



# UNIVERSITY OF JAMMU

(NAAC ACCREDITED A + GRADE UNIVERSITY)  
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

## NOTIFICATION

(24/Aug/Adp/55)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Bodies, has been pleased to authorize the adoption of the revised Syllabi and Courses of Studies in **Bachelor of Technology (B. Tech) in Electronics and communication Engineering** for Semester V to VIII under the **Credit Based System** as per the new **AICTE Model Curriculum** adopted from batch 2022 and onwards (as given in the **Annexure**) for the candidates of **Govt. /Pvt. Engineering Colleges affiliated with the University of Jammu** for the Examinations to be held in the years indicated against each Semester as under:-

Branch	Semester	For the Examination to be held in the years
E&C	Semester-V	Dec. 2024, 2025, 2026, and 2027
Engineering	Semester-VI	May 2025, 2026, 2027 and 2028
	Semester-VII	Dec. 2025, 2026, 2027 and 2028
	Semester-VIII	May 2026, 2027, 2028 and 2029

The Syllabi of the course is available on the University Website: [www.jammuuniversity.in](http://www.jammuuniversity.in).

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DEAN ACADEMIC AFFAIRS

No. F.Acd/III/24/ 0599-0608  
Dated: 09/08/2024

Copy for information & necessary action to:-

1. Dean Faculty of Engineering
2. Principal, GCET/MBSCET /UIET/BCET/YCET
3. C.A to the Controller of Examinations
4. Joint /Assistant Registrar (Exams Prof. /Eval Prof. /Confidential)
5. Incharge University Website for uploading the same in the University Website.

Sumitasharma  
Deputy Registrar (Academic) 8/8/2024  
Subinaya 7/8/24  
7/8/24  
7/08/2024

**Item No- 01**

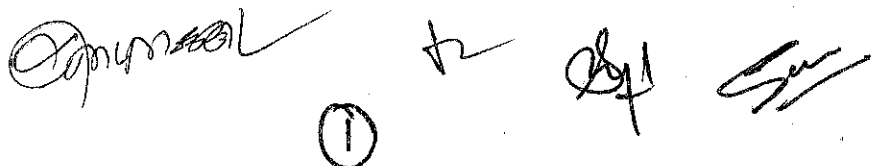
Resolved the syllabus of B.E 5<sup>th</sup> Semester starting from session 2024 of Electronics and Communication Engineering branch: -

**B.Tech. Electronics & Communication Engineering 5<sup>th</sup> Semester Examination to be held in the year Dec 2024, 2025,2026, 2027**

**B.TECH: 5<sup>th</sup> Semester**

**Contact Hours: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD			MARKS		TOTAL	Credits	% Change
			ALLOCATION L	T	P	DISTRIBUTION Internal	External			
ECT-1501	Professional Core Course	Communication Engineering- II	2	1	0	25	75	100	3	100%
ECT-1502	Professional Core Course	Microprocessor and Interfacing	2	1	0	25	75	100	3	100%
ECT-1503	Professional Core Course	Electronics Measurement & Instrumentation	2	1	0	25	75	100	3	100%
ECT-1504	Professional Core course	Linear Integrated Circuits	2	1	0	25	75	100	3	100%
EEO-2505	Open Elective Course	Non-conventional energysources and instrumentation	2	1	0	25	75	100	3	100%
CSO-3505		Python Programming								
ITO-4505		Linux shell programming								
MEO-5505		3D printing								
CEO-6505		Essentials of Civil Engineering								
EEO-2515	Open Elective Course lab	Non-conventional energysources and Instrumentation Lab	0	0	2	25	0	25	1	100%
CSO-3515		Python Programming								
ITO-4515		Linux Shell Programming Lab								
MEO-5515		3D printing Lab								
CEO-6515		Essentials of Civil Engineering Lab								
MOC-1501	Massive open-line course	SWAYAM/NPTEL	3	0	0	0	100	100	3	100%
ECP-1511	Professional Core Course Lab	Communication Engincering Lab	0	0	2	25	0	25	1	100%
ECP-1512	Professional Core Course Lab	Microprocessor and Interfacing Lab	0	0	2	25	0	25	1	100%
ECP-1513	Professional Core Course Lab	Linear Integrated Circuits Lab	0	0	2	25	0	25	1	100%
SIT-1511	Summer Internship Training	Summer Training-I	0	0	0	25	0	25	1	100%
<b>TOTAL</b>			<b>13</b>	<b>5</b>	<b>8</b>	<b>250</b>	<b>475</b>	<b>725</b>	<b>23</b>	



**REMARKS:**

1. The course titled "**Digital Communication**" with code **PEC-501** has been replaced by the course titled "**Communication Engineering-II**" with code **ECT-1501**.
2. The course titled "**Microprocessor**" with code **PEC-503** has been replaced by the course titled "**Microprocessor and Interfacing**" with code **ECT-1502**.
3. Subjects with courses titled "**Electronics Measurement & Instrumentation**" having code **ECT-1502** and "**Linear Integrated Circuits**" having code **ECT-1504** have been introduced.
4. **Open Elective courses** for interdisciplinary branches have been shifted from the 8th semester to the 5th semester to incorporate multidisciplinary courses as per NEP.
5. **Open Elective course (Labs)** for interdisciplinary branches have been shifted from the 7th semester to the 5th semester to incorporate multidisciplinary courses as per NEP.
6. The course code of the **Massive Open Online Course "SWAYAM/NPTEL"** has been changed from **MOC-604** to **MOC-1501**. The department shall offer a SWAYAM/NPTEL course from the list of courses offered by SWAYAM/NPTEL around the commencement of the semester. However, the selected Massive Open Online Course should not be similar to the regular courses offered as part of the department curriculum.
7. Three new Professional Core Course labs have been introduced: "**Communication Engineering Lab**" (**ECP-1511**), "**Microprocessor and Interfacing Lab**" (**ECP-1512**), and "**Linear Integrated Circuits Lab**" (**ECP-1513**), replacing the existing "Microwave and Radar Lab" (ECE-511), "Power Electronics Lab" (ECE-512), "Microprocessor Lab" (PEC-513), and "OOPs Lab" (ECP-514).
8. "Industrial Training-1" having code **PIT-504** has been replaced by the course titled "**Summer Training-I**" with code **SIT-1511**.

*Approved*

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**Item No- 02**

Resolved the syllabus of B.E 6<sup>th</sup> Semester starting from session 2024 of the Electronics and Communication Engineering branch: -

**B.Tech. Electronics & Communication Engineering 6<sup>th</sup> Semester Examination to be held in the year May 2025, 2026, 2027, 2028**

**B.TECH: 6<sup>th</sup> Semester**

**Contact Hours: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
ECT-1601	Professional Core Course	<b>Embedded systems and Microcontroller</b>	2	1	0	25	75	100	3	100%
ECT-1602	Professional Core Course	<b>Wireless Communication</b>	2	1	0	25	75	100	3	100%
ECT-1603	Professional Core Course	<b>Microwave Theory &amp; Techniques</b>	2	1	0	25	75	100	3	100%
ECT-1604	Professional Core Course	<b>Internet of Things</b>	2	1	0	25	75	100	3	100%
HMT-7601	Humanities and Social science Course	<b>Fundamentals of Economics</b>	2	1	0	25	75	100	3	100%
EET-2607	Engg Science Courses/ Massive open online course	<b>Electrical Machines</b>	2	1	0	25	75	100	3	100%
EET-2602		<b>Power Electronics</b>								
MOC-1601		<b>SWAYAM/NPTEL</b>				-	100			
ECP-1611	Professional Core Course Lab	<b>Embedded systems and Micro-controller lab</b>	0	0	2	25	0	25	1	100%
ECP-1613	Professional Core Course Lab	<b>Microwave Engineering lab</b>	0	0	2	25	0	25	1	100%
ECP-1614	Professional Core Course Lab	<b>IoT Lab</b>	0	0	2	25	0	25	1	100%
MOC-1611	Massive open online course	<b>MOOCs</b>	0	0	2	50	0	50	2	100%
<b>TOTAL</b>			<b>12</b>	<b>6</b>	<b>8</b>	<b>275/250*</b>	<b>450/475*</b>	<b>725</b>	<b>23</b>	

\* In case of SWAYAM/NPTEL

**REMARKS:**

1. The course "**Embedded System**" with code PEC-601 has been replaced by the course titled "**Embedded Systems and Microcontroller**" with code **ECT-1601**.
2. The course titled "**Wireless Communication**" with course code PEC-703(A) has been shifted from the 7th semester to the 6th semester with the new course code **ECT-1602**.
3. A new subject titled "**Microwave Theory & Techniques**" with course code **ECT-1603** has been introduced.

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Ritu Sharma  
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4. The elective course "**Internet of Things**" with code PEC-704(C) has been shifted from the 7th semester to the 6th semester with the new course code **ECT-1604**.
5. Under the **Human & Social Science course category**, the course "**Fundamentals of Economics**" with code **HMT-7601** has been introduced, replacing the electives "Engineering Economics" (HMC-602) and "Organizational Behavior" (HMC-603).
6. New courses have been introduced as electives viz. under **Engineering Science Courses: "Electrical Machines" (code EET-2607) and "Power Electronics" (code EET-2608)**, as well as Massive Open Online Course (SWAYAM/NPTEL) with code MOC-1601. Under MOOC, the department will offer a SWAYAM/NPTEL course from the list of courses offered by SWAYAM/NPTEL around the commencement of the semester. However, the selected MOOC should not be similar to the regular courses offered as part of the department curriculum. The student has to opt for one course out of **Engineering Science Courses/ Massive Open Online Course**.
7. Two new Professional Core Course labs have been introduced: "**Embedded Systems and Microcontroller Lab**" (**ECP-1611**) and "**Microwave Theory & Techniques Lab**" (**ECP-1613**), replacing the existing "Embedded Systems Lab" (PEC-611) and "Integrated Circuits and Instrumentation Lab" (PEC-614).
8. The course code for the "**Internet of Things Lab**" has been changed from PEC-615 to **ECP-1614**.
9. The course code for the **Massive Open Online Course** has been changed from MOC-617 to **MOC-1611**.

