BOARD OF STUDIES MEETING – 2018-19

K.S.R.M COLLEGE OF ENGINEERING

AUTONOMOUS

Minutes of the Meeting

Date	**18.07.2018**	**Day**	**Wednesday**
Time	**10:00AM**	**Venue**	**DSP Lab**
Dept./SS	**ECE**	**Convener**	**Dr. G. Hemalatha**

MembersPresent:10				**Members Absent: 02**		
S.No	**Name**	**Designation**	**Signature**	**S.No**	**Name**	**Designation**
1.	Prof. G. Hemalatha	Prof., & HOD ECE, KSRMCE		1	Sri M. Nagendra Kumar	Alumni Member Research Staff CRL, BEL
2.	Prof. K. Rama Naidu	University nominee Professor in ECE, JNTUA, Anantapur.		2	Sri A. Valli Bhasha	Asso. Prof., in ECE KSRMCE
3.	Prof. M. Rama Subba Reddy	Subject Expert Professor in ECE IIT Madras				
4.	Dr. V. Anil Kumar	Subject Expert Asso.Prof.in ECE IIIT, Hyderabad				
5.	Dr. M. Venkatanarayana	Prof., KSRMCE				

6.	Sri R.V. Sreehari	Assoc. Prof., in ECE KSRMCE				
7.	Dr. S. L. Prathapa Reddy	Assoc. Prof., in ECE KSRMCE				
8.	Dr. S. Zahiruddin	Asst. Prof., in ECE KSRMCE				
9.	Sri Md. Mahaboob Pasha	Asst. Prof., in ECE KSRMCE				
10	Sri B. Prabhakar	Industry S. V. P. Networks Bangalore				

Dr. G. Hemalatha, welcomed all the members to the meeting and presented the agenda of the meeting.

The resolutions are:

	To do item	Discussions	Resolutions	Coordinator/in-charge
1	Implementation of R-18 UG & PG Regulations	The HoD has presented that the institute is implementing the new regulations for both UG & PG courses	The committee approved the Regulations and its implementation	Dr. G. Hemalatha
2	Syllabus for R-18 UG program Semester -I&II	The HoD has presented that Syllabus for R-18 UG program Semester -I&II	The committee approved the proposed syllabus	
3	Syllabus for R-18 PG program Semester -I&II	The HoD has presented that Syllabus for R-18 PG program Semester -I&II	The committee approved the proposed syllabus	
4	Minor Degree R-18 UG	The HoD has presented the syllabus for R-18 UG	The committee approved the proposed syllabus	
5	To finalize the Course Structure & Syllabus	The Head of the Department has presented the syllabus designed, Including New Courses recommended Based on the Feedback given by the Stack holders and Action taken Reports and comparing with premier institute syllabus.	The committee has approved to modify the syllabus for "Biomedical Instrumentation". The committee has approved to introduce VLSI Lab in the current academic year. The committee has approved to modify the syllabus for "Electronic Measurements and Instrumentation", "Optical Communications", "Digital Image Processing"	

6.	Certification Courses		The committee has approved to conduct certification Courses	Sri. S. L. Prathapa Reddy

The Head of the Department has proposed the Vote of thanks and concluded the meeting.

Convenor

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COURSE STRUCTURE
AND
DETAILED SYLLABUS
R18 UG

DEPARTMENT OF

ELECTRONICS AND COMMUNICATION ENGINEERING

COLLEGE VISION

KSRMCE seeks to be recognized as one of the best engineering colleges in India in providing high standards of academics with most productive, creative learning environment by including research, Innovation thoughts and producing graduates with human values & leadership qualities to serve nation.

COLLEGE MISSION

M1: To provide high quality education in Engineering & Technology in order to bring out knowledgeable engineers.

M2: To creative environment a collaborative environment with stakeholders to take up need-based research and industry specific programs.

M3: To organize co-curricular and extracurricular activities for character and personality development to produce highly competent and motivated engineers and professionals to serve and lead the society.

DEPARTMENT VISION

To emerge the Electronics and Communication Engineering Department as a value based globally recognized centre ensuring academic excellence, fostering research innovation and entrepreneurial attitude.

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M1: To be a student centric institute imbibing experiential, innovative and lifelong learning skills, addressing industrial and societal problems.

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M3: To inculcate entrepreneurial attitude and values amongst the learners.

M4: To strengthen National and International, Industrial and Institutional collaborations for symbiotic relations.

