VIGNAN'S
Foundation for Science, Technology & Research
UNIVERSITY
(Estd u/s 3 of UGC Act of 1956)

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
Biomedical Engineering

21-02-2015

Minutes of BoS meeting for B.Tech Biomedical Engineering on 21-02-2015

Agenda:

- B.Tech Syllabus & course Structure (Bio-Medical Engineering)

The meeting for the Board of Studies for B. Tech (Biomedical Engineering) conducted by the Department of ECE on 21st February 2015, in Sravanthi Seminar Hall under the Chairmanship of Dr. N. Usha Rani, Professor & HoD, Department of ECE. The following members were present for the meeting.

BoS Members:

1. Dr. G. Jeevana Latha, Gynecologist, Health Hospitals, Tenali.
2. Dr. V. Vasudeva Rao, Professor, VR Siddhartha Engg College, Vijayawada.
3. Dr.R.V. Satya Narayana, Professor, College of Engineering, Sri Venkateswara University.
4. Dr. Ranjan Maheshwari, Director, National Institute of Electronics & IT, Aurangabad.
5. Dr. N. Usha Rani, Professor & HoD, Department of ECE, Vignan's University.

Invitee:

1. Dr.P. Ramesh babu, Professor, Dept. of Mechanical Engineering, Vignan's Institute of Technology and Science, Vizag.

- Dr. N. Usha Rani welcomed all Board of studies members and she briefly explained the background work she has done for this course (ie. Contacting hospital authorities Doctors etc.). The following discussions took place prior to approving the curriculum for B. Tech Biomedical Engineering.

The comments given by the following BoS members

1. Dr. G. Jeevana Latha, Gynecologist, Health Hospitals, Tenali.

- She raised question on employability
- She suggested stress should be more on diagnosis part, importance for analysis is needed for pharma industry
- Anatomy and Physiology should be handled by doctor

- stem cell research instead of allotting anatomy and physiology as separate subjects she suggested to include them as same subject.

2. Dr. V. Vasudeva Rao, professor, VR Siddhartha Engg College, Vijayawada

- Opportunities
- Local hospital cooperation
- Invite to handle class work by doctors for different topics
- Sending students for internship to the biomedical equipment industry and hospital management training
- Understanding general hospital needs

3. Dr.R.V. Satya Narayana, Professor, College of Engineering, Sri Venkateswara University

- Who is eligible to do the course? The BiPC and mathematics students
- If admit Mathematics background students, how to manage Biology subject
- If admit BiPC students, how to manage Mathematics subjects
- Felt that for BiPC student's Mathematics course will be very difficult

4. Dr. Ranjan Maheshwari, Director, National Institute of Electronics & IT, Aurangabad.

- Felt that pathology and microbiology can be offered as optional courses and he felt that a physiology principle is missing
- Hinted about how elective streaming and connectivity should be achieved
- Suggested to include biomechanics as compulsory course
- Suggested to include telemetry as a course and Dr. Jeevana Latha supported it

5. Dr. B. Seetharamanajeyulu, Professor, Department of ECE, Vignan's University

- Discussed about Bioinformatics
- Informed about medical electronics B. Tech program in other states
- Points on eligibility criteria and benefits to BiPC students by opting this program
- Felt that for DSP, image processing prerequisite of M-I and M-II are necessary

General suggestion about the programme

- The BoS members have reviewed all the courses for Biomedical Engineering including first year courses
- Some of the BoS members felt that physiology, anatomy should be handled separately.
- Minor courses from Biotechnology can be offered to these students such as hematology, noninvasive techniques etc.

- Mr. Sampath and Dr. Yagnanarayana suggested that empathy of customers" as an elective course.
- Some BoS members felt that bridge course can be offered for BiPC for mathematics courses.
- Dr.T. Pitchaiah raised question on capability of students studying in engineering, instrumentation, medical fields.

Reflections on BME Syllabus

The above mentioned suggestions of the BoS are taken into account and feasibly incorporated in the curriculum.

The following are the outcomes of the meeting:

1. The curriculum follows the choice based credit system(CBCS)
2. The proposed course structure is approved with effect from the academic year 2015-16 for the 4 years of B.Tech programme in Biomedical Engineering. The proposed syllabus is applicable for 2015 admitted batch onwards
3. The finalized Couse Structure is provided in Appendix I.
4. The curriculum is encompassing the courses that enable employability or entrepreneurship or skill development presented in Appendix II.
5. Since the B. Tech biomedical Engineering proposed is floated for the first time all the courses are considered as new courses provided in Appendix III.
6. 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.