*Approved*

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**Item No- 03**

Resolved the syllabus of B.Tech 7<sup>th</sup> Semester starting from session 2025 of the Electronics and Communication Engineering branch: -

**B.Tech. Electronics & Communication Engineering 7th Semester Examination to be held in the year Dec. 2025,2026, 2027,2028**

**B.TECH: 7<sup>th</sup> Semester**

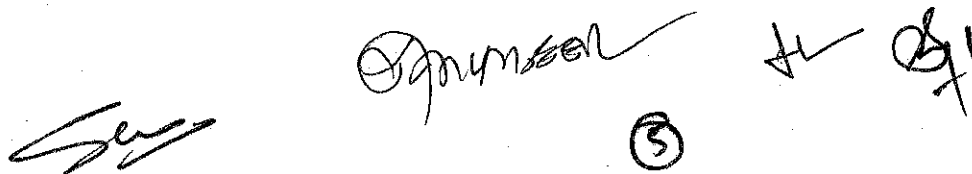
**Contact Hours: 24**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
ECT-1701	Professional Core Course	Digital VLSI Techniques	2	1	0	25	75	100	3	100%
ECT-1702	Professional Core Course	Antenna and Wave Propagation	2	1	0	25	75	100	3	100%
ECT-1703	Professional Elective Course/MOOC	Digital Image Processing	2	1	0	25	75	100	3	100%
ECT-1704		Artificial Neural Networks								
MOC-1701		SWAYAM/NPTEL				-	100			
ECT-1705	Professional Elective Course/Engineering Science courses	<del>Optical Communication</del> Fibre and Optical Communication	2	1	0	25	75	100	3	100%
ECT-1706		Information Theory and coding								
CST-3706		AI & ML								
PRJ-1711	Mini Project	Mini Project	0	0	4	100	0	100	2	100%
ECT-1711	Professional Core Course Lab	Digital VLSI Lab <del>Design Techniques</del>	0	0	2	25	0	25	1	100%
NCC-6701	Non-Credit Course	Disaster management	2	0	0	Satisfactory/ Unsatisfactory			0	100%
SIT-1711	Summer Industrial Internship	Summer Training-II	0	0	0	50	0	50	2	100%
SEM-1711	Seminar	Seminar	0	0	4	50	0	50	2	100%
<b>TOTAL</b>			<b>10</b>	<b>4</b>	<b>10</b>	<b>325/300*</b>	<b>300/325*</b>	<b>625</b>	<b>19</b>	

\* In case of SWAYAM/NPTEL

**REMARKS:**

1. The course **VLSI** having code **PEC-701** has been replaced by course titled **Digital VLSI Techniques** having Code **ECT-1701**.
2. The Subject with Course code **PEC-603** titled "**Antenna & Wave Propagation**" has been shifted from 6th semester to 7th semester having Course Code **ECT-1702**.
3. The course code of subjects **Digital Image Processing PEC704(A)**, **Artificial Neural Networks PEC704(B)** under Professional Elective Course has been changed to **Digital Image Processing(ECT-1703)** and **Artificial Neural Networks (ECT-1704)**. Further, **Massive Open Online Course( SWAYAM/NPTEL)** with code **MOC-1701** has also been introduced with an option to choose one course out of Professional Elective Course/MOOC. Under MOOC, the department will offer a SWAYAM/NPTEL course from the list of courses offered by



SWAYAM around the commencement of the semester. However, the selected MOOC should not be similar to the regular courses offered as part of the department curriculum.

4. Under Professional Elective Course, Subjects "**Fiber Optics and Communication**" has been shifted from 8th **semester to 7th** semester having Course Code ECT-1705 and the course code of **Information Theory and coding** has been changed from PEC703(B) to ECT-1706. Also new subject **AI & ML** has been introduced under Engineering science course as elective. The students has t choose one subject out of the three subjects.
5. New subject **Mini Project** having code **PRJ-1711** has been introduced.
6. **VLSI Lab** having code **PEC7011** has been changed with **Digital VLSI Lab** having code **ECT-1711**
7. Disaster management having code **NCC-6701** has been introduced in place subject **Professional Practice law & Ethics** having code **NCC701**.
8. The name and course code of Industrial Training -II (PIT-701) has been changed to Summer Training-II having codeSIT-1711.
9. The code of seminar has been changed from **SEM 701** to **SEM1711**.

*Sanj* *Dharmendra* *HL* *By*

**Item No- 04**

Resolved the syllabus of B.Tech 8<sup>th</sup> Semester starting from session 2024 of the Electronics and Communication Engineering branch: -

B.Tech. Electronics & Communication Engineering 8th Semester Examination to be held in the year  
May 2026, 2027, 2028, 2029

**SCHEME-I**

Contact Hours: 26

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
ECT-1801	Professional Elective Course	Satellite Communication	2	1	0	25	75	100	3	100%
ECT-1802		Biomedical Electronics								
ECT-1803	Professional core Course	Computer Networks	2	1	0	25	75	100	3	100%
ECP-1813	Professional core Course	Computer Networks lab	0	0	2	25	0	25	1	100%
MOC-1811	Massive open online course	MOOC	0	0	2	25	0	25	1	100%
PRJ-1811	Project	Project	0	0	16	150	50	200	8	100%
<b>TOTAL</b>			<b>4</b>	<b>2</b>	<b>20</b>	<b>250</b>	<b>200</b>	<b>450</b>	<b>16</b>	

OR

**SCHEME-II**

Contact Hours: 26

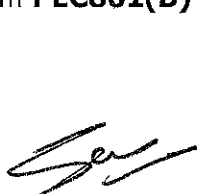
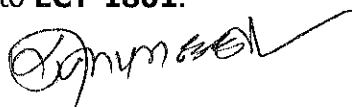
COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
PII-1811	Professional Industry Course	Industry Internship	0	0	24	325	100	425	15	100%
MOC-1811	Massive open online course	MOOC	0	0	2	25	0	25	1	100%
<b>TOTAL</b>			<b>0</b>	<b>0</b>	<b>26</b>	<b>350</b>	<b>100</b>	<b>450</b>	<b>16</b>	

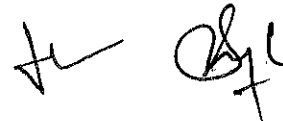
**Remarks:**

**Students have the choice to opt among Scheme -I and Scheme -II**

**SCHEME-I**

- Under Professional Elective Courses, New Subject with course code **ECT-1802** titled "**Biomedical Electronics**" has been introduced in place of Fibre Optics & communication and the subject code of **Satellite communication** has been changed from **PEC801(B)** to **ECT-1801**.



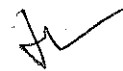
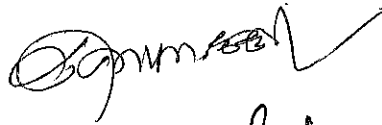


2. The Subject with Course code **PEC-702** titled "**Computer Networks**" has been shifted from 7th semester to 8<sup>th</sup> semester having Course Code **ECT-1802** titled "**Computer Networks**"
3. The lab with Course code **PEC-712** titled "**Computer Networks lab**" has been shifted from 7th semester to 8<sup>th</sup> semester having Course Code **ECP-1813 lab**.
4. The course code of **Massive Open Online** has been changed from **MOC-801** to **MOC-1811** WITH change in title **SWAYAM/NPTEL** any other MooC platform.
5. The course code of Project has been changed form PRJ 801 to PRJ 1811

OR

**SCHEME-II**

1. The course code of Industry Internship has been changed from PII 801 to PII-1811.
2. The course code of **Massive Open Online** has been changed from **MOC-801** to **MOC-1811** with change in title **SWAYAM/NPTEL** any other MooC platform.



# UNIVERSITY OF JAMMU

**B.Tech. Electronics & Communication Engineering 5<sup>th</sup> Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**B.TECH 5<sup>th</sup> semester**

**Contact Hours: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD			MARKS		TOTAL	Credits	% Change
			L	T	P	Internal	External			
ECT-1501	Professional Core Course	Communication Engineering- II	2	1	0	25	75	100	3	100%
ECT-1502	Professional Core Course	Microprocessor and Interfacing	2	1	0	25	75	100	3	100%
ECT-1503	Professional Core Course	Electronics Measurement & Instrumentation	2	1	0	25	75	100	3	100%
ECT-1504	Professional Core course	Linear Integrated Circuits	2	1	0	25	75	100	3	100%
EEO-2505	Open Elective Course	Non-conventional energysources and instrumentation	2	1	0	25	75	100	3	100%
CSO-3505		Python Programming								
ITO-4505		Linux shell programming								
MEO-5505		3D printing								
CEO-6505		Essentials of Civil Engineering								
EEO-2515	Open Elective Course lab	Non-conventional energysources and Instrumentation Lab	0	0	2	25	0	25	1	100%
CSO-3515		Python Programming								
ITO-4515		Linux Shell Programming Lab								
MEO-5515		3D printing Lab								
CEO-6515		Essentials of Civil Engineering Lab								
MOC-1501	Massive open-line course	SWAYAM/NPTEL	3	0	0	0	100	100	3	100%
ECP-1511	Professional Core Course Lab	Communication Engineering Lab	0	0	2	25	0	25	1	100%
ECP-1512	Professional Core Course Lab	Microprocessor and Interfacing Lab	0	0	2	25	0	25	1	100%
ECP-1513	Professional Core Course Lab	Linear Integrated Circuits Lab	0	0	2	25	0	25	1	100%
SIT-1511	Summer Internship Training	Summer Training-I	0	0	0	25	0	25	1	100%
<b>TOTAL</b>			<b>13</b>	<b>5</b>	<b>8</b>	<b>250</b>	<b>475</b>	<b>725</b>	<b>23</b>	

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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025,2026, 2027**

**CLASS: B.TECH. 5TH SEMESTER  
BRANCH: E&C ENGINEERING**

**COURSE NO: ECT-1501  
COURSE TITLE: COMMUNICATION ENGG-II  
DURATION OF EXAM: 3 HOURS**

**Credits: 3**  
**Hours/ Week**      **Marks Distribution**  
**L   T   P**      **Theory    Sessional**  
**2   1   0**      **75        25**

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
CO1	Understand the geometric representation of signals and their interpretation in signal space diagrams.
CO2	Analyze digital communication systems using techniques such as error control coding, and multiplexing.
CO3	Critically evaluate the advantages, limitations, and trade-offs of different digital communication techniques and technologies in various application scenarios.
CO4	Implement and analyze spread spectrum communication systems with an understanding of synchronization requirements and techniques
CO5	Apply information theory concepts to analyze and optimize communication system performance in terms of data rate, coding efficiency, and channel capacity

**SECTION-A**

**Digital Modulation Techniques:** Introduction, Types of digital modulation techniques, FSK, ASK, BPSK, DPSK, QPSK generation and reception, Differentially encoded PSK (DEPSK), M-ary PSK, MSK, Comparison of digital modulation techniques. **(10 Hours)**

**Multiplexing and Multiple Access:** Allocation of communication Resources, FDM/FDMA, TDM/TDMA, CDMA **(07 Hours)**

**Spread Spectrum Techniques:** Spread Spectrum Overview, Pseudo-noise Sequences, Direct Sequence and Frequency Hopped Systems, Synchronization of DS and FH systems. **(10 Hours)**

**SECTION-B**

**Information theory:** Information, Information rate, Entropy, Shannon theorem, capacity of Gaussian channel, source coding and coding efficiency, Shannon Fano coding, Huffman coding. **(8 Hours)**

**Line Coding:** NRZ, RZ, Manchester **(05 Hours)**

**Channel coding:** Block codes : coding and decoding, Soft and hard decision, CRC code, Convolution coding and decoding, State & Trellis diagrams, Viterbi Algorithm. **(06 Hours)**

**TEXT BOOKS**

- Principles of Communication Systems, Taub and Schilling Tata McGrill
- Principles of Communication Systems, Bernard Sklar

**RECOMMENDED BOOK**

- Communication Signals and Systems, S. Haykins Wiley
- Principles of Digital Communication J. Das, S.K. Mullick, P.K. Chatterjee, New Age International Ltd
- Digital Communications, J.G. Proakis Tata McGraw Hill

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**CLASS: B.TECH.. 5TH SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO: ECT-1502  
COURSE TITLE: MICROPROCESSORS AND INTERFACING  
DURATION OF EXAM: 3 HOURS**

**Credits: 3**  
**Hours/ Week**  
**L T P Theory Sessional**  
**2 1 0 75 25**

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
CO1	Understand the Architecture of 8085 and 8086 Microprocessors and their working with instruction set.
CO2	Implementation of Hardware and software techniques of interfacing digital devices (I/P, O/P) with microprocessor-based systems and provide solutions to real-world problems
CO3	Design and analysis of operation & interfacing of different Peripheral I/C's, memory chips with advanced Processors.
CO4	Comparison of advanced architecture of microprocessors with earlier systems

**SECTION-A**

**Unit I: The 8085 Microprocessor**

Introduction to Microprocessor – Pin diagram and Architecture and block diagram of Microprocessor 8085-Internal registers (8-bit & 16-bit)-CPU-ALU-Types of System Bus-Bus Structure- multiplexing and demultiplexing address/data Bus-Instruction Register and Decoder - Timing and Control Unit-Interrupts and Serial I/O (principle only)-external memory and its types. (No programming using 8085). **(07 Hours)**