PROGRAM EDUCATIONAL OBJECTIVES

PEO1: To provide students with a strong foundation in mathematics, science and engineering.

PEO2: To provide students with sufficient technical and programming skills to meet the industry demands.

PEO3: To provide students with sufficient leadership, entrepreneurship qualities, professional and ethical attitude for a successful professional career.

PEO4: To generate graduates with a multidisciplinary approach and an ability to relate engineering issues to broader social context.

PROGRAM OUTCOMES

PO1 - Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

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.

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.

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.

PO5 - Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including predication and modeling to complex engineering activities with an understanding of the limitations.

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.

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.

PO8 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

PO9 - Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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.

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.

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.

PROGRAM SPECIFIC OUTCOMES

PSO1: An ability to design and conduct experiments, as well as to analyze and interpret data.

PSO2: An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

PSO3: An ability to understand the impact of engineering solutions in a global, economic, environmental and societal context.

PSO4: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

I Semester

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	Credits
1	1821101	Mathematics - I	BSC	3	1	0	30	70	4
2	1822102	Engineering Physics	BSC	3	1	0	30	70	4
3	1823103	Basic Electrical Engineering	ESC	3	1	0	30	70	4
4	1824107	Engineering Graphics & Design	ESC	1	0	4	50	50	3
5	1825108	Engineering Physics Lab	BSC	0	0	3	50	50	1.5
6	1826106	Basic Electrical Engineering Lab	ESC	0	0	2	50	50	1
7	1827110	Workshop and Manufacturing Practices	ESC	1	0	4	50	50	3
		Total:							20.5

II Semester

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	Credits
1	1821201	Mathematics - II	BSC	3	1	0	30	70	4
2	1823202	Engineering Chemistry	BSC	3	1	0	30	70	4
3	1824203	English	HSMC	2	0	0	30	70	2
4	1805204	Programming for Problem Solving	ESC	3	0	0	50	50	3
5	1823207	Chemistry Lab	BSC	0	0	3	50	50	1.5
6	1805208	Programming for Problem Solving Lab	ESC	0	0	4	50	50	2
7	1824209	English Lab	HSMC	0	0	2	50	50	1
		Total:							17.5

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III Semester

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	Credits
1	1821301	Mathematics – III	BSC	3	1	0	30	70	4
2	1821302	Managerial Economics and Financial Analysis	HSMC	3	0	0	30	70	3
3	1821303	Electronic Devices and Circuits	EC	3	0	0	30	70	3
4	1821304	Digital System Design	EC	3	0	0	30	70	3
5	1821305	Signals And Systems	EC	3	0	0	30	70	3
6	1821306	Network Theory	EC	3	0	0	30	70	3
7	1821307	Python Programming	ESC	0	0	3	50	50	1.5
8	1821308	Electronic Devices and Circuits Lab	EC	0	0	3	50	50	1.5
9	18994M1	Environmental Science	MC	2	0	0	30		0
		Total:							22

IV Semester

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	Credits
1	1823401	Biology for Engineers	BSC	2	0	0	30	70	2
2	1804402	Probability Theory and Stochastic Processes	EC	3	0	0	30	70	3
3	1785403	Analog and Digital Circuits	EC	3	0	0	30	70	3
4	1766404	Control Systems	EC	3	0	0	30	70	3
5	1747405	Linear IC Applications	EC	3	0	0	30	70	3
6	1728406	Electromagnetic Theory and Transmission lines	EC	3	0	0	30	70	3
7	1804407	LABVIEW Programming Lab	ESC	0	0	3	50	50	1.5
8	1804408	Analog and Digital Circuits Lab	EC	0	0	3	50	50	1.5
		Total:							20

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V Semester

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	Credits
1	1804501	Microprocessors & Microcontrollers	EC	3	0	0	30	70	3
2	1804502	Digital Signal Processing	EC	3	0	0	30	70	3
3	1804503	Computer Organization	EC	2	0	0	30	70	2
4	1804504	Analog Communication	EC	3	0	0	30	70	3
5	1804505	Digital IC Applications	EC	3	0	0	30	70	3
6	1804506	Antennas and Wave Propagation	EC	3	0	0	30	70	3
7	1804507	Microprocessors & Microcontrollers Lab	EC	0	0	3	50	50	1.5
8	1804508	Analog and Digital IC Lab	EC	0	0	3	50	50	1.5
9	1804509	Socially Relevant Project	PR				100		2
		Total:							22