Signatures of the member's present

1. Dr. Jeevan Latha (Health Hospital)
2. Dr. V. Vasudeva Rao (PVP Siddhartha)
3. Dr.R.V. Satya Narayana (S.V. University)
4. Dr. Ranjan Maheshwari (NIELIT, Director)
5. Dr. N. Usha Rani

APPENDIX – I

B. Tech. I Year – Course Structure

SEMESTER -I

S. No	Course Name	L	T	P	Credits
1	Mathematics for Bioengineering	4	-	-	4
2	Engineering Physics	4	-	-	4
3	Engineering Mechanics	4	-	-	4
4	Technical English Communication	3	2	-	5
5	Problem Solving and Computer Programming	5	-	-	5
6	Network Security	2	-	-	-
7	Engineering Physics Lab	-	-	3	2
8	Computer Programming Lab	-	-	3	2
9	Workshop Practices	-	-	3	2
	Total	22	2	9	28

SEMESTER -II

S. No	Course Name	L	T	P	Credits
1	Mathematics for Bioengineering-II	3	1	-	4
2	Engineering Chemistry	4	-	-	4
3	Fondamentals of Electrical Engineering	4	-	-	4
4	Environmental Studies	3	-	-	3
5	Engineering Materials	4	-	-	4
6	Professional Ethics, Values and Human Rights	2	-	-	-
7	Engineering Chemistry Lab	-	-	3	2
8	Engineering Graphics	1	-	3	3
9	Fundamentals of Electrical Engg. Lab	-	-	3	2
	Total	21	1	9	26

B. Tech. II Year – Course Structure

SEMESTER -I

S. No	Course Name	L	T	P	Credits
1	Anatomy	4	-	-	4
2	Physiology	4	-	-	4
3	Biochemistry	4	1	-	4
4	Network Theory	3	1	-	4
5	Signals and Systems for Bioengineers	3	-	-	4
6	Seminar	-	-	1	1
7	Minor -1	4	-	-	4
8	Anatomy and Physiology Lab	-	-	3	2
9	Biochemistry Lab	-	-	3	2
10	Signals and Systems for Bioengineers Lab	-	-	3	2
	Total	22	2	10	31

SEMESTER -II

S. No	Course Name	L	T	P	Credits
1	Transforms and Partial differential Equations	3	1	-	4
2	Electrical Engineering	4	-	-	4
3	Transducers and Biosensors	3	1	-	4
4	Communications Systems	4	-	-	4
5	Clinical Science	3	1	-	4
6	Seminar	-	-	1	1
7	Minor -II	4	-	-	4
8	Soft Skills Lab	-	-	3	2
9	Electronics Engineering –I Lab	-	-	3	2
10	Transducers and Biosensors Lab	-	-	3	2
	Total	21	3	10	31

B. Tech. III Year – Course Structure

SEMESTER -I

S. No	Course Name	L	T	P	Credits
1	Microprocessor and Microcontrollers for Bioengineers	4	-	-	4
2	Biomedical Instruments	4	-	-	4
3	Diagnostics and therapeutic Equipments -1	4	-	-	4
4	Electronics Engineering-II	4	-	-	4
5	Department Elective -1	4	-	-	4
6	Minor -III	4	-	-	4
7	Seminar	-	-	1	1
8	Microprocessor and Microcontrollers for Bioengineers Lab	-	-	3	2
9	Biomedical Instruments Lab	-	-	3	2
10	Professional Communication Lab	-	-	3	2
	Total	24	-	10	31

SEMESTER –II

S. No	Course Name	L	T	P	Credits
1	Digital Signal Processing	3	1	-	4
2	Data Structures	4	-	-	4
3	Diagnostic and therapeutic Equipment's -II	4	-	-	4
4	Medi-Embedded Systems and RTOS	4	-	-	4
5	Department Elective -II	4	-	-	4
6	Minor -IV	4	-	-	4
7	Seminar	-	-	1	1
8	DSP Lab (with MATLAB,C)	-	-	3	2
9	Embedded System Lab	-	-	3	2
9	Mini Project	-	-	3	2
	Total	23	1	10	31

B. Tech. IV Year – Course Structure

SEMESTER -I

S. No	Course Name	L	T	P	Credits
1	Managerial Economics	4	-	-	4
2	Medical Imaging Techniques	3	1	-	4
3	Digital Image Processing	3	1	-	4
4	Soft Computing	4	-	-	4
5	Department Elective -III	4	-	-	4
6	Department Elective -IV	4	-	-	4
7	Digital Image Processing Lab	-	-	3	2
8	Data Structures Lab	-	-	3	2
9	Hospital Visit	-	-	3	2
	Total	22	2	9	30

SEMESTER -II

S. No	Course Name	L	T	P	Credits
1	Minor -V	4	-	-	4
2	Department Elective -V	4	-	-	4
3	Department Elective -VI	4	-	-	4
4	Project Work		-	20	10
	Total	12	-	20	22

S. No	Course Name	L	T	P	Credits
1	Internship	-	-	36	18
	Total	-	-	36	18

B. Tech. Department Elective

S. No	Department Electives	L	T	P	Credits
1	Physiological Control System	4	-	-	4
2	Bioinformatics	4	-	-	4
3	Total Quality Management	4	-	-	4
4	Biomaterials and Artificial Organs	4	-	-	4
5	Physiological System Modelling	4	-	-	4
6	VLSI Design	4	-	-	4
7	Rehabilitation Engineering	4	-	-	4
8	Wearable Systems	4	-	-	4
9	Nano Electronics	4	-	-	4
10	Hospital Managements	4	-	-	4
11	Assist Devices	4	-	-	4
12	Fiber Optics and Laser in Medicine	4	-	-	4
13	Telemedicine	4	-	-	4
14	Biotransport Process	4	-	-	4
15	Neural Engineering	4	-	-	4
16	Tissue Engineering	4	-	-	4
17	Bio MIMS	4	-	-	4
18	Medical Physics	4	-	-	4