**Unit II: The 8086 MICROPROCESSOR**

Introduction to 8086, Microprocessor architecture, Memory segmentation, Even & Odd memory banks, Memory interface addressing modes, Instruction set and assembler directives, Timing diagrams, Assembly language programming, Stack and subroutines, Procedures and Macros, Interrupts and interrupt service routines, Byte and String Manipulation, Programming technique using Macros and Procedures. **(10 Hours)**

**SECTION-B**

**Unit III: 8086 MAX Mode**

System design using 8086 (Min and Max mode), I/O programming, Introduction to Multi-programming, System Bus Structure, Multiprocessor configurations, Coprocessor, closely coupled and loosely Coupled configurations. The architecture of 8087 and its interfacing with 8086. **(08 Hours)**

**Unit IV: I/O INTERFACING**

Difference between Memory Interfacing and I/O interfacing — Parallel ports using PPI 8255, Interrupt controller 8259, DMA controller- 8257 **(10 Hours)**

**Unit V: ADVANCED PROCESSORS:** Architecture/Block diagram along with features of Pentium, Dual Core, **(05 Hours)**

**RECOMMENDED BOOKS:**

- |                                                  |                |
|--------------------------------------------------|----------------|
| • Microprocessor Architecture Programming & App. | Ramesh Gaonkar |
| • Microprocessor & Interfacing Programming       | Douglas V Hall |
| • Microprocessor Systems                         | Liu Gibson     |
| • The Intel Microprocessor                       | Brey           |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**CLASS: B.TECH. 5TH SEMESTER  
BRANCH: E&C ENGINEERING.**

**COURSE NO: ECT-1503**

**COURSE TITLE: ELECTRONICS MEASUREMENT & INSTRUMENTATION**

**DURATION OF EXAM: 3 HOURS**

**Credits: 3**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
CO1	Describe basic principles of instrumentations and measurements associated with engineering, design and the general technology applications
CO2	Use and calibrate common errors in instruments and their analysis.
CO3	Selecting appropriate sensors, instruments, display devices and analyzers for the task under consideration
CO4	Understanding various transducers available, their operating principles, strengths and weaknesses.
CO5	Select optimum transducer, analyzers and display devices to assemble a system for routine measurements of environmental and dynamic phenomena

**SECTION-A**

**Instrumentation Scheme & Characteristics:** Definition, Application and Methods of Measurements, Instrument Classification, Functional Elements of an instrument, Input Output Configuration of Measuring Instruments, Methods of Correction for Interfer-ing and Modifying Inputs, Standards, Calibration, Accuracy, Precision, Loading Effects, Selection of Instruments, Measurement Systems–Static and Dynamic Characteristics. **(6Hours)**

**Error analysis:** Types of errors, Methods of error analysis, Uncertainty Analysis, Statistical Analysis, Gaussian Error Distribution, Rejection of Data, Method of Least Square, Curve Fitting, Graphical Analysis. **(6Hours)**

**DC & AC Measurement:** Analog Ammeter, Voltmeter and Ohmmeters, PMMC, Moving Iron, Electro-dynamometer, Electrostatic, Ohmmeter, Digital type voltmeter, AC Voltmeter using Rectifier, True RMS Voltmeter, Digital VOM Meter. DC/AC Bridges-measurement of Resistance, Capacitance and Inductance, Q meter-measurement of Resistance, capacitance, and Inductance. **(9Hours)**

**SECTION-B**

**Transducers:** Principles, Classification, Guidelines for Selection, Requirements, Types and Application of Transducers, Resistance, Capacitance, Inductance Transducers, Potentiometer, Strain Gauges, LVDT, Piezo Electric Transducers, Resistance Thermometers, Thermocouples, Thermistors, Photosensitive Device, Capacitive Transducer, Hall Effect Transducers, Thermo Sensors using Semiconductor Devices. **(10Hours)**

**Display and Indicating Devices:** Remote sensing, Geographical Information System, Digital Display Devices and Recorders, Digital CRO: introduction, working, Lissajous patterns. **(5Hours)**

**Signal Generators and Analyzers:** Function Generators, RF Signal Generators, Sweep Frequency Generator, Frequency Synthesizer, Wave Analyzer, Harmonic Distortion Analyzer, Spectrum Analyzer. **(5Hours)**

**BOOKS RECOMMENDED:**

- Modern Electronic Instrumentation and Measurement Techniques A.D. Helfrick and W.D. Cooper, Prentice Hall.
- Instruments and Measurements C.N. Herrick
- Electrical and Electronic Measurements and Instrumentation A. K Sawhney

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed

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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**CLASS: B.TECH. 5TH SEMESTER  
BRANCH: E&C ENGINEERING**

**COURSE NO: ECT-1504  
COURSE TITLE: LINEAR INTEGRATED CIRCUITS  
DURATION OF EXAM: 3 HOURS**

Credits: 3			Marks Distribution	
Hours/ Week			Theory	Sessional
L	T	P		
2	1	0	75	25

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Understand the theoretical and the circuit aspects of operational amplifier and its characteristics
CO2	Understand the DC and AC characteristics of operational amplifier and its effect on output.
CO3	Design the liner and non liner applications of an op amp for special applications.
CO4	Classify and comprehend the working principle of data converters.
CO5	Illustrate the function of application specific IC's such as voltage regulators, PLL etc. for application in communication.

**SECTION-A**

**Basic Operational Amplifiers:** Basic differential amplifiers, Its working & types, Transfer characteristics, Small Signal analysis of differential amplifier, using h-parameter, Differential Gain & Common-Mode Gain, Constant Current basic circuit, Constant Current source/Current mirror circuit, Level shifting techniques, Active load, Output stage. **(8Hours)**

**Ideal & Practical Op-Amp & Characteristics:** Block diagram , Op-amp symbol, terminals and specifications, characteristics of ideal & practical operational amp, Ideal voltage transfer curve, Open loop Op-amp configurations, Op-Amp as inverting, Non-inverting amplifier, Differential amplifiers using one and two Op-Amp, Op-amp Characteristics, Offset voltage compensating N/W, Frequency response of internally compensating Op-amp, High frequency Op-Amp equivalent circuit, Open loop & close loop frequency response, Circuit Stability, Slew rate and its cause. **(12Hours)**

**SECTION-B**

**Op-Amp Applications:** DC & AC Amplifier, AC amplifier with single power supply, Peaking amplifier, Summing, Scaling & Averaging amplifiers using inverting/Non-inverting Configurations, Differential input / Differential output amplifier, High input impedance circuit, Active filters, Integrator, Differentiator, Instrumentation amplifier. **(8Hours)**

**Op-Amp circuits and Waveform generators:** Square, Triangular, Saw tooth, Sine wave generator, Op-amp, as clipper, Clamper & comparator circuits, Voltage limiter, Peak detector, comparators, zero crossing detector, Schmitt trigger. **(6Hours)**

**Data Conversion Devices :** Digital to Analog Converter, Binary Weighted Resistor, R-2R Resistor type D/A Converters, A/D Converters & its types; Dual slope, Successive approximation & Counter type A/D Converter. **(4Hours)**

**Phase-Locked Loops & 555 Timers:** Block diagram and its working, applications. **(4Hours)**

**BOOKS RECOMMENDED:**

- |                                      |                          |
|--------------------------------------|--------------------------|
| • Op-Amp & Linear Integrated Circuit | Ramakant A. Gayakwad     |
| • Linear Integrated Circuit          | Wixer                    |
| • Linear Integrated Circuit          | Tobey Graeme & Huelsomen |
| • Op-Amp Design Application          | Dailey                   |
| • Design with Op-Amp                 | Franco                   |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**CLASS: B.TECH. 5TH SEMESTER  
BRANCH: ECE/ CSE/ IT/ ME/ CIVIL ENGG.**

**Credits: 3**

**COURSE NO: EEO-2505**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

**COURSE TITLE: NON-CONVENTIONAL ENERGYSOURCES AND INSTRUMENTATION**

**DURATION OF EXAM: 3 HOURS**

Course Outcomes: Student will be able to	
CO1	Understand the need of energy, Various types of energy and scenario.
CO2	Identify non-conventional energy as alternate form of energy and to know how it can be tapped.
CO3	Understanding various methods of measurement and instrumentation.
CO4	Understanding different types of wattmeter and their errors.

**SECTION -A**

**Module 1: Introduction:** Limitations of conventional energy sources need & growth of alternate energysources, basic schemes and applications of direct energy conversion. Photovoltaic effect, characteristics of photovoltaic cells, conversion efficiency, solar batteries and applications. Solar energy in India, solar collectors, solar furnaces & applications. Geothermal system, Characteristics of geothermal resources, choice of generators, electric equipment and precautions. Low head hydro plants, definition of low head hydro power, choice of site and turbines. (12Hours)

**Module 2: Wind Energy & MHD Generators:** History of wind power, wind generators, theory of wind power, characteristics of suitable wind power sites, scope in India. Basic Principles and Halfeffect, generator and motor effect, different types of MHD generators, conversion effectiveness. Practical MHD generators, applications and economic aspects. (10Hours)

**SECTION-B**

**Module 3: Measuring Instruments:** Classification, effects utilized in measuring instruments. Indicating instruments: Deflection, controlling and damping forces, various dampings. Measurement of low resistance: - Potentiometer method, Kelvin double bridge. Ammeters and Voltmeters: Moving coil, moving iron ammeter and voltmeters, Errors in Ammeters and Voltmeters. (11Hours)

**Module 4: Measurement of Power:** Wattmeter measurement in single phase A.C. circuits, Wattmeter errors. Measurement of three phase power by two wattmeter methods. Energy meters for A.C. circuits, Theory of Induction type meters. (10Hours)

**RECOMMENDED BOOKS:**

- |                                                                        |                           |
|------------------------------------------------------------------------|---------------------------|
| • Non-conventional Energy Resources                                    | D.S. Chauhan              |
| • Conventional energy sources                                          | G.D. Rai                  |
| • Non-Conventional energy sources                                      | B.H. Khan                 |
| • Solar Energy Fundamentals and Applications                           | H.P. Garg and Jai Prakash |
| • A course in Electrical and Electronics Measurement & instrumentation | A.K. Sawhney              |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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BTech. Electronics & Communication Engineering 5<sup>th</sup> Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027

CLASS: B.TECH. 5<sup>TH</sup> SEMESTER  
BRANCH: ECE/EE/ IT/ ME/ CIVIL ENGG.

COURSE NO: CSO-3505  
COURSE TITLE: PYTHON PROGRAMMING  
DURATION OF EXAM: 3 HOURS

CREDITS:3

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Describe the syntax and semantics of Python programming language.
CO2	Understand the use of loops and decision-making statements to solve problems.
CO3	Identify the methods to create and manipulate lists, tuples and dictionaries.s
CO4	Demonstrate proficiency in handling and creation of functions.