VI Semester

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	Credits
1	1804601	Embedded Systems	EC	3	0	0	30	70	3
2	1804602	Digital Communication	EC	3	0	0	30	70	3
3	1804603	Microwave Engineering	EC	3	0	0	30	70	3
		Professional Elective I							
4	1804604	Fiber-Optic Communication	PE	3	0	0	30	70	3
5	1804605	Data structures and Algorithms	PE	3	0	0	30	70	3
6	1804606	Digital Signal Processors & Architectures	PE	3	0	0	30	70	3
7	1804607	Analog IC Design	PE	3	0	0	30	70	3
8	1804608	Introduction to MEMS	PE	3	0	0	30	70	3
9		Open Elective I	OE	3	0	0	30	70	3

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10	1804609	Analog and digital communication Lab	EC	0	0	3	50	50	1.5
11	1804610	Digital Signal Processing Lab	EC	0	0	3	50	50	1.5
12	1804611	Micro Wave &Optical Communication Lab	EC	0	0	4	50	50	2
13	18996M1	Organizational Behaviour	MC	3	0	0	30		0
14	1804613	Internship	PR				100		2
		Total:							22

VII Semester

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	Credits
1	1804701	Internet Of Things	EC	3	0	0	30	70	3
2	1804702	Electronic Measurements & Instrumentation	EC	3	0	0	30	70	3
		Professional Elective II							
3	1804703	Information Theory & Coding	PE	3	0	0	30	70	3
4	1804704	Real Time Operating Systems	PE	3	0	0	30	70	3
5	1804705	Scientific Computing	PE	3	0	0	30	70	3
6	1804706	CMOS Design	PE	3	0	0	30	70	3
7	1804707	Electromagnetic Interference & Compatibility	PE	3	0	0	30	70	3
		Professional Elective III							
8	1804708	Radar and Satellite Communication	PE	3	0	0	30	70	3
9	1804709	Computer System Architecture	PE	3	0	0	30	70	3
10	1804710	Digital Image & Video processing	PE	3	0	0	30	70	3
11	1804711	Digital IC Design	PE	3	0	0	30	70	3
12	1804712	Cognitive Radio	PE	3	0	0	30	70	3
13		**Open Elective II**	OE	3	0	0	30	70	3

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14		**Open Elective III**	OE	3	0	0	30	70	3
15	1804713	IOT Lab	EC	0	0	2	50	50	1
16	1804714	Project Stage-I	PR	0	0	6	100	0	3
17	1824715	Human Values and Professional Ethics	MC	0	0	3	30	0	0
		Total:							22

VIII Semester

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	Credits
		Professional Elective IV							
1	1824801	Wireless Communication	PE	3	0	0	30	70	3
2	1804802	SoC Architecture	PE	3	0	0	30	70	3
3	1804803	Speech Processing	PE	3	0	0	30	70	3
4	1804804	Low Power VLSI	PE	3	0	0	30	70	3
5	1804805	RF System Design	PE	3	0	0	30	70	3
		Open Elective IV	OE	3	0	0	30	70	3
6	1804806	Technical Seminar	PR	0	0	2	100	0	1
7	1804807	Project Stage-II	PR	0	0	20	50	50	5
		Total:							12

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DEPARTMENT OF ECE

R 18-PG SYLLABUS

I Semester

S. No.	Core or Elective	Course Code	Course Name	L	T	P	IM	EM	CR
1	Core 1	1854101	Digital System Design	3	0	0	40	60	3
2	Core 2	1854102	Digital Communication Techniques	3	0	0	40	60	3
3	PE I	1854103 1854104 1854105	1.Analog & Digital CMOS VLSI Design 2.Low power VLSI 3.SoC Design	3	0	0	40	60	3
4	PE II	1854106 1854107 1854108	1.Digital Image & Video Processing 2. Wireless & Mobile Communications 3. Advanced Communication Networks	3	0	0	40	60	3
5		1800109	Research Methodology & IPR	2	0	0	40	60	2
6	Core	1854110	DSD Lab	0	0	4	50	50	2
7	Core	1854111	DCT Lab	0	0	4	50	50	2
8	Audit Course	1870A02	Disaster Management	2	0	0	40	0	0
Total:				16	0	8	300	400	18