B. Tech. Minor Specialization

S. No	MANAGEMENT	L	T	P	Credits
1	Principles of Management and Organization Behaviour	4	-	-	3
2	Business Environment and Ethics	4	-	-	3
3	Marketing and HR Management	4	-	-	3
4	Entrepreneurship and Project Management	4	-	-	3
5	Production and Operations Management	4	-	-	3

S. No	HUMANITIES AND SCIENCES	L	T	P	Credits
1	Indian History and Culture	4	-	-	3
2	Polity and Governance of India	4	-	-	3
3	Economic and Social Development of India	4	-	-	3
4	Basic Numeracy, Mental Ability and Local Reasoning	4	-	-	3
5	Geography and Environmental Concerns of India	4	-	-	3

S. No	INFORMATION TECHNOLOGY	L	T	P	Credits
1	Object Orientated Programming Through Java	4	-	-	3
2	Internet and Web Technologies	4	-	-	3
3	Operating System	4	-	-	3
4	Unix and Shell Programming	4	-	-	3
5	Data Base Systems	4	-	-	3
6	Multimedia Systems	4	-	-	3
7	Software Engineering	4	-	-	3
8	Data warehousing and Datamining	4	-	-	3
9	Software Testing Methodologies	4	-	-	3
10	Object Oriented Analysis &Design	4	-	-	3

S. No	ELECTRONICS AND COMMUNICATION ENGINEERING	L	T	P	Credits
1	Electronics Devices	4	-	-	3
2	Electronics Circuits	4	-	-	3
3	Digital Electronics	4	-	-	3
4	Communication Systems -1	4	-	-	3
5	Liner IC Applications	4	-	-	3
6	Microprocessors and Interfacing	4	-	-	3
7	Communication System -II	4	-	-	3
8	Sensors and Transducers	4	-	-	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-13

B. Tech – Biomedical Engineering

S.No	Courses Name	Employability/ Entrepreneurship/ Skill development
1	Anatomy	Skill development
2	Physiology	Skill development
3	Biochemistry	Employability
4	Network Theory	Employability
5	Signals & Systems for Bioengineers	Employability
6	Transforms & Partial Differential Equations	Skill development
7	Electronics Engineering-I	Skill development
8	Transducers & Biosensors	Employability
9	Communication Systems	Skill development
10	Basic Clinical Science	Employability
11	Microprocessor and Microcontroller for bioengineers	Employability
12	Biomedical Instrumentation	Employability
13	Diagnostic and Therapeutic Equipment's-I	Employability
14	Electronics Engineering-II	Employability
15	Physiological Control Systems	Skill development
16	Bioinformatics	Skill development
17	Total Quality Management	Entrepreneurship
18	Digital Signal Processing	Employability
19	Diagnostic and Therapeutic Equipment's-II	Employability
20	Medi-Embedded Systems & RTOS	Employability
21	Biomaterials and Artificial Organs	Skill development
22	Physiological System Modeling	Employability
23	Medical Imaging Techniques	Employability
24	Digital Image Processing	Skill development
25	Rehabilitation Engineering	Skill development
26	Wearable Systems	Employability
27	Fiber Optics and Lasers in Medicine	Employability

28	Hospital Management	Entrepreneurship
29	Assist Devices	Employability
30	Hospital Visit	Employability
31	Telemedicine	Skill development
32	Bio Transport Process	Skill development
33	Neural Engineering	Skill development
34	Tissue Engineering	Employability
35	Medical Physics	Employability
36	Bio MEMS	Skill development
37	Project Work	Employability
38	Internship	Employability

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APPENDIX - III

List of new courses in the R-13

B.Tech – Biomedical Engineering Curriculum

S.No	Courses Name
1	Anatomy
2	Physiology
3	Biochemistry
4	Network Theory
5	Signals & Systems for Bioengineers
6	Transforms & Partial Differential Equations
7	Electronics Engineering-I
8	Transducers & Biosensors
9	Communication Systems
10	Clinical Science
11	Microprocessor and Microcontroller for bioengineers
12	Biomedical Instrumentation
13	Diagnostic and Therapeutic Equipments-I
14	Electronics Engineering-II
15	Physiological Control Systems
16	Bioinformatics
17	Total Quality Management
18	Digital Signal Processing
19	Diagnostic and Therapeutic Equipments-II
20	Medi-Embeded Systems & RTOS
21	Biomaterials and artificial Organs
22	Physiological system modeling
23	Medical Imaging Techniques
24	Digital Image Processing
25	Rehabilitation Engineering
26	Wearable systems
27	Fiber Optics and Lasers in Medicine
28	Hospital Management
29	Assist Devices
30	Hospital Visit

31	Telemedicine
32	Bio Transport process
33	Neural Engineering
34	Tissue Engineering
35	Medical Physics
36	Bio MEMS
37	Project Work
38	Internship

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