VIGNAN'S
Foundation for Science, Technology & Research
(Deemed to be University)
-Estd. u/s 3 of UGC Act 1956

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Biomedical Engineering

Minutes of BoS meeting for B.Tech Biomedical Engineering on 04-04-2019

1. Meeting Started at 10:15 AM with, External BOS Members: Dr. M. Rama Subba Reddy, IIT Chennai, Mr. S. Kumar, TMI Systems Bangalore, Dr. Amarnath, Amar Orthopaedic Hospitals, Guntur; & Dr. Jeevana Latha, absent to the meeting (Emergency Medical); Comments will be taken from her. BOS chairman as Dr. T. Pitchaiah, HOD, ECE; Internal members as Dr. G. Sitaramanjaneya Reddy, Assoc. Professor, Mr. B. Sunil Tej, Asst. Prof. and Mr. Y. Amarendranath, Asst. Professor.
2. Dr. T. Pitchaiah started the meeting with introduction to the department and the biomedical engineering program starting from roots, he said that more emphasis for R-19 syllabus is given to projects, when compared to skill based syllabus in R-16 and more emphasis is given to sports and physical education.
3. The following members were present for the Board of studies meeting held on 04th April 2019 at Centre of Excellence, Department of Electronics and Communication Engineering (Biomedical Engineering), VFSTR, Vadlamudi, Guntur, and the BoS members suggested the following modifications.

BoS Members:

1. Dr. Rama Subba Reddy, Professor, Dept. of Applied Engineering, IIT Madras.
2. Mr. S. Kumar, CEO, TMI Systems, Bangalore.
3. Dr. Amarnath, Orthopaedic, Amarnath orthopaedics hospital, Guntur
4. Dr. T. Pitchaiah, Associate Professor & HoD, Department of ECE, VFSTR.

The comments given by the following BoS members

1. Dr. M. Rama Subba Reddy, Dept. of Applied Engineering, IIT Madras

- When it comes to field exposure, students should be rotated in different hospitals for broad exposure of the hospitals.
- If possible he suggested to include FAP and BCS in the basic Engineering or Science courses.

- In first semester before FAP course one / two-week modular course on explaining the importance of BME and increase the passion of the students.
- Analog electronic & Digital electronics could be combined
- Microprocessor and ARM processor course name should be changed; this merging should reflect on the practical same as the Analog electronic & Digital electronics course practical's also.
- Coloration of the pre-requisite flow chart should be differentiated as per the different domains and same for the professional electives.
- Lecture and physical fitness total credits are to be looked and adjusted properly.
- Students who are having Backlogs in the professional core courses should not be allowed to internship. If Backlogs are there in open elective an online course has to be done and he should be permitted.
- Signals and Systems course should contain Z-transforms, and the LT should be included in Control systems.
- Professional courses can be offered in the same way as the open electives to reduce the overall work load.
- Courses for open elective offered by us should be of lighter version and with different subject code.
- Bridge course for Bi. P. C. background students should be included in the regulations.
- Arduino and Raspberry Pi should be included.

2. Mr. S. Kumar, CEO, TMI Systems, Bangalore.

- When identifying projects, students are to be advised to look at the data sheets, manuals for equipment and match their requirements, so that time and resources can be saved.
- Practical are to be such a sort that simulations should be preceded by manual doing.
- Modular course should give more emphasis on importance of the course rather than meeting the academic importance.

3. Dr. Amarnath, Orthopaedic, Amarnath orthopaedics hospital, Guntur

- He raised a point that students should have more exposure on hospitals and should be stream lined in a way that suits their interest flowed by guidance in training.
- Faculty should be invited to give lectures on bigger picture of the biomedical engineering and that should be included on a whole week basis or the 1-hour class/week for 9-10 weeks. So that passion will be there, that will eliminate the conception of students that they are in default selection system.

- He advised that maximum of 3 weeks are enough for hospital training, provided visiting in broad range of departments and equipment, he said he would facilitate the visiting.

The above suggestions and comments evolved in the discussion of the R-19 BME course curriculum. Based on the suggestions, necessary modification will be incorporated. Approval of modifications will be taken from the External BoS Members through e-mail communication, which will be presented to academic council through approval of BoS chair.