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IISemester

S. No.	Core or Elective	Course Code	Course Name	L	T	P	IM	EM	CR
1	Core 3	1854201	Microcontrollers & Programmable DSP Processors	3	0	0	40	60	3
2	Core 4	1854202	Advanced DSP	3	0	0	40	60	3
3	PE III	1854203 1854204 1854205	1.Advanced Computer Architecture 2.IOT & Applications 3.VLSI Signal Processing	3	0	0	40	60	3
4	PE IV	1854206 1854207 1854208	1.Detection & Estimation Theory 2.Optical Networks 3.Biomedical Signal Processing	3	0	0	40	60	3
5	Core	1854209	Mini Project with Seminar	0	0	4	100	0	2
6	Core	1854210	Microcontrollers and Programmable DSP Processors Lab	0	0	4	50	50	2
7	Core	1854211	Advanced DSP Lab	0	0	4	50	50	2
8	Audit Course	1870A01	English for Research paper writing	2	0	0	40	0	0
Total:				14	0	12	360	340	18

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III Semester

S. No.	Core or Elective	Course Code	Course Name	L	T	P	IM	EM	CR
1	PE V	1854301 1854302 1854303	1.Microcomputer System Design 2. Joint Time Frequency Analysis & MRA 3. Pattern recognition & Machine learning	3	0	0	40	60	3
2	OE	1871304 1871305 1871306 1871307 1871308 1871309	1.Business Analytics 2.Industrial Safety 3.Operations Research 4.Cost Management of Engineering Projects 5.Composite Materials 6.Waste to Energy	3	0	0	40	60	3
3	Major Project	1854310	Dissertation Phase I	0	0	20	100	100	10
Total:				6	0	20	180	220	16

IV Semester

S. No.	Core or Elective	Course Code	Course Name	L	T	P	IM	EM	CR
1	Major Project	1854401	Dissertation Phase II	0	0	32	50	50	16
Total:				0	0	32	50	50	16

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COURSE STRUCTURE
R15UG

DEPARTMENT OF

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I SEMESTER

S.No	Subject Code	Subject Name	Category	L	T	P	IM	EM	CR
1	1521101	Mathematics-1	BS	3	1	0	30	70	3
2	1521102	Mathematics-2	BS	3	1	0	30	70	3
3	1503103	Engineering Graphics	ED	1	0	3	30	70	3
4	1524104	English-1	HS	4	0	0	30	70	3
5	1505105	Programming in C	ED	3	1	0	30	70	3
6	1501106	Environmental Studies	HS	4	0	0	30	70	3
7	1505107	Programming in C Lab	ED	0	0	3	50	50	2
8	1599108	Engineering Workshop	ED	0	0	3	50	50	2
Total									22

II SEMESTER

S.No	Subject Code	Subject Name	Category	L	T	P	IM	EM	CR
1	1522201	Engineering Physics	BS	3	1	0	30	70	3
2	1521202	Mathematics-3	BS	3	1	0	30	70	3
3	1523203	Engineering Chemistry	BS	3	1	0	30	70	3
4	1524204	English-2	HS	4	0	0	30	70	3
5	1502205	Electrical Circuits	PJ	3	1	3	30	70	3
6	1525206	Human Values and Professional Ethics	HS	4	0	0	30	70	3
7	1524207	English Language and Communication Skills Lab	HS	0	0	3	50	50	2
8	1599208	Physics and Chemistry Lab	BS	0	0	3	50	50	2
Total									22

III SEMESTER

S. No.	Subject Code	Subject Name	Category	L	T	P	IM	EM	CR
1	1521301	Mathematics-4	BS	3	1	0	30	70	3
2	1504302	Electromagnetic Fields	PN	3	1	0	30	70	3
3	1504303	Electronic Devices and Circuits	PJ	3	1	0	30	70	3
4	1504304	Signals and Systems	PJ	3	1	0	30	70	3
5	1502305	Network Theory	PN	3	1	0	30	70	3
6	1512306	Electrical Machines	PJ	3	1	0	30	70	3
7	1512307	Electrical Engineering Lab	PN	0	0	3	50	50	2

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8	1504308	Electronic Devices & Circuits Lab	PJ	0	0	3	50	50	2
Total									22