**SECTION – A**

**Introduction to Python:** Introduction to Python, history of Python, Unique features of Python, Python Syntax compared to other programming languages, First Python Program. **(4 Hours)**

**Beginning Python Basics:** Python Identifiers, Keywords and Indentation, Python Data Types, The Integer, Floating-Point, and String Data Types, String Operations in Python, Storing Values in Variables, Comments, Simple Input & Output, Operators in python. **(7 Hours)**

**Flow control:** Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Indentation, The If statement and its related statement, an example with If and its related statement, the while loop, the for loop, the range statement, Break & Continue, Examples for looping **(7 Hours)**

**SECTION – B**

**Python Data Structures:** Lists: Definition and syntax, Indexing and slicing, List methods (e.g., append(), extend(), insert(), remove(), pop(), clear(), index(), count(), sort(), reverse()), Iterating through lists; Tuples: Definition and syntax, Immutable nature, Accessing elements, Tuple methods (e.g., count(), index()); Dictionaries: Definition and syntax, Key-value pairs, Accessing elements by key, Adding, updating, and deleting key-value pairs, Dictionary methods (e.g., keys(), values(), items()), Iterating through dictionaries **(10 Hours)**

**Functions in Python:** Function definition, Function calling, Return statement, Scope, Default arguments, Variable-length arguments (Using \*args and \*\*kwargs), Docstrings, Lambda functions, Recursion, Function composition, Built-in functions (like print(), input(), len(), range(), map(), filter(), sorted()) **(10 Hours)**

**BOOKS RECOMMENDED:**

- Gowrishankar S, Veena A, Introduction to Python Programming

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**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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**BTech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**CLASS: B.TECH. 5<sup>TH</sup> SEMESTER  
BRANCH: ECE /EE/CSE/ ME/ CIVIL ENGG.**

**CREDITS: 3**

**COURSE NO: ITO-4505  
COURSE TITLE: LINUX SHELL PROGRAMMING**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

<u>COURSE OUTCOMES</u>	
At the end of the course student will be able to:	
<b>CO1</b>	Explain multi user OS LUNIX and its basic features
<b>CO2</b>	Interpret LUNIX Commands, Shell basics, and shell environments
<b>CO3</b>	Design and develop shell programming, communication, System calls and terminology.
<b>CO4</b>	Design and develop LINUX File I/O and LUNIX Processes.

**Section- A**

**Overview of Linux:** What is Linux, Linux, s root in Unix, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Overview of Unix and Linux architectures, hardware requirements for Linux, hardware requirements for Linux, Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons. **(6 Hours)**

**Essential Linux commands:** Processes in Linux Process fundamentals, Connecting processes with pipes, Redirecting input, Redirecting output Background processing , Managing multiple processes, Process scheduling – (at,batch), nohupcommand, kill, ps, who, find, sort, touch, file,File processing commands – wc, cut, paste etc ,Mathematical commands – expr, factor etc ,Creating files with vi editor. Editing files with vi editor **(6 Hours)**

**Shell programming:** Basics of shell programming ,various types of shell available in Linux,Comparisonsbetween various shells ,Shell programming in bash ,Conditional statements,Looping statements, Case statement ,Parameter passing and arguments, Shell variables ,System,shell variables shell keywords ,Creating Shell programs for automating system tasks. **(8Hours)**

**Section- B**

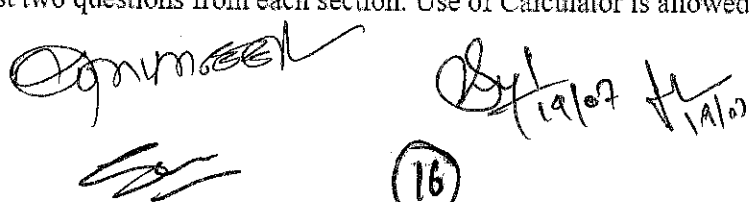
**System administration:** Common administrative tasks ,identifying administrative files,Configuration and log files ,Role of system administrator ,Managing user accounts -adding users ,Managing user accounts -deleting users ,Changing permissions and ownerships ,Creatingnd managing groups ,Temporary disabling of users accounts ,Creating and mounting file system,Checking and monitoring system performance ,file security & Permissions ,becoming super user using su ,Getting system information with uname, host name ,Disk partitions & sizes ,rpm command. **(12 hours)**

**Simple filter commands & Understanding various Servers.**Filter Commands-pr, head, tail,Filter Commands -cut, sort,Filter Commands- uniq, tr,Filter using regular expression grep,DHCPDNS,ApacheSquid,Apache,Telnet,FTP,Samba. **(8 hours)**

**Books Recommended:**

- UNIX Shell Programming, First edition, BPB, YeswantKanethkar
- Red Hat Linux Bible, Wiley Dreamtech India 2005 edition. Cristopher Negus
- Linux System Programming, Robert Love, O'Reilly, SPD

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.


  
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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025,2026, 2027**

**CLASS: B.TECH. 5<sup>TH</sup> SEMESTER**  
**BRANCH: ECE/EE / CSE/ IT/ CIVI ENGG.**

**CREDITS: 3**

**COURSE NO: MEO-5505**  
**COURSE TITLE: 3D PRINTING**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

<b>COURSE OUTCOMES</b>	
<b>On completion of the course the students will be able to:</b>	
CO 1:	Identify key 3D printing technologies, and corresponding major industry segments
CO 2:	Identify key material properties for 3D printability for each printing technique
CO 3:	Compare and differentiate printing methods and printable materials based on specific application
CO 4:	Manufacture devices and tools using 3D printing
CO 5:	Assess the 3D printing industry and the global effects of 3D printing particularly on engineering and manufacturing

**SECTION-A**

**3D Printing Materials:**

Types of Materials, Properties of materials, Application of materials in mechanical, chemical, electronics and software industry, Selection of Materials, Smart materials, Materials for 3D Printing, Bio materials, composite materials etc.

**Introduction to Design, Prototyping fundamentals.** Introduction to 3D printing, its historical development, Commonly used terms in 3D modelling, Data Conversion, and transmission, Checking and preparing, Building, Post processing, RP data formats, Classification of 3D printing process, Applications to various fields.

**Pre-Processing in 3D Printing (3D Modeling and Design)**

Creation of 2D geometry using Auto CAD, 2D drawing space, AutoCAD Modify commands, Construct orthographic sectional views of brackets with dimension in different layers, 3D solid Modeling Create 3D solid and edit solid, Create a new assembly, insert components into an assembly, Design for 3D printing.  
**(20 Hours)**

**SECTION-B**

**Liquid Based 3D Printing:**

Stereo lithography apparatus (SLA): Models and specifications, process, working principle, photopolymers, photo polymerization, layering technology, laser and laser scanning, applications, advantages and disadvantages.

Solid ground curing (SGC): Models and specifications, process, working principle, applications, advantages and Disadvantages.

**Solid Based 3D Printing**

Laminated object manufacturing (LOM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages.

Fused Deposition Modeling (FDM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages.  
**(20 Hours)**

**RECOMMENDED BOOKS:**

- Additive Manufacturing Technology Ian Gibson, Davin Rosen
- Additive Manufacturing Fundamentals and Advancement Manu Srivastava, Sachin Maheshwari
- 3D printing and Additive Manufacturing Chua Chee Kai, Leong Kah Fai

**TEXT & REFERENCES:**

- Chua C.K., Leong K.F. and LIM C.S Rapid prototyping: Principles an Applications, World Scientific publications, 3rdEd., 2010
- Ian Gibson, Davin Rosen, Brent Stucker "Additive Manufacturing Technologies, Springer, 2nd Ed, 2014.

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025,2026, 2027**

**CLASS: B.TECH. 5<sup>TH</sup> SEMESTER**  
**BRANCH: E&C/EE /CSE/ IT/ MECHANICAL ENGG.**

**CREDITS: 3**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

**COURSE NO: CEO-6505**

**COURSE TITLE: ESSENTIALS OF CIVIL ENGINEERING**

<b>COURSE OUTCOMES :</b>	
On completion of the course the students will be able to:	
CO1	Able To Identify The Properties Of Building Materials.
CO2	Perform various tests on building materials.
CO3	Acquaint With The Masonry Construction And Finishes
O4	Carry Out Surveying In The Field For Engineering Projects.

**SECTION-A**

**Brick:** Classification of Bricks, Constituents of Good Brick Earth, Harmful Ingredients, Manufacturing Of Bricks, Testing Of Bricks.

**Timber:** Classification Of Timber, Structure Of Timber, Seasoning Of Timber, Defects In Timber And Prevention Of Timber.

**Aggregates:** Classification Of Aggregates And Various Tests Conducted On Aggregates

**Cement:** Composition Of Cement, Types Of Cement, Manufacturing Of Cement, Tests On Cement.

**Concrete :** Grades Of Concrete, Strength Of Concrete, RMC ( Manufacturing Of RMC, Transportation), Tests On Concrete. (20hrs)

**SECTION-B**

**Masonry Construction Introduction:** Various Terms Used, Stone Masonry-Dressing Of Stones, Classifications Of Stone Masonry, Safe Permissible Loads, Brick Masonry-Bonds In Brick Work, Laying Brick Work, Defects In Brick Masonry, Composite Stone And Brick Masonry.

**Foundations:** Purpose, Site Exploration, Methods Of Testing Bearing Capacity Of Soils, Types Of Foundations.

**Introduction to Surveying:**Principles Of Surveying, Measurement Of Distance. Chain Surveying, Field Equipment, Methods of Chain Surveying, Plotting From The Field Books And Degree Of Accuracy, Tape Corrections.

**Levelling:** Instruments Used and Field Book Recording, Height Of Instrument Method, Rise And Fall Method, Temporary And Permanent Adjustments In Levels. (20hrs)

**BOOKS RECOMMENDED:**

- |                                    |              |
|------------------------------------|--------------|
| • BUILDING MATERIAL & CONSTRUCTION | SUSHIL KUMAR |
| • BUILDING MATERIAL                | PRABIN SINGH |
| • SURVEYING VOL.- I                | B.C PUNMIA.  |
| • CONCRETE TECHNOLOGY              | M.L GAMBHIR  |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025,2026, 2027**

**CLASS: B.TECH. 5<sup>th</sup> SEMESTER**

**CREDIT: 1**

**BRANCH: E&C/CSE / IT/ MECHANICAL/ CIVIL ENGG.**

**COURSE NO.: EEO-2515**

**Hours/ Week**

**Marks Distribution**

**COURSE TITLE: NON-CONVENTIONAL ENERGY RESOURCES  
AND INSTRUMENTATION LAB**

L	T	P
0	0	2

Practical
25

Course Outcomes: Student will be able to	
CO1	Measure phase and frequency using CRO and Multimeter
CO2	Students will be able to understand Solar Radiation, distillation
CO3	To study Solar Energy solar cooker, street light and its applications
CO4	To study Fuel Cells

**LIST OF PRACTICALS:**

Experiment 1	To study the extension of Ammeter and voltmeter ranges.
Experiment 2	To Study Block wise Construction of Multimeters & Frequency Counter
Experiment 3	To Study Block wise Construction of Analog Oscilloscope & Function Generator.
Experiment 4	To study the connection of solar panels.
Experiment 5	To study overall efficiency of solar PV and battery integrated system
Experiment 6	To Study of Solar Radiation by using Pyranometer.
Experiment 7	To Study of Solar Distillation or Solar Still.
Experiment 8	To study the constructional ds of a box type solar cooker.
Experiment 9	To Study of Solar Street Lighting and Lanterns.
Experiment 10	To Study of Fuel cells.

**NOTE: Additional Lab experiments/practical will be performed based on the course requirements**

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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**CLASS: B.TECH. 5<sup>th</sup> SEMESTER**  
**BRANCH: E&C/EE / IT/ MECHANICAL/ CIVIL ENGG.**  
**COURSE NO.: CSO-3515**  
**COURSE TITLE: PYTHON PROGRAMMING LAB**

**CREDIT: 1**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

**COURSE OUTCOMES**

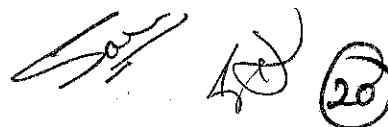
**At the end of the course the student will be able to: -**

<b>CO1</b>	To write, test, and debug simple Python programs.
<b>CO2</b>	To implement Python programs with conditionals and loops.
<b>CO3</b>	Use functions for structuring Python programs.
<b>CO4</b>	Represent compound data using Python lists, tuples, and dictionaries.

