

Sl. No.	Name of the Member	Designation	Contact No
1.	Prof. R.R.Elangovan	HOD	9176602009
2.	Dr. Muruganandham A	Professor	9443825711
3	Mr. Sunil Raj	Asst. Prof.	9844752319

DEPARTMENT OF BIOMEDICAL ENGINEERING

List of faculty members who are administrators/decision makers for various assigned jobs:

Sl. No.	Name	Position
1	Mr. S Vijay Anand	Executive Director
2	Dr. M.S. Murali	Principal
3	Prof. R.R. Elangovan	Vice Principal(Administration)
4	Mr. A.M. Prasanna Kumar	Vice-Principal
5	Dr. A. Muruganandham	Head of Department – Electronics & Communication
6	Dr. C.S. Pillai	Head of Department – Computer Science & Engineering
7	Dr. S.S. Patil	Head of Department – Electrical Engineering
8	Dr. Selvanandham	Head of Department – Basic Sciences
9	Mr. Dhanya Prakash. R. Babu	In-Charge, Alumni Association
10	Prof. R.R. Elangovan	In-Charge, Workshop
		In-Charge, Counseling Cell
11	Mr. A.M. Prasanna Kumar	In-Charge, Student Professional Activities Cell
12	Mr. C.S. Rajagopalan	Administrative Officer
13	Dr. Selvanandham. S	Chairman, Central Library
14	Anti-Ragging	Dr. M.S. Murali

DEPARTMENT OF BIOMEDICAL ENGINEERING

10.2. Budget Allocation, Utilization, & Public Accounting at Institute Level

Total Income at Institute level: For CFY, CFYm1, CFYm2 & CFYm3

CFY: Current Financial Year, CFYm1 (Current Financial Year minus 1, CFYm2 (Current Financial Year minus 2) and CFYm3 (Current Financial Year minus 3)

For CFY

Total Income				Actual expenditure (till 31/10/2016)			
Fee	Govt.	Grant(s)	Other Sources (specify)	Recurring Including Salaries	Non-recurring	Special projects/ Any other, specify	Expenditure per student (Oct -15)
1242.82	NIL	NIL	-	1056.09	-	-	0.82

Note: Similar tables are to be prepared for CFYm1, CFYm2 & CFYm3.

Items	Budget ed in CFY	Actual expenses in CFY (till Nov - 17)	Budget ed in CFY	Actual expenses in CFYm 1 (16-17)	Budget ed in CFYm1	Actual expenses in CFYm 2 (15-16)	Budget ed in CFYm2	Actual expenses in CFYm 3 (14-15)	Budget ed in CFYm3	Actual expenses in CFYm 3 (13-15)
Infrastructure Built-up	350.00	171.42	300.00	258.50	160.00	113.00	110.00	104.41	110.00	111.61
Library	15.00	7.66	10.00	8.25	10.00	9.26	25.00	22.16	5.00	2.99
Laboratory equipment	35.00	79.92	30.00	25.16	25.00	27.9	70.00	67.75	40.00	39.90
Laboratory consumables	7.00	4.24	6.00	3.09	5.00	11.19	50.00	46.08	5.00	2.71
Teaching and non-teaching staff salary	850.00	438.51	800.00	608.46	500.00	493	400.00	422.56	350.00	303.54
Maintenance and spares	35.00	19.61	30.00	26.10	25.00	6	30.00	26.54	30.00	27.49
R&D	30.00	1.35	20.00	4.57	25.00	2.05	5.00	3.43	3.00	1.00
Training and Travel	20.00	11.64	15.00	14.89	15.00	8.02	10.00	7.72	10.00	7.08
Miscellaneous expenses*	2.50	1.74	2.00	2.21	2.00	3.07	2.00	1.15	2.00	0.42
Others, specify	600.00	380	700.00	631.21	400.00	440	400.00	320.42	400.00	343.51
Total	1944.50	1056.09	1913.00	1582.44	1167.00	1113.49	1102.00	1022.22	955.00	840.25

10.4 Library and Internet:

Carpet area of library (in m ²)	15488 sq ft
Reading space (in m ²)	1438 sq ft
Number of seats in reading space	320
Number of users (issue book) per day	100-150
Number of users (reading space) per day	320
Timings: During working day, weekend, and Vacation	8:30am to 8:00 pm
Number of library staff	04
Number of library staff with a degree in Library	02
Library Management	NGL
Computerization for search, indexing	Yes
Issue/return records bar coding used	Yes
Library services on Internet/Intranet INDEST or other similar membership archives	Yes

10.5.2 Titles and volumes per title (4)

Number of titles: 3387

Number of volumes: 17472

	Number of new titles added	Number of new editions added	Number of new volumes added
2014-2015	253	1268	1268
2015-2016	68	666	666
2016-2017	57	356	356
2017-2018	82	761	761

DEPARTMENT OF BIOMEDICAL ENGINEERING

Scholarly journal (3)

Details		2017-18	2016-17	2015-16	2014-15	2013-14
Engg. and Tech.	As soft copy		-	-	7	-
	As hard copy	62	70	62	62	62

Digital Library (3)

Availability of digital library content:

If available, mention number of courses, number of e-books, etc. : 07

Availability of an exclusive server : Yes

Availability over Intranet/Internet : Yes

Availability of exclusive space/room : Yes

Number of users per day : 25-50

Library expenditure on books, magazines/journals, and miscellaneous content (5)

Year	Expenditure				Comments if any
	Books	Magazines/journals (for hard copy subscription)	Magazines/journals (for soft copy subscription)	Misc. content	
2013-14	3,81,212	1,90,047	10,000	70,026	
2014-15	5,67,000	1,81,666	12,81,022	76,382	
2015-16	4,18,095	1,95,744	4,77,000	1,59,891	
2016-17	1,51,506	2,25,774	4,93,000	-	
2017-18	3,35,830	2,18,314		-	

INTERNET (5)

Name of the Internet provider	city online and BSNL
Available bandwidth	60Mbps
Access speed	100Mbps
Availability of Internet in an exclusive lab	Yes
Availability in most computing lab	Yes
Availability in Departments and other units	Yes
Availability in Faculty rooms	Yes
Institute own e-mail facility to faculty/students	Yes
Security/privacy of e-mail/internet users	Yes

Declaration:

I undertake that, the institution is well aware about the provisions in the NBA's accreditation manual concerned for this application, rules, regulations, notifications and NBA expert visit guidelines in force as on date and the institute shall fully abide by them.

It is submitted that information provided in this Self Assessment Report is factually correct. I understand and agree that an appropriate disciplinary action against the Institute will be initiated by the NBA, in case any false statement/information is observed during pre-visit, visit, post visit and subsequent to grant of accreditation.