IV SEMESTER

S. No.	Subject Code	Subject Name	Category	L	T	P	IM	EM	CR
1	1504401	Analog Communications	PJ	3	1	0	30	70	3
2	1504402	Switching Theory and Logic Design	PJ	3	1	0	30	70	3
3	1504403	Electronic Circuit Analysis	PJ	3	1	0	30	70	3
4	1504404	Pulse and Digital Circuits	PJ	3	1	0	30	70	3
5	1504405	Electromagnetic waves& Transmission Lines	PJ	3	1	0	30	70	3
6	1504406	Probability Theory & Stochastic Processes	PJ	3	1	0	30	70	3
7	1504407	Electronic Circuit Analysis Lab	PJ	0	0	3	50	50	2
8	1504408	Pulse & Digital Circuits Lab	PJ	0	0	3	50	50	2
Total									22

V SEMESTER

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	CR
1	1504501	Microprocessors & Interfacing	PJ	4	0	0	30	70	3
2	1504502	Linear IC Applications	PJ	4	0	0	30	70	3
3	1504503	Digital Communications	PJ	4	0	0	30	70	3
4	1504504	Antenna and Wave Propagation	PJ	4	0	0	30	70	3
5	1515505	Computer Organization	PN	4	0	0	30	70	3
6	1504506	Digital IC Applications	PJ	4	0	0	30	70	3
7	1504507	IC Applications Lab	PJ	0	0	3	50	50	2
8	1504508	Communication Engineering Lab	PJ	0	0	3	50	50	2
Total									22

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VI SEMESTER

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	CR
1	1525601	Managerial Economics & Financial Analysis	HS	4	0	0	30	70	3
2	1504602	Digital Signal Processing	PJ	4	0	0	30	70	3
3	1504603	Microwave Engineering	PJ	4	0	0	30	70	3
4	1512604	Control Systems	PN	4	0	0	30	70	3
5	1504605	Microcontrollers and Applications	PJ	4	0	0	30	70	3
		Elective-I							
6	1515606	Data structures	PN	4	0	0	30	70	3
7	1515607	Computer Network	PN	4	0	0	30	70	3
8	1515608	Database Management Systems	PN	4	0	0	30	70	3
9	1504609	Microprocessors & Microcontrollers Lab	PJ	0	0	3	50	50	2
10	1504610	Digital Signal Processing Lab	PJ	0	0	3	50	50	2
Total									22

VII SEMESTER

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	CR
1	1525701	Management Science	HS	4	0	0	30	70	3
2	1504702	VLSI Design	PJ	4	0	0	30	70	3
3	1504703	Electronic Measurements and Instrumentation	PJ	4	0	0	30	70	3
4	1504704	Optical communications	PJ	4	0	0	30	70	3
5	1504705	Digital Image Processing	PJ	4	0	0	30	70	3
		Elective-II							
6	1504706	Embedded Real Time Operating Systems	PJ	4	0	0	30	70	3
7	1504707	Neural networks and Fuzzy Logic	PJ	4	0	0	30	70	3
8	1504708	Data Communications	PJ	4	0	0	30	70	3
9	1504709	Microwave & Optical Communications Lab	PJ	0	0	3	50	50	2
10	1504710	VLSI Lab	PJ	0	0	3	50	50	2
Total									22

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VIII SEMESTER

S. No.	Subject Code	Subject	SC	L	T	P	IM	EM	CR
1	1504801	Cellular & Mobile Communications	PJ	4	0	0	30	70	3
2	1504802	Satellite Communications	PJ	4	0	0	30	70	3
		Elective -III							
3	1504803	RADAR Systems	PJ	4	0	0	30	70	3
4	1504804	Speech Processing	PJ	4	0	0	30	70	3
5	1504805	OOPS through Java Programming	PJ	4	0	0	30	70	3
		Elective-IV							
6	1504806	Data Acquisition Systems	PJ	4	0	0	30	70	3
7	1504807	Spread Spectrum Communications	PJ	4	0	0	30	70	3
8	1504808	Biomedical Instrumentation	PJ	4	0	0	30	70	3
9	1504809	Seminar	PJ	0	0	0	100	0	3
10	1504810	Project	PJ	0	0	0	50	50	10
Total									25

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Course Title	ELECTRONIC MEASUREMENTS AND INSTRUMENTATION				B. Tech. ECE VII Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504703	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30Min					End Exam Duration: 3Hrs		

Course Objectives:

- The presentation of fundamental measurement concepts and measurement methodologies including the description of basic instruments that are the technological implementation of general methodologies.
- Understanding about the transducers and to help the students analyze various signals using CRO.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Define** the performance characteristics of an instrument.
CO 2	**Understand** the principle of analog, digital voltmeters and wave analyzers
CO 3	**Explain** different types of oscilloscopes
CO 4	**Use** AC and DC bridges for relevant parameter measurement.
CO 5	**Apply** the complete knowledge of various electronic transducers to measure the physical Quantities in the field of science and technology

UNIT I

Performance characteristics of Instruments : Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Errors in Measurement, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error.