**LIST OF PRACTICALS:**

<b><u>Lab Experiments:</u></b>	
Experiment 1	Write a program to demonstrate different number data types in Python.
Experiment 2	Write a program to perform different Arithmetic Operations on numbers in Python.
Experiment 3	Write a python program to find largest of three numbers.
Experiment 4	Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: $c/5 = f-32/9$ ]
Experiment 5	Write a program to create, concatenate and print a string and accessing sub-string from a given string
Experiment 6	Write a program to create, append, and remove lists in python.
Experiment 7	Write a program to demonstrate working with tuples in python.
Experiment 8	Write a program to demonstrate working with dictionaries in python.
Experiment 9	Write a Python program to construct the following pattern, using a nested for loop: * * * * * * * * * * * * * * * *
Experiment 10	Write a python program to find factorial of a number using Recursion.

**NOTE: Additional Lab experiments/practical will be performed based on the course requirements.**



**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**CLASS: B.TECH. 5<sup>th</sup> SEMESTER**  
**BRANCH: E&C/EE / IT/ MECHANICAL/ CIVIL ENGG.**  
**COURSE NO.: CSO-3515**  
**COURSE TITLE: INTRODUCTION TO PYTHON**  
**PROGRAMMING LAB**

**CREDIT: 1**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

**COURSE OUTCOMES**

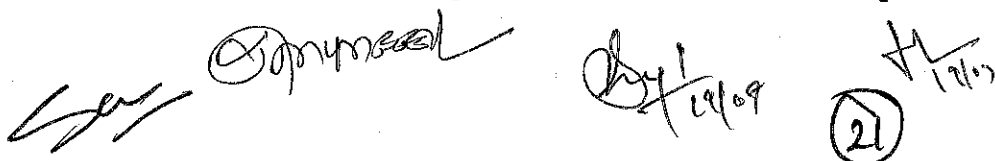
**At the end of the course the student will be able to: -**

<b>CO1</b>	To write, test, and debug simple Python programs.
<b>CO2</b>	To implement Python programs with conditionals and loops.
<b>CO3</b>	Use functions for structuring Python programs.
<b>CO4</b>	Represent compound data using Python lists, tuples, and dictionaries.

**LIST OF PRACTICALS:**

<b><u>Lab Experiments:</u></b>	
Experiment 1	Write a program to demonstrate different number data types in Python.
Experiment 2	Write a program to perform different Arithmetic Operations on numbers in Python.
Experiment 3	Write a python program to find largest of three numbers.
Experiment 4	Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: $c/5 = f-32/9$ ]
Experiment 5	Write a program to create, concatenate and print a string and accessing sub-string from a given string
Experiment 6	Write a program to create, append, and remove lists in python.
Experiment 7	Write a program to demonstrate working with tuples in python.
Experiment 8	Write a program to demonstrate working with dictionaries in python.
Experiment 9	Write a Python program to construct the following pattern, using a nested for loop: * * * * * * * * * * * * * * * * *
Experiment 10	Write a python program to find factorial of a number using Recursion.

**NOTE: Additional Lab experiments/practical will be performed based on the course requirements.**


  
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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025,2026, 2027**

**CLASS: B.TECH. 5<sup>th</sup> SEMESTER**

**CREDIT: 1**

**BRANCH: E&C/EE / CSE/ MECHANICAL/ CIVIL ENGG.  
COURSE NO.: ITO-4515  
COURSE TITLE: LINUX SHELL PROGRAMMING**

Hours/ week			Marks Distribution
L	T	P	Practical
0	0	2	25

**COURSE OUTCOMES**

At the end of the course the student will be able to: -	
<b>CO1</b>	Install LINUX and its working environment.
<b>CO2</b>	Understand Linux commands to manage files and file systems
<b>CO3</b>	Write a shell programs to solve a given problems
<b>CO4</b>	Write Regular expressions for pattern matching and apply them to various filters for a specific task
<b>CO5</b>	Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem

**LIST OF EXPERIMENTS:**

Experiment 1	Implement the Linux Shell Commands: ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit , Commands related to inode, I/O redirection, piping, process control commands, mails,manage the password,Vieditors,wild card characters used in Linux.
Experiment 2	Write a shell programs to perform operations using case statement such as 1)Addition 2)subtraction 3)multiplication 4)Division
Experiment 3	Write a shell scripts to see current date,time username and directory.
Experiment 4	Write a shell programs to find maximum of three numbers
Experiment 5	Write a script to check whether the given no. is even/odd
Experiment 6	Write a script to calculate the average of n numbers
Experiment 7	Write a script to check whether the given number is prime or not
Experiment 8	Write a script to calculate the factorial of a given number
Experiment 9	Write a script to calculate the sum of digits of the given number
Experiment 10	Write a shell script to print file names in directory showing date of creation & serial no. of file.

**NOTE: Additional Lab experiments/practical will be performed based on the course requirements**

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B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027

CLASS: B.TECH. 5<sup>th</sup> SEMESTER  
BRANCH: E&C/EE / CSE/IT/ CIVIL ENGG.  
COURSE NO.: MEO-5515  
COURSE TITLE: 3D PRINTING LAB

CREDIT: 1

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Develop CAD models for 3D printing and import and export AD data and generate.stl file.
CO2	Select a specific material and a 3D printing process for the given application.
CO3	Produce a product using 3D Printing.

**LIST OF EXPERIMENTS:**

1. To study the basic features of a 3D printing machine.
2. To study the different components of a 3D printer.
3. To study the various types of 3D Printer
4. To print a 3D model of nut/bolt using PLA material.
5. To print a 3D model of spanner using PLA material.
6. To print a 3D model of pyramid using PLA material.
7. To print a 3D model of gear using PLA material.
8. To print a 3D model of bearing using PLA material.

**NOTE:**

1. At least six practical's should be performed.
2. Additional lab/experiment will be performed based on course content requirement.
3. Simulation/virtual labs are used to enhance the practical ability of student

**NOTE: Additional Lab experiments/practical will be performed based on the course requirements**

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**B.Tech Electronics & Communication Engineering 5th Semester Examination to be held in the year Dec  
2024, 2025,2026, 2027**

**CLASS: B.TECH. 5<sup>th</sup> SEMESTER**  
**BRANCH: E&C/EE /CSE/ IT/ MECHANICAL ENGG.**

**CREDIT: 1**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

**COURSE NO.: CEO-6515**

**COURSE TITLE: ESSENTIALS OF CIVIL ENGINEERING LAB**

<b><u>COURSE OUTCOMES :</u></b>	
<b>At the end of the course the student will be able to: -</b>	
<b>CO1</b>	Perform tests on bricks and aggregates
<b>CO2</b>	Determine the physical properties of cement.
<b>CO3</b>	Determine the Workability and Compressive strength of concrete.
<b>CO4</b>	Determine the Specific gravity, Atterberg limits, Compaction characteristics of Soil

**LIST OF EXPERIMENTS:**

- Experiment 1** To determine water absorption and compressive strength of bricks
- Experiment 2** To determine the consistency and initial and final setting time of a given sample of cement using Vicat's apparatus.
- Experiment 3** To determine the Soundness and Compressive strength of cement.
- Experiment 4** To determine the fineness modulus and bulk density of fine and coarse aggregates.
- Experiment 5** To determine flakiness index and Impact value of coarse aggregates.
- Experiment 6** To determine Workability and Compressive strength of concrete
- Experiment 7** To determine the tensile strength of the steel.
- Experiment 8** To determine the Specific gravity and Atterberg limits of Soil.
- Experiment 9** To determine the compaction characteristics of soil by proctor's test.
- Experiment 10** To determine  $C_d$  for Venturimeter
- Experiment 11** To determine  $C_d$  Orificemeter
- Experiment 12** To determine  $C_d$  for a Notch.

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**B.Tech Electronics & Communication Engineering 5th Semester Examination to be held in the year Dec  
2024, 2025,2026, 2027**

**CLASS: B.TECH. 5<sup>th</sup> SEMESTER**  
**BRANCH: E&C/EE /CSE/ IT/ MECHANICAL ENGG.**

**CREDIT: 1**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

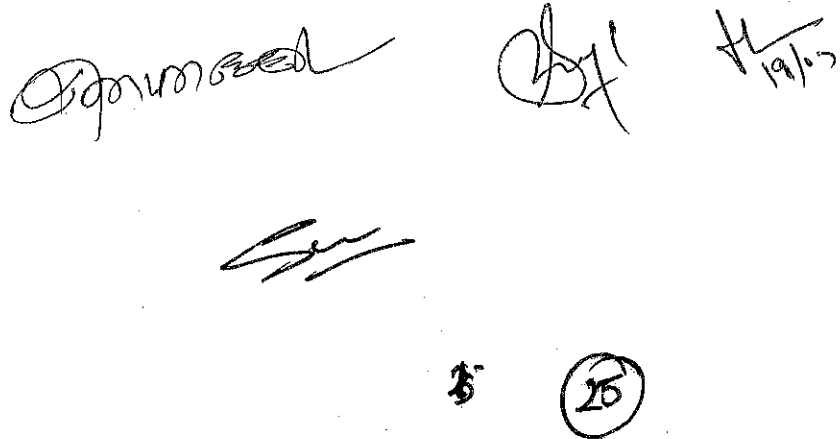
**COURSE NO.: CEO-6515**

**COURSE TITLE: BASIC CIVIL TESTING LAB**

<b>COURSE OUTCOMES :</b>	
<b>At the end of the course the student will be able to: -</b>	
<b>CO1</b>	Perform tests on bricks and aggregates
<b>CO2</b>	Determine the physical properties of cement.
<b>CO3</b>	Determine the Workability and Compressive strength of concrete.
<b>CO4</b>	Determine the Specific gravity, Atterberg limits, Compaction characteristics of Soil

**LIST OF EXPERIMENTS:**

- Experiment 1**      To determine water absorption and compressive strength of bricks
- Experiment 2**      To determine the consistency and initial and final setting time of a given sample of cement using Vicat's apparatus.
- Experiment 3**      To determine the Soundness and Compressive strength of cement.
- Experiment 4**      To determine the fineness modulus and bulk density of fine and coarse aggregates.
- Experiment 5**      To determine flakiness index and Impact value of coarse aggregates.
- Experiment 6**      To determine Workability and Compressive strength of concrete
- Experiment 7**      To determine the tensile strength of the steel.
- Experiment 8**      To determine the Specific gravity and Atterberg limits of Soil.
- Experiment 9**      To determine the compaction characteristics of soil by proctor's test.
- Experiment 10**     To determine  $C_d$  for Venturimeter
- Experiment 11**     To determine  $C_d$  Orificemeter
- Experiment 12**     To determine  $C_d$  for a Notch.

  
A collection of handwritten signatures and initials, including a large signature on the left, initials 'BY' in the middle, and initials 'H' with '19/12' below it on the right. Below these are two more signatures and a circled number '25'.

**B.Tech Electronics & Communication Engineering 5th Semester Examination to be held in the year Dec  
2024, 2025, 2026, 2027**

**CLASS: B.E. 5<sup>TH</sup> SEMESTER**  
**BRANCH: E&C ENGINEERING**  
**COURSE NO: MOC-1501**  
**COURSE TITLE: SWAYAM / NPTEL**

Hours/ Week			Credits: 3	
L	T	P	Theory	Sessional
3	0	0	100	00

The department shall offer the 12 weeks NPTEL course, out of the list of courses listed by NPTEL around the time of commencement of the semester. The courses offered shall be related to the core stream but should not be similar to the regular courses offered as a part of the department curriculum. The overall monitoring of the NPTEL course will be under the supervision of the faculty Incharge of the department.