The following are the outcomes of the meeting:

1. Major restructuring has taken place in the curriculum with theoretical courses amalgamated with laboratory and skill components added which is oriented towards interdisciplinary and societal centric projects, field projects, industrial related projects.
2. The curriculum follows the choice based credit system(CBCS)
3. The proposed course structure is approved with effect from the academic year 2019-20 for the 4 years of B.Tech programme in Biomedical Engineering. The proposed syllabus is applicable for 2019 admitted batch onwards.
4. The finalized Couse Structure is provided in Appendix I.
5. The curriculum is encompassing the courses that enable employability or entrepreneurship or skill development presented in Appendix II.
6. The courses in the revised curriculum (R19) significant changes are made in the content. The percentage of revision from R16 to R19 is 44%. The list of new courses is provided in Appendix III.
7. Analysed feedback from Stakeholder's in CDMC is placed before the BoS and given utmost priority while designing the curriculum and their suggestions are implemented.

1) Dr. M. Rama Subba Reddy Samatha Reddy

2) Mr. S. Kumar S. Kumar

3) Dr. Amarnath

4) Dr.T. Pitchaiah

APPENDIX – I

I Year I Semester

S. No	Course Name	L	T	P	Credits
1	Engineering Mathematics-I	3	1	2	5
2	Engineering Physics	3	-	2	4
3	Basics of Electrical & Electronics Engineering	3	-	2	4
4	Engineering Graphics & Design	2	-	2	3
5	Programming for Problem Solving	2	-	4	4
6	Physical fitness, Sports & Games-1	-	-	2	1
	Total	13	1	14	21

I Year II Semester

S.No	Course Name	L	T	P	Credits
1	Engineering Mathematics-II	3	1	2	5
2	Engineering Chemistry	2	-	2	3
3	Basics of Engineering products	2	-	2	3
4	Workshop	1	-	2	2
5	English Proficiency and communication skills	-	-	2	1
6	Constitution of India	1	-	-	1
7	Fundamentals of Anatomy and Physiology	3	-	2	4
8	Technical English Communication	2	-	2	3
9	Physical fitness, Sports & Games-2	-	-	2	1
	Total	14	1	16	23

II Year I Semester

S.No	Course Name	L	T	P	Credits
1	Probability& statistics	3	1	-	4
2	Basic Clinical Science	3	-	-	4
3	Clinical Biochemistry	3	-	2	4
4	Analog Electronic Circuits	3	-	2	4
5	Electric Circuit Theory	3	1	-	3
6	Life skills-I	-	-	2	-
7	Environmental Science	1	-	-	1
8	Technical Seminar-I	-	-	2	1
9	Intra Disciplinary Project-I	-	-	2	1
10	Physical fitness, Sports & Games-III	-	-	2	1
	Total	16	2	12	22

II Year II Semester

S.No	Course Name	L	T	P	Credits
1	Signals and Systems for Bioengineers	3	-	2	4
2	Digital Electronic Circuits	3	-	2	4
3	Biomedical Instrumentation	3	-	2	4
2	Biomaterials and Artificial Organs	3	-	-	3
5	Open Elective-I	3	-	-	3
6	Life skills-II	-	-	2	1
7	Management Science	3	-	-	3
8	Intra-Disciplinary Project-II	-	-	2	1
9	Technical Seminar-II	-	-	2	1
	Open Elective -I	3	-	-	3
	Total	18		12	24

III Year I Semester

S.No	Course Name	L	T	P	Credits
1	Diagnostic and Therapeutic Equipment's	3	-	2	4
2	Microprocessor and Microcontroller	3	-	2	4
3	Biosensors and Transducers	3	-	2	4
4	Biomechanics	3	-	-	3
5	Department Elective-I	3	-	-	3
6	Open Elective-II	3	-	-	3
7	Soft skills Laboratory	3	-	-	3
8	Employability skills -1	-	-	2	-
9	Human Values, Professional Ethics Gender Equity	-	-	-	-
10	Inter-departmental Project-I	-	-	4	2
	Total	21	-	14	26

III Year II Semester

S.No	Course Name	L	T	P	Credits
1	Analog and Digital Communication	3	-	2	4
2	Biomedical Signal Processing	3	-	2	4
3	Medical Imaging Techniques	3	-	-	3
4	Python Programming for Medical Applications	1	-	2	2
5	Department Elective-III	3	-	-	3
6	Professional communications Laboratory	-	-	2	1
7	Open Elective-III	3	-	-	3
8	Employability skills -II	-	-	2	1
9	Inter-Departmental Project-II	-	-	4	2
10	Short Industrial Training	-	-	4	2
11	Modular course	-	-	2	1
	Total	16	0	20	26