Analog Instruments: Transistor Voltmeter, Micro Voltmeter (Chopper type) – DC Differential voltmeter – AC voltmeters – Multi meter -wave analyzers (AF & RF) – Harmonic distortion analyzer- Spectrum analyzer.

UNIT II

Digital Instruments: Digital Voltmeters (Ramp, Dual slope, stair case, successive approximation types) Digital multi meter, Universal counter, Digital tachometer, Digital Phase meter.

UNIT III

Cathode Ray Oscilloscopes: Motion of electron in electronic field and in magnetic field-Block diagram of CRO, CRT, Electrostatic deflection sensitivity – Vertical and Horizontal deflection systems – Principle of operation of dual beam, dual trace, sampling and storage CRO's- Measurements with CRO (Voltage, Current, time, frequency, Phase angle, lissajous figures)

UNIT IV

Bridges: Wheat stone bridge, Kelvin Bridge, Measurement of inductance- Maxwell's bridge, Anderson Bridge. Measurement of capacitance-Schearing Bridge, Wien Bridge Errors and precautions in using bridges- Q meter and measurement methods

UNIT V

Transducers: Active & passive transducers, Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Resistance Thermometers, Thermocouples, Thermistors, Sensistors. Measurement of physical parameters force, pressure, velocity, humidity, moisture, speed, proximity and displacement.Data acquisition systems.

Text Books:

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1. Electronic instrumentation, second edition - H.S. Kalsi, Tata McGraw Hill, 2004.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.

References:

1. Electronic Instrumentation & Measurements - David A. Bell, PHI (OUP), 2nd Edition, 2003.
2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2nd Ed., 2004.
3. Electronic Measurements & Instrumentations by K. Lal Kishore, Pearson Education – 2005.

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Course Title	OPTICAL COMMUNICATIONS				B. Tech. ECE VII Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504704	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1 Hr 30Min					End Exam Duration: 3Hrs		

Course Objectives:

- To understand the functionality of each of the components of fiber optic communication system
- To understand the properties and principles of different types of optical fibers, and losses that occur in fibers.
- To understand the working and principle of optical sources (LED and LASER) and power launching schemes.
- To analyze the operation of various optical detectors (PIN & APD) and optical receiver
- To understand the design of optical systems, WDM and Measurements

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Identify** the structures of Optical fibers based on modes, refractive index and fiber materials.
CO 2	**Analyze** the different kind of losses in fibers and optical fiber link design parameters
CO 3	**Categorize** the types of optical sources and optical detectors on the basis of physical construction and principle of operation.
CO 4	**Explain** the necessity for using splices, couplers and connectors in energy transmission.
CO 5	**Discuss** WDM concepts, Optical Amplifiers, Optical System design and Measurements

UNIT-I

Introduction and Optical fiber waveguides: Historical Development, The General System, Advantages of Optical Fiber Communications, Ray Theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew Rays, Cylindrical Fiber – Modes, V Number, Mode coupling, Step Index fibers, Graded Index Fibers Single mode fibers - Cut off wavelength, Mode Field Diameter, Effective Refractive Index.

UNIT-II

Fiber Materials - Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers, Mechanical Properties of Fibers, Fiber Optic Cables. **Transmission Characteristics of optical fibers** -Attenuation, Material Absorption Losses in Silica Glass Fibers, Linear Scattering Losses, Fiber Bend Loss, Dispersion, Chromatic dispersion, Intermodal dispersion, Overall fiber dispersion, Polarization – Fiber Birefringence, Polarization Mode Dispersion.

UNIT-III

Power launching and Coupling-Source to Fiber Power Launching – Source output pattern, power coupling calculation, power launching versus wavelength, Equilibrium Numerical Aperture, **Lensing schemes for Coupling Improvement** -non imaging microsphere, Laser diode to fiber coupling, LED coupling to single mode fibers. **Fiber-to-fiber Joints** – Mechanical misalignments, Fiber related losses, Fiber end face preparation, **Fiber Splicing** – Splicing techniques, splicing single mode fibers, **Optical Fiber Connectors** – Connector types, Single mode fiber connectors- Connector return losses, **Passive components** – The 2 x 2 fiber coupler, Star couplers

UNIT-IV

Optical Sources: Light Emitting Diodes (LEDs) - LED Structures, Light Source Materials, Quantum efficiency and LED Power, Modulation of LED. **LASER Diodes**- Laser Diode Modes and Threshold Conditions, Laser Diode Rate Equations, External Quantum

Efficiencies, Resonant Frequencies.**Photo Detectors: Physical principles of photo diodes-** The PIN and Avalanche photo diode (APD), detector response time, structures for InGaAs APDs, temperature effect on avalanche gain, comparisons of photo detectors.