The NPTEL certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per notified schedule.

The marks obtained by the student in the NPTEL certification course will be tabulated by the concerned department.

**Note:**

*(i) The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course. The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.*

*(ii) The Student must select their College name from the drop down box while registering for a particular course. There after the option of sharing the result with the Institute also needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by NPTEL to college authorities.*

**No certificate will be accepted without this and student will be marked absent in college records.**



**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025,2026, 2027**

**CLASS: B.TECH. 5<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: ECP-1511  
COURSE TITLE: COMMUNICATION ENGG.LAB**

**CREDIT: 1**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

Course Outcomes: At the end of the course the student will be able to: -	
CO1	Understand the frequency response of RF Tuned Amplifier and IFT by calculating gain at different range of frequencies.
CO2	Understand the significance of modulation index in communication system by observing maximum and minimum value in AM modulated wave
CO3	Design different modulation circuits.

**LIST OF EXPERIMENTS**

- To plot the response of RF Tuned Amp.
- To find the modulation index of AM signal.
- Hardware realization of AM demodulation circuit.
- Hardware realization of FM modulation circuit using IC 8038.
- To plot the response of IF transformer.
- Hardware realization of sample & hold circuit.
- Hardware realization of ASK modulation circuit.
- Study of PCM & TDM signal.
- Matlab Program for single tone AM and FM signal.
- Matlab Program for generating PAM signal.
- Matlab Program for different digital techniques.

**NOTE:** Each student has to perform atleast 08 experiments, out of which 40% shall be simulation based. Additional Practical / Experiments will be performed based on the course content requirements.

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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**CLASS: B.TECH. 5<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: ECP-1512  
COURSE TITLE: MICROPROCESSOR AND INTERFACING LAB**

**CREDIT: 1**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Write assembly language programs using microprocessor 8086 kit.
CO2	Perform Arithmetic, logic operations using microprocessor 8086 kits and store the result in a register or memory.
CO3	Perform Advanced Programming Techniques and by interfacing IC's with 8086 microprocessor

**LIST OF PRACTICALS**

- Write a program using 8086 Microprocessor for Decimal and hexadecimal addition and subtraction of two Numbers.
- Write a program using an 8086 Microprocessor for the addition and subtraction of two BCD numbers.
- To perform multiplication and division of two 8-bit numbers using 8086
- To find the largest and smallest number in an array of data using 8086
- To write a program to arrange an array of data in ascending and descending order in 8086.
- To convert a given Hexadecimal number into its equivalent ASCII number and vice versa in 8086
- Write a program using the 8086 Microprocessor to convert binary numbers into HEX equivalent.
- Write a program using 8086 Microprocessor to convert Hex number into binary equivalent.
- Write a program using the 8086 Microprocessor to convert BCD numbers into binary numbers.
- Write a program using the 8086 Microprocessor to convert binary numbers into BCD equivalents.
- Write a program in the 8086 microprocessor to move data from one location to another using MACRO.
- Write a program in 8086 to display the message "MICROPROCESSOR 8086"

**NOTE: Additional Lab experiments/practical will be performed based on the course requirements.**

*Sanjiv*      *By*      *H. 19/07*

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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**CLASS: B.TECH. 5<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: ECP-1513  
COURSE TITLE: LINEAR INTEGRATED CIRCUITS LAB**

**CREDIT: 1**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
<b>CO1</b>	Study and use of OP-Amp in open loop and closed loop configuration and observe waveforms.
<b>CO2</b>	Study and use of op-amp in different applications and observe their waveforms.
<b>CO3</b>	Study and use of various instruments and measurement of various component values. Observation of Lissajous patterns using CRO and study of different bridges to calculate Resistance, Capacitance and Inductance.

**LIST OF PRACTICALS:**

01. Design of OP-amp as closed loop Inverting, Non-Inverting, amp voltage follower & Inverter.
02. Design of Op-Amp as summer, Scaling, Averaging using Inverting amplifier & Non-Inverting amplifier.
03. Design & study of Op-Amp as clipper, clamper circuit.
04. Design of Op-Amp as Square wave generator.
05. Design of Op-Amp as Integrator & Differentiator.
06. Design of Op-Amp as low pass filter & high pass filter.
07. Design of IC 555 timer as Monostable, Multivibrator & Astable Multivibrator.
08. Study of IC – LF 398 N sample & hold circuit & show the waveform on CRO.
09. Design of OP-Amp as Schmitt trigger.

**NOTE: Additional Lab experiments/practical will be performed based on the course requirements.**

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**B.Tech. Electronics & Communication Engineering 5th Semester Examination to be held in the year  
Dec 2024, 2025, 2026, 2027**

**CLASS: B.TECH. 5<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: SIT-1511  
COURSE TITLE: SUMMER TRAINING-I**

**CREDIT: 1**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	0	25

<b>COURSE OUTCOMES</b>	
<b>At the end of the course the student will be able to: -</b>	
<b>CO1</b>	Interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.
<b>CO2</b>	Understand the engineering code of ethics and demonstrate knowledge of practical application of training
<b>CO3</b>	Submit a training report along with the certificate issued by the concerned department.

Students are required to undertake 4 to 6 weeks Practical Training during the summer vacations in the field of Electronics and Communication Engineering in Govt./Semi-Govt./Private organizations through offline/Online mode. Thereafter, each student shall be required to submit a report on the practical training to the concern HOD for evaluation.

**Guidelines for evaluation of Practical Training:**

The evaluation shall be done by the Departmental committee at the end of 5<sup>th</sup> semester. The committee shall have a convener and at least two members.

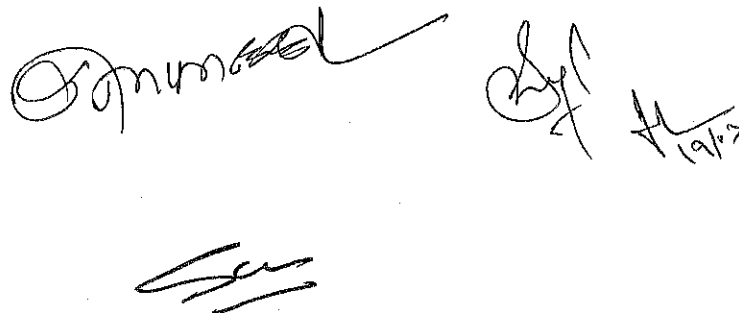
**Distribution of Marks as per the University statutes:**

<b>Total Marks for Evaluation</b>	<b>= 25 marks</b>	
<b>i) Report</b>	<b>= 10</b>	<b>40%</b>
<b>ii) Viva-Voce</b>	<b>= 7.5</b>	<b>30%</b>
<b>iii) Miscellaneous Marks</b>	<b>= 7.5</b>	<b>30%</b>

Due weight age will be given to those who have opted for Industrial Training outside the UT as well as keeping in view the profile of that Industry.

**Award of the Marks:**

Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose.



## UNIVERSITY OF JAMMU

B.Tech. Electronics & Communication Engineering 6<sup>th</sup> Semester Examination to be held in the year  
May 2025, 2026, 2027, 2028

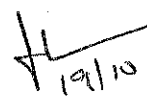
B.TECH. 6<sup>th</sup> semester

Contact Hrs:26

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
ECT-1601	Professional Core Course	Embedded systems and Microcontroller	2	1	0	25	75	100	3	100%
ECT-1602	Professional Core Course	Wireless Communication	2	1	0	25	75	100	3	100%
ECT-1603	Professional Core Course	Microwave Theory & Techniques	2	1	0	25	75	100	3	100%
ECT-1604	Professional Core Course	Internet of Things	2	1	0	25	75	100	3	100%
HMT-7601	Humanities and Social science Course	Fundamentals of Economics	2	1	0	25	75	100	3	100%
BET-2607	Engg Science Courses/ Massive open online course	Electrical Machines	2	1	0	25	75	100	3	100%
BET-2602		Power Electronics								
MOC-1601		SWAYAM/NPTEL								
ECP-1611	Professional Core Course Lab	Embedded systems and Micro-controller lab	0	0	2	25	0	25	1	100%
ECP-1613	Professional Core Course Lab	Microwave Engineering lab	0	0	2	25	0	25	1	100%
ECP-1614	Professional Core Course Lab	IoT Lab	0	0	2	25	0	25	1	100%
MOC-1611	Massive open online course	MOOCs	0	0	2	50	0	50	2	100%
<b>TOTAL</b>			<b>12</b>	<b>6</b>	<b>8</b>	<b>275/250*</b>	<b>450/475*</b>	<b>725</b>	<b>23</b>	

\* In case of SWAYAM/NPTEL







**B.Tech. Electronics & Communication Engineering 6th Semester Examination to be held in the year  
May 2025, 2026, 2027, 2028**

**CLASS: B.TECH.6TH SEMESTER**  
**BRANCH: E&C ENGINEERING**  
**COURSE NO: ECT-1601**  
**COURSE TITLE: EMBEDDED SYSTEM AND**  
**MICROCONTROLLER**  
**DURATION OF EXAM: 3 HOURS**

**Credits: 3**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

COURSE OUTCOMES	
At the end of the course the student will be able to:	
CO1	Understand the architecture of Microcontroller 8051
CO2	Programming skills using Embedded C
CO3	Design applications involving interface of DC & Stepper Motors, ADC, Keyboards and indicators (Display Devices like LEDs, Seven Segment Displays, LCD) and use in project work.
CO4	Differentiate between CISC & RISC architecture

**SECTION-A**

**Unit - I** Introduction and history of microcontrollers. Features of 8051 microcontrollers. Embedded microcontrollers- types and features. Block diagram of 8051- program status word (PSW), accumulator, program counter. Memory organization – RAM & ROM, register banks and stack, Pin out diagram- description of pins, special function registers (SFRs), I/O port organization, Interrupts. **(05 Hours)**

**Unit – II** Programming 8051 Using Embedded C: Introduction to embedded C, Arithmetic operations, pointers, memory assigning, loops, ISR. Programs for Arithmetic operations, Block transfers, finding the smallest and biggest number from a set of numbers. Concept of subroutine, **(06 Hours)**

**Unit –IV** Timer / Counter in 8051: Timer registers - Timer0, Timer1. Configuration of TMOD (Timer Mode), and TCON (Timer Control) registers. Timer modes- Mode1, Mode2 programming. Counter mode. Serial Communication in 8051: Serial communication – modes and protocols, RS-232 pin configuration and connection. Serial port programming (Transmitting a character, and receiving a character using serial communication) using Embedded C. **(08 hours)**

**SECTION-B**

**Unit –IV Interfacing problems:** Interfacing of 8051 with LEDs, 7 segment LED display, LCD display, Keys, Keyboard matrix, Stepper and DC Motor, Relay, ADC 0808/0809, Interfacing Data Converters with 8051: Digital to Analog converters – DAC0808 / MC 1408 DAC. Analog-to-Digital Converters - ADC0808, ADC0848, LM34/LM35 temperature measurement. **(12 Hours)**

**Unit: Embedded Systems:** Define Embedded Systems, characteristics, design considerations with examples like ASIC, FPGA, CPLD etc. I<sup>2</sup>C protocol, SPI protocol. **(05 hours)**

**Unit-V** RISC Microcontrollers-. CISC v/s RISC, Introduction to ARM7 microcontroller (LPC2148). Architecture, **(4 Hours)**

**BOOKS RECOMMENDED:**

- The 8051 Microcontroller and Embedded Systems using assembly and C Muhammad Ali Mazidi and Janice Gillespie Mazidi and Rollin D. McKinlay
- The 8051 Microcontroller Kenneth J. Ayala
- Microcontrollers: Architecture, Programming, Interfacing and System Design Raj Kamal

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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**B.Tech. Electronics & Communication Engineering 6th Semester Examination to be held in the year  
May 2025, 2026,2027, 2028**

**CLASS: B.TECH.6TH SEMESTER**  
**BRANCH: E&C ENGINEERING.**  
**COURSE NO: ECT-1602**  
**COURSE TITLE: WIRELESS COMMUNICATION**  
**DURATION OF EXAM: 3 HOURS**

Hours/ Week			Credits: 3	
L	T	P	Theory	Sessional
2	1	0	75	25

<b>COURSE OUTCOMES</b>	
<b>At the end of the course the student will be able to: -</b>	
<b>CO1</b>	Understand cellular concepts and signal propagation in mobile communication.
<b>CO2</b>	Discuss different multiple access techniques and modulation techniques for transmission and detection.
<b>CO3</b>	Understand the different mobile propagation models and diversity techniques in wireless communication.
<b>CO4</b>	Describe wireless systems & standards and 5G channel modelling & spectrum.