IV Year I Semester

S.No	Course Name	L	T	P	Credits
1	Medical Image Processing	3	-	2	4
2	Department Elective-III	3	-	-	3
3	Department Elective-IV	3	-	-	3
4	Department Elective-V	3	-	-	3
5	Societal Centric project	-	-	6	3
	Total	12	-	8	16

IV Year II Semester

S. No	Course Name	L	T	P	Credits
1	Internship/Project work	-	-	24	12

DEPARTMENT ELECTIVE COURSES

S.No	Course Name	L	T	P	Credits
1	Hospital Management	3	-	-	3
2	Medical Informatics	3	-	-	3
3	Tele Medicine	3	-	-	3
4	Assist Devices and Implant Technology	3	-	-	3
5	Rehabilitation Engineering	3	-	-	3
6	Physiological Control Systems	3	-	-	3
7	Fiber Optics and Lasers in Medicine	3	-	-	3
8	Virtual Bio-Instrumentation	3	-	-	3
9	Physiological control systems	3	-	-	3
10	VLSI	3	-	-	3
11	Robotics and Automation in Medicine	3	-	-	3
12	Machine Vision in Medical Technology	3	-	-	3
13	Biofluids and Dynamics	3	-	-	3
14	Medical Physics	3	-	-	3

***The courses that are highlighted denote implementation of 'Choice Based Credit System (CBCS)|"**

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APPENDIX - II

List of courses that enable Employability/ Entrepreneurship /Skill Development in the R-19

S.No	Name of the Courses	Employability/Entrepreneurship/ Skill development
1	Fundamentals of Anatomy & Physiology	Skill development
2	Basic Clinical Sciences	Employability
3	Clinical Biochemistry	Employability
4	Analog Electronic Circuits	Employability
5	Electric Circuit Theory	Skill development
6	Technical Seminar	Employability
7	Signals and Systems for Bioengineers	Employability
8	Digital Electronic Circuits	Employability
9	Biomedical Instrumentation	Employability
10	Biomaterials and Artificial Organs	Skill development
11	Diagnostic and Therapeutic Equipments	Employability
12	Microprocessors and Microcontrollers	Employability
13	Biosensors and Transducers	Employability
14	Biomechanics	Skill development
15	Analog and Digital Communications	Skill development
16	Biomedical Signal Processing	Employability
17	Medical Imaging Techniques	Employability
18	Python Programming for Medical Applications	Skill development
19	Modular Course	Employability
20	Short Industrial training	Skill development
21	Medical Image Processing	Employability
22	Hospital Management	Entrepreneurship
23	Medical Informatics	Skill development
24	Telemedicine	Skill development
25	Assist Devices and Implant Technology	Skill development
26	Biofluids and Dynamics	Skill development
27	Rehabilitation Engineering	Skill development
28	Embedded Systems for Medical Devices	Employability
29	Fiber Optics and Lasers in Medicine	Employability
30	Machine Vision in Medical Technology	Employability
31	Medical Physics	Employability
32	Physiological Control Systems	Skill development
33	Robotics and Automation in Medicine	Skill development
34	Virtual Bio-Instrumentation	Skill development
35	VLSI	Skill development
36	Internship / Project work	Employability

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APPENDIX - III
List of new courses in the R-19
B.Tech – Biomedical Engineering Curriculum

S.No	Name of the Courses
1	Fundamentals of Anatomy & Physiology
2	Basic Clinical Sciences
3	Clinical Biochemistry
4	Analog Electronic Circuits
5	Electric Circuit Theory
6	Technical Seminar
7	Signals and Systems for Bioengineers
8	Digital Electronic Circuits
9	Biomedical Instrumentation
10	Biomaterials and Artificial Organs
11	Diagnostic and Therapeutic Equipments
12	Microprocessors and Microcontrollers
13	Biosensors and Transducers
14	Biomechanics
15	Analog and Digital Communications
16	Biomedical Signal Processing
17	Medical Imaging Techniques
18	Python Programming for Medical Applications
19	Modular Course
20	Short Industrial training
21	Medical Image Processing
22	Hospital Management
23	Medical Informatics
24	Telemedicine
25	Assist Devices and Implant Technology
26	Biofluids and Dynamics
27	Rehabilitation Engineering
28	Embedded Systems for Medical Devices
29	Fiber Optics and Lasers in Medicine
30	Machine Vision in Medical Technology
31	Computers and Hardware interfacing
32	Medical Physics
33	Physiological Control Systems
34	Robotics and Automation in Medicine
35	Virtual Bio-Instrumentation
36	VLSI
37	Internship / Project work

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