UNIT-V

Optical receiver operation: Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, **Optical system design** - Point to point links, system considerations, Link Power budget, Rise time budget, Transmission distance, **Operational principles of WDM** - Types, Fiber grating filters. **Measurements** – Optical Time domain Reflectometer (OTDR). Attenuation Measurements, dispersion Measurements, EYE Patterns.

Text Books:

1. Optical fiber communications- Gerdkeiser, McGraw Hill International Edition, 4th Edition, 2010.
2. Optical fiber communications-John M. Senior, PHI, 3rd Edition, 2010.

Reference Books:

1. Principles and Applications of Optical Communications, Max Ming-Kang Liu, TMH, 2010.
2. Text book on optical fiber communication and its applications-S. C. Gupta, PHI, 2005.
3. Fundamentals of Optical Fiber communications, Satish Kumar, PHI, 2009.
4. Fiberoptic communications Technology- DjaferKmynbaev Lowell L. Scheiner, Pearson Education pte. Ltd.

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Course Title	DIGITAL IMAGE PROCESSING				B. Tech. ECE VII Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504705	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs		

Course Objectives:

- To study the image fundamentals and transforms necessary for image processing
- To learn the concepts of filtering in spatial and frequency domain
- To study different noise models and restoration filters
- To understand different redundancies and lossy and lossless compression techniques.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Define** various image processing parameters
CO 2	**Explain** image filtering, segmentation and compression
CO 3	**Compare** different 2D transforms Color models and image restoration techniques
CO 4	**Apply** the concepts of image processing techniques in various applications.
CO 5	**Analyze** mathematical operations, coding and filtering methods in image processing.

UNIT-I

Introduction: Fields that use digital image processing, fundamental Steps in Digital Image Processing, Components of an Image processing system, elements of Visual Perception. Image sensing and Acquisition, Image formation model, Image Sampling and Quantization - Representing digital images, spatial and intensity resolution. Relationship between pixels - neighbours of a pixel, Adjacency, Connectivity, Regions and boundaries, distance measures, Mathematical tools in digital image processing – Array versus matrix operations, Linear and Nonlinear Operations, Arithmetic operations, geometrical spatial transformations and image registration.

UNIT-II

Image Transforms: General approach for operating in the linear transform domain, 2-D DFT and Properties, Walsh transform, Hadamard Transform, Discrete cosineTransform, Haar transform, Slant transform, KL Transform or Hotelling transform

UNIT-III

Image Enhancement: Image enhancement in Spatial domain - Some Basic Intensity Transformations, Histogram Processing, Enhancement, Basics of Spatial filtering, Smoothing spatial filtering, sharpening spatial filters, Combining spatial enhancement methods.

Image enhancement in the Frequency Domain –Basics of filtering in frequency domain, Image smoothing and sharpening in frequency domain, homomorphic filters. Color image processing, Color fundamentals, color models.

UNIT-IV

Image Restoration: Degradation model, Noise models, Restoration in the presence of noise only – spatial filtering, Periodic noise reduction by frequency domain filtering, Linear position-Invariant degradation, Inverse filtering, least mean square (Wiener) filters, Constrained Least Squares filtering.

Image Segmentation: Point, Line and Edge detection, Edge linking and boundary detection, Thresholding, Region based segmentation – Region growing, Region splitting and merging.

UNIT-V

Image Compression: Redundancies in images, Fidelity criteria, Image compression models, Error free compression – Variable length coding, Huffman coding, Arithmetic coding, LZW coding, Bit-plane coding, loss less and lossy predictive coding, Transform coding, Image Compression standards.

Text Books:

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson Ed., 2nd Edition, 2002.

2. Fundamentals of Digital Image processing – A.K.Jain, Prentice Hall of India.

Reference Books:

1. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.

2. Digital Image Processing – William K. Pratt, John Wiley, 3rd Edition, 2004.

3. Jayaraman, S. Esakkirajan and T. Veerakumar, Digital Image Processing, Tata McGraw

Hill Education, 2011.