**SECTION-A**

**Cellular concepts-** Cell structure, frequency reuse, cell splitting, channel assignment, handoff, interference, capacity; Wireless Standards: Overview of 2G 3G, 4G and 5G cellular mobile standards, LTE, VoLTE. **(08 Hours)**  
**Signal propagation-** Free space propagation model Propagation mechanism, Fading channels-Multipath and small scale fading. Power delay profile, average and rms delay spread, coherence bandwidth and coherence time, flat and frequency selective fading, slow and fast fading. **(08 Hours)**  
**Diversity techniques** -Space Diversity, Frequency Diversity, Rake Receiver, Introduction to SISO & MIMO (Multiple I/P Multiple O/P systems). **(04 Hours)**

**SECTION-B**

**Modulation Technique:** QPSK,  $\pi/4$  QPSK, MSK, GMSK, Multicarrier modulation, OFDM. **(04 Hours)**  
**Wireless System & Standards:** GSM-Features, Architecture, CDMA Digital Cellular standard (IS-95) **(08 Hours)**  
**Introduction to 5G:** Channel modeling requirements, propagation scenarios and challenges in the 5G modelling, Spectrum for 5G, spectrum access/sharing, carrier aggregation, small cells, dual connectivity, Multiple access techniques: orthogonal frequency division multiple accesses (OFDMA), non-orthogonal multiple accesses (NOMA). **(10Hours)**

**BOOKS RECOMMENDED:**

- |                                    |                             |
|------------------------------------|-----------------------------|
| • Wireless Communication           | T.S. Rappaport              |
| • Personal & Mobile Communication  | R. Panday                   |
| • Mobile Communication Engineering | W.C.Y. Lee Tata McGraw Hill |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed

*Approved by*  
*7/19/07*

**B.Tech. Electronics & Communication Engineering 6th Semester Examination to be held in the year  
May 2025, 2026,2027, 2028**

**CLASS: B.TECH.6TH SEMESTER  
BRANCH: E&C ENGINEERING**

**Credits: 3**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

**COURSE NO: ECT-1603**

**COURSE TITLE: MICROWAVE THEORY AND TECHNIQUES**

**DURATION OF EXAM: 3 HOURS**

**COURSE OUTCOMES**

**At the end of the course the student will be able to: -**

<b>CO1</b>	Study different types of waveguide ,transmission and mode of propagation .
<b>CO2</b>	Understand the functioning of microwave devices , amplifiers and generators.
<b>CO3</b>	Study different microwave measurements techniques /parameters .
<b>CO4</b>	Understand different types of strip lines and analyse the loss in microstrips lines

**SECTION-A**

**Waveguides:** Frequency allocations and frequency plans, Rectangular waveguide and its mathematical analysis, Power Transmission, Circular waveguide and its mathematical analysis, modes of propagation, dominant modes, cut off wavelength, excitation modes. **(06 Hours)**

**Microwave passive devices:** Scattering matrix of microwave junction, cavity resonators, E-plane tee, H-plane tee, magic tee, phase shifters, attenuators, Resonator, directional couplers, ferrite devices, Faraday rotation, gyrator, isolator, circulators and detector. **(08 Hours)**

**Microwave generators and amplifiers:** limitations of conventional tubes, reflex klystron, two and multi cavity klystron amplifiers and oscillators, backward wave oscillators, Magnetrons, cross field amplifiers & the MASER. **(08 Hours)**

**SECTION-B**

**Microwave solid-state devices:** Gunn diode and its modes of operation, Avalanche IMPATT diode, TRAPATT diode, Schottky diode, Backward diode, PIN diode **(08 Hours)**

**Microwave Measurements:** Measurement of Power,Frequency, and impedance measurement at microwave frequency, ,Noise at microwave frequency and measurement of noise figure ,Measurement of Microwave antenna parameters **(06 Hours)**

**Micro-Strip Lines:** Introduction, Micro strip lines, parallel strip lines, coplanar strip lines, shielded strip lines, characteristic impedance of micro strip lines, losses in micro strip lines, quality factor of micro strip lines. **(06 Hours)**

**RECOMMENDED BOOKS:**

- |                                         |                                    |
|-----------------------------------------|------------------------------------|
| • Foundations for Microwave Engineering | R E.Collins                        |
| • Microwave Devices and Circuits        | Samuel Y Liao.                     |
| • Microwave and Radar Engineering       | M Kulkarni                         |
| • Microwave Engineering                 | David M. Pozar                     |
| • Microwave Engineering                 | A Das and S K Das                  |
| • Microwave Engineering                 | Rajeswari Chatterjee               |
| • Microwaves                            | M.L.Sisodiya and Vijay Laxmi Gupta |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed

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**B.Tech. Electronics & Communication Engineering 6th Semester Examination to be held in the year  
May 2025, 2026,2027, 2028**

**CLASS: B.TECH.6TH SEMESTER  
BRANCH: E&C ENGINEERING.**

**Credits: 3**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

**COURSE NO: ECT-1604  
COURSE TITLE: INTERNET OF THINGS  
DURATION OF EXAM: 3 HOURS**

Course Outcome:	
At the end of the semester, the students will be able to	
CO 1	Demonstrate basic concepts, principles, and challenges in IoT.
CO 2	Illustrate the functioning of hardware devices and sensors used for IoT.
CO 3	Analyze network communication aspects and protocols used in IoT.
CO 4	Apply IoT for developing real-life applications using Arduino programming.

**SECTION-A**

**Unit-I** Vision, Definition, Conceptual framework, Architecture view, Sources of IoT, Understanding IoT fundamentals, IOT Architecture and communication protocols, Various Platforms for IoT and cloud computing benefits, Real-time examples of IoT, Overview of IoT components and IoT Communication Technologies, Challenges in IoT. **(08 Hours)**

**Unit-II Arduino Simulation Environment** Arduino Uno Architecture and platform Board Anatomy, Setup the IDE, coding using an emulator. Overview of IOT-supported Hardware platforms such as Raspberry pi, and ARM cortex. **(08 Hours)**

**Unit-III IoT sensing and Actuation processing Topologies:** Overview of Sensors working, Analog and Digital Sensors, Actuators, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensor with Arduino, Interfacing of Relay Switch and Servo Motor with Arduino. Interfacing LED, push button, buzzer with Arduino along with LCD and DC motor. **(08 Hours)**

**SECTION -B**

**Unit-IV Basic Networking with ESP8266 Wi-Fi module** Basics of Wireless Networking, Introduction to ESP8266 Wi-Fi Module, Various Wi-Fi libraries, Web server- introduction, installation, configuration, posting sensor(s) data to the web server platforms, Thing Speak API and MQTT, Interfacing ESP8266 with Web services **(08 Hours)**

**Unit V -Basics of Industrial IoT:** Development of IIOT, IIOT Layers, Security Challenges and Other challenges in IIOT, Applications in Industrial process - Smart Metering, E-health, City Automation, Automotive Applications, home automation, smart cards, communicating data with H/W units, mobiles, tablets, Designing of smart street lights in a smart city. **(08Hours)**

**BOOKS RECOMMENDED:**

- |                                                         |                                   |
|---------------------------------------------------------|-----------------------------------|
| • The Internet of Things key applications and protocols | Olivier Hersent, DaviBoswarthick, |
| • The Internet of Things key applications and protocols | Omar Elloumi                      |
| • Internet of Things                                    | Boswarthick, Omar Elloumi         |
| • The Internet of Things                                | Jeeva Jose                        |
| • Hands on IIoT                                         | Michael Miller                    |
|                                                         | G VeneriAntonio                   |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed

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**B.Tech. Electronics & Communication Engineering 6th Semester Examination to be held in the year  
May 2025, 2026,2027, 2028**

**CLASS: B.TECH.6TH SEMESTER**  
**BRANCH: ECE/EE/CSE/IT/ME ENGINEERING**  
**COURSE NO: HMT-7601**  
**COURSE TITLE: FUNDAMENTAL OF ECONOMICS**  
**DURATION OF EXAM: 3 HOURS**

**Credits: 3**  
**Hours/ Week**  
**L T P**  
**Theory Sessional**  
**2 1 0 75 25**

<b>Course Outcome: At the end of the semester, the students will be able to</b>	
<b>CO1</b>	To understand the basic concepts of economics such as demand analysis, utility analysis and its role in decision making process.
<b>CO2</b>	To develop skills to create the goods and services at minimum cost by studying in detail about the production and cost analysis.
<b>CO3</b>	To understand about the market structure and pricing decisions.
<b>CO4</b>	To understand the basic concept of National Income, banking, inflation, Problem of Unemployment and Poverty in India

**SECTION A**

**Unit 1-Meaning and Importance of Economics:** Introduction, Meaning, Scope of Economics; Role and responsibilities of economist, Relationship of economics with other disciplines: Importance of Economics in decision making, the basic process(steps) of decision making. **(5Hours)**

**Unit 2-Demand Analysis:** Introduction, Meaning of demand and Law of Demand, factors affecting demand ;exceptions to the law of demand: Elasticity of Demand (Price, income and cross elasticity of demand. **(6Hours)**

**Unit 3-Consumer Behaviour:** Cardinal utility analysis: Concept: law of diminishing marginal utility: law of equi marginal utility, Ordinal utility analysis: meaning and properties of Indifference curves and utility maximization(consumer equilibrium). **(5Hours)**

**Unit 4- Production and cost Analysis:** Meaning of Production function, Isoquants (meaning and properties) law of variable proportions, law of returns to scale, Cost Analysis: Concept of Fixed, Variable, Total, Average & Marginal Costs &their relationships in short run. **(6Hours)**

**SECTION B**

**Unit 5- Market structure and pricing decisions -** Introduction, Perfect Competition, monopoly (Price-Output Determination under Perfect Competition and monopoly in short run and long run); kinked demand curve analysis of price stability in Oligopoly(Sweezy's model) **(5Hours)**

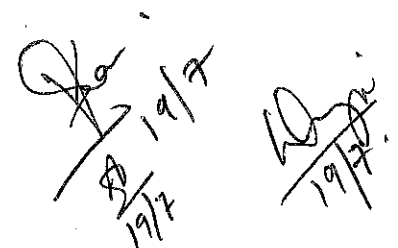
**Unit 6-Macroeconomics-** Meaning & Concept of National Income; Different methods of calculating national income and difficulties in measuring national income. **(5Hours)**

**Unit 7-Banking and Inflation-Functions of central bank and methods of credit control:** functions of Commercial bank and methods of credit creation, Inflation:Types, effects and methods to control inflation. **(6Hours)**

**Unit 8- Problem of Unemployment and Poverty in India:** Meaning, types and causes of Unemployment; Poverty: meaning and causes. Poverty alleviation and employment generation programmes in India **(6Hours)**

**BOOKS RECOMMENDED :**

- K.K.Dewett : Modern Economic Theory
- H.L Ahuja : Advanced Economic Theory
- M.L. Jhingan : Macro Economic Theory
- P.N Chopra : Business Economics/Advanced Eco. Theory
- D.N. Dwivedi :Managerial Economics
- A. Koutsoyiannis : Modern microeconomics
- Meenu Agrawal: Economic Reforms, Unemployment and Poverty
- K.R. Gupta: Poverty in India


  
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**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed.


  
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 Ritu Sharma  
 19/7/2024  
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**B.Tech. Electronics & Communication Engineering 6th Semester Examination to be held in the year  
May 2025, 2026,2027, 2028**

**CLASS: B.TECH.6TH SEMESTER**  
**BRANCH: E&C ENGINEERING**  
**COURSE NO: EET-2607**  
**COURSE TITLE: ELECTRICAL MACHINES**  
**DURATION OF EXAM: 3 HOURS**

Hours/ Week			Credits: 3	
L	T	P	Theory	Sessional
2	1	0	75	25

<b>COURSE OUTCOME:</b> At the end of the course student will be able to:	
CO1	To acquire knowledge about the construction and operating characteristics of DC machines.
CO2	To identify the relation between transformer and autotransformers.
CO3	To understand the principle of operation, testing and speed control of synchronous machines.
CO4	To analyze the application of special machines in various fields with their working principle.

**SECTION - A**

**D.C. Generators:** Operating principle, constructional features, E.M.F equation, Armature reaction and commutation, operating characteristics losses and efficiency. **(6 Hours)**

**D.C. Motors:** Operating principle, back EMF, Torque equation, Starters, speed control, operating characteristics, and their applications. **(6 Hours)**

**Transformers:** Principle of operation, Vector diagram, Regulation efficiency parallel operation, tap changing auto transformer. **(6 Hours)**

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**SECTION - B**

**Synchronous Generators:** Principle of operation, E.M.F equation, Leakage reactance, Vector diagram, Voltage regulation by EMF and MMF method. **(6 Hours)**

**Synchronous Motors:** Principle of operation, Vector diagram, V-curves and inverted V-curves, method of starting and their applications. **(6 Hours)**


**Induction Motors:** Principle of operation, Types of motors, Equivalent circuits, Torque and power calculations, No load and blocked rotor test, speed control, Method of starting and their applications. **(8 Hours)**

**Special A.C. Machines:** Repulsion motors, A.C series motors, Universal motor, single phase induction motor and their applications. **(4 Hours)**

**BOOKS RECOMMENDED:**

- |                                          |                     |
|------------------------------------------|---------------------|
| • Theory of A.C Machines                 | A. Langsdorf        |
| • Principles of D.C. Machines            | Clayson and Hancock |
| • Performance and design of A.C Machines | M.G. Say            |
| • Advanced Electrical Technology         | H.A. Cotton         |

NOTE: There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed.



**B.Tech. Electronics & Communication Engineering 6th Semester Examination to be held in the year  
May 2025, 2026, 2027, 2028**

**CLASS: B.TECH.6TH SEMESTER  
BRANCH: ECE/ELECTRICAL ENGINEERING**

**Credits: 3**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

**COURSE NO: EET-2602  
COURSE TITLE: POWER ELECTRONICS  
DURATION OF EXAM: 3 HOURS**

Course Outcomes: At the end of the course the student will be able to: -	
<b>CO1</b>	Understand fundamental concepts of power electronics, SCR and its family.
<b>CO2</b>	Analyse various controlled rectifiers with different loads and various commutation techniques.
<b>CO3</b>	Understand the operation and control of single-phase AC Voltage Controller and Chopper.
<b>CO4</b>	Understand the operations and control of Inverters and Cycloconverters.

**SECTION- A**

**Introduction:** Power electronics system and devices, applications, advantages and disadvantages. Solid state devices SCR: Basic theory of Operation, Characteristics: Static & Dynamic, ratings, protection of SCR against over-current, overvoltage, high dv/dt , di/dt, Snubber circuit, series and parallel operation, gate protection, firing circuit of SCR, SCR Gate characteristics, two transistor analogy of SCR, Family of SCR: TRIAC, LASCR, DIAC, PUT, SUS, GTO and UJT. **(10 Hours)**

**Phase controlled rectifiers:** Single and three phase, half and full wave, fully controlled and half controlled rectifiers with R L E loads with / without freewheeling diode. **(07 Hours)**

**Commutation:** Introduction and Methods of Commutation (Class A-F) of SCR **(04 Hours)**

**SECTION- B**

**AC Voltage Controller:** Operation of Single-phase half and full-wave AC controller with R & R-L Load, Integral cycle control. **(06 Hours)**

**Choppers:** Principle and basic chopper circuits, classification, Steady-state Analysis of chopper circuits, control strategies, Commutation in Chopper circuits. **(07 Hours)**

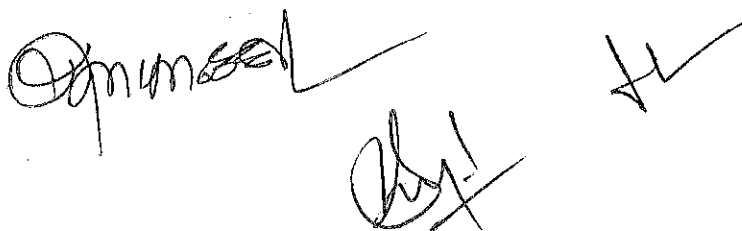
**Inverters:** Single-phase voltage source inverters, voltage control of single phase inverter. **(04 Hours)**

**Cycloconverters:** Classification, single phase to single phase Cycloconverters with resistive inductive load. **(06 hours)**

**BOOKS RECOMMENDED:**

- Elements of Power Electronics -P.S.Bimbra
- Power Electronics -M.Ramamoorthy

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

  
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**B.Tech. Electronics & Communication Engineering 6th Semester Examination to be held in the year  
May 2025, 2026, 2027, 2028**

**CLASS: B.TECH. 6<sup>th</sup> SEMESTER**

**BRANCH: E&C ENGINEERING**

**COURSE NO.: ECP-1611**

**COURSE TITLE: EMBEDDED SYSTEMS &  
MICROCONTROLLER LAB**

**CREDIT: 1**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

CO1	Write assembly language programs including interrupt-based programming using 8051 microcontrollers
CO2	Displaying messages using LCD display, LED indicator, seven seven-segment display with a delay.
CO3	Generate various waveforms like square, sawtooth, ramp and triangle with simulator
CO4	Perform interfacing of ARM processor with Robot system, DC motors and A/D Converters and interfacing of biometric and RFID module with ARM 7 microcontroller

**List of Practicals:**

**Section-A: Write a program :**

- To transfer the block of data from one memory location to another memory location.
- ALP to sum of first 'n' natural numbers.
- To find the largest/smallest number in a given array of numbers
- To Arrange 'n' numbers in ascending order and descending order
- To send hex values for ASCII characters of 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D and E to port P1
- To send values 00-FF to Port 1
- To toggle bits of P1 with time delay, Program to read a byte from P1, wait 1/2 second and then send to P2.
- For 8051 to transfer the letter "A" serially at 9600 baud continuously. Use 8-bit data and 1-stop bit.
- 8051 program to transfer the message "SJC" serially at 9600 baud, 8-bit data, 1 stop bit. Do this continuously.
- 8051 C Program to send the two messages "first name" and "last name" to the serial port. If SW = 0, send first name else if SW = 1, send last name. Set the baud rate at 9600, 8bit data, and 1-stop bit
- Program the 8051 to receive bytes of data serially and put them in P1. Set the baud rate at 9600, 8-bit data, and 1 stop bit.
- To interface 8051 with seven segment LED and display the numbers from 0-9.
- To interface LCD with 8051 and display the message "AT89C51"

**Section -B :Programs based on ARM processor:**

- Study of ARM7-32 Bit Processor Architecture and pin dig.
- Write a program of Flashing LED connected to port 1 of the microcontroller
- Interfacing of ARM Processor with Robot System such as DTMF, IR, RF.
- Interfacing of the SD-MMC card with ARM7 microcontroller.
- Interfacing of Biometric & RFID module with ARM7 microcontroller

NOTE: Each student has to perform atleast 08 experiments from section A and 03 from section B. Additional experiments will be performed based upon course content requirement.





CLASS: B.TECH. 6<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: ECP-1613  
COURSE TITLE: MICROWAVE ENGG. LAB

CREDIT: 1

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Plot and study the characteristics of reflex klystron tube/Gunn Diode/Tees /Isolator and circulators.
CO2	Evaluate the parameters (frequency, wavelength) of rectangular waveguide for a particular mode and verify the impedance measured using klystron tube with Smith Chart.
CO3	Calculate reflection coefficient and VSWR of electromagnetic field

### LIST OF EXPERIMENTS

- To study the characteristics of Reflex Klystron tube and to determine its electronic tuning range.
- To determine the frequency and wave length in Rectangular wave guide.
- To determine the standing-wave ratio & reflection coefficient.
- To measure an unknown impedance with smith chart.
- To study the following characteristics of Gunn diode.
  - V-I Characteristics.
  - Output power & frequency as a function of voltage.
- To calculate the Coupling Factor & directivity using a directional coupler.
- To study the following Tees :-
  - E-Plane Tee.
  - H-Plane Tee
  - Magic Tee.
- To study the Isolator & Circulators.
- To draw the radiation pattern of Horn antenna.

**NOTE:** Each student has to perform at least six experiments. Additional Practical / Experiments will be performed based on the course content requirements.

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CLASS: B.TECH. 6<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: ECP-1614  
COURSE TITLE: IOT LAB

CREDIT: 1

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

Course Outcome (CO)	
At the end of the semester, the students will be able to	
CO 1	To develop the knowledge and interfacing of components using embedded C
CO 2	To know about XBEE and its communication devices
CO 3	To have the knowledge about Arduino module and its interfacing with GSM and Bluetooth
CO 4	To demonstrate the ESP8266 module and its interfacing with Arduino.

**LIST OF PRACTICALS:**  
**SECTION -A**

**Embedded Experiments**

1. Learning the Embedded C programming concepts
2. Interfacing of peripherals like LEDs, seven segment and LCD.
3. Interfacing of Relay and Buzzer Module.
4. Interfacing of various Sensors with Arduino Board.
5. Interfacing of Temperature Humidity Sensors and turning on Relay at threshold level.

**SECTION -B**

**Wireless Experiments**

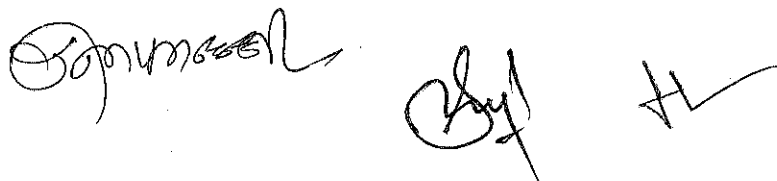
6. How to communicate two XBEE modules in AT mode
7. How to configure a XBEE module in Broadcast and API Mode
8. How to read the destination address of XBEE module using API mode
9. Data sharing using Bluetooth module to the Android APP
10. Making a call and receiving a call using GSM module

**SECTION -C**

**IoT Experiments**

11. Interfacing Wi-Fi with Arduino Module
12. Study of various AT Commands for Wi-Fi
13. Setting a Link with things Speak Server.
14. Updating Data of Sensors on Thing Speak cloud using Wi-Fi Module
15. Study of AT commands for the GSM Module.
16. Updating data on