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Course Title	VLSI LAB				B. Tech. ECE VII Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
1504710	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		--	--	3	2	50	50	100
						End Exam Duration: 3Hrs		

Course Objectives:

- To provide knowledge on various types of combinational and sequential circuits.
- To improve the knowledge on Verilog programming.
- To find RTL schematic and synthesis reports.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Apply** switching theory in the design of logic circuits. (L3)
CO 2	**Analyze** the combinational logic circuits and sequential logic circuits. (L4)
CO 3	**Model** various digital circuits using Verilog HDL. (L5)
CO 4	**Synthesize** different logic circuits and debug using FPGA/CPLD.

Software required: Xilinx ISE simulator

List of Experiments

Combinational Design Exercises:

1. Design of 8:3 Priority Encoder.
2. Design of 4 Bit Binary to Gray code Converter.
3. Design of 4 Bit Binary to BCD Converter using sequential statement.
4. Design an 8 Bit parity generator (with for loop and Generic statements).
5. Design of 2"s Complementary for 8-bit Binary number using Generate statements.
6. Design Arithmetic Logical Unit (ALU) using VHDL.

Sequential Design Exercises:

1. Design of all type of Flip-Flops using (if-then-else) Sequential Constructs.
2. Design of 8-Bit Shift Register with shift Right, shift Left, Load and Synchronous reset.
3. Design of Synchronous 8-Bit universal shift register (parallel-in, parallel-out) with 3 state output (IC 74299).
4. Design counters (MOD 3, MOD 5, MOD 8, MOD 16).
5. Design a decimal up/down counter that counts up from 00 to 99 or down from 99 to 00.
6. Design 3-line to 8-line decoder with address latch.

Note: Implement at least two combinational and two sequential designs using FPGA/CPLD trainer kit.

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Course Title	BIO-MEDICAL INSTRUMENTATION				B. Tech. ECE VIII Sem.		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1504808	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		4	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs			

Course Objectives:

- To understand the functioning of Human Cell and its electrical characteristics.
- To get sufficient knowledge about cardiovascular measurement and circulatory System of heart
- To get familiarize with pace makers and Defibrillators
- To understand about the electrical hazards that may occur during the usage of medical instruments

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the functioning of Human Cell and its electrical characteristics
CO 2	Describe Organization of cell and various potentials
CO 3	Describe various bio-electrodes
CO 4	understand the functioning of cardiovascular measurement and circulatory System of heart
CO 5	Analyze the electrical hazards that may occur during the usage of medical instruments.

UNIT I

Components of Medical Instrumentation System: Bio-amplifier, Static and dynamic characteristics of medical instruments. Bio-signals and characteristics. Problems encountered with measurements from human beings.

UNIT II

Organization of cell: Derivation of Nernst equation for membrane Resting Potential Generation and Propagation of Action Potential, Conduction through nerve to neuro-muscular junction.

UNIT III

Bio Electrodes: Bio-potential Electrodes-External electrodes, Internal Electrodes. Biochemical Electrodes.Mechanical function, Electrical Conduction system of the heart, Cardiac cycle.Relation between electrical and mechanical activities of the heart. Pacemaker, Defibrillator

UNIT IV

Cardiac Instrumentation Blood pressure and Blood flow measurement: Specification of ECG machine. Einthoven triangle, Standard 12-lead configurations, Therapeutic equipment, Shortwave diathermy.

Respiratory Instrumentation: Mechanism of respiration, Spirometry, Pnemuotacho graph Ventilators.

UNIT V

Patient electrical safety: Types of hazards, natural protective mechanism, leakage current, patient isolation, hazards in operation rooms, grounding conditions in hospital environment.

Text Books:

1. Biomedical Instrumentation and Measurements – Leslie Cromwell and F.J. Weibell, E.A. Pfeiffer, PHI, 2nd Ed, 1980.
2. Medical Instrumentation, Application and Design – John G. Webster, John Wiley, 3rd Ed., 1998.

Reference Books:

1. Principles of Applied Biomedical Instrumentation – L.A. Geoddes and L.E. Baker, John Wiley, 1975.
2. Hand-book of Biomedical Instrumentation – R.S. Khandpur, TMH, 2nd Ed., 2003.
3. Biomedical Telemetry – Mackay, Stuart R., John Wiley, 1968.
4. Biomedical Instrumentation- M. Armugam,Anuradha agencies publications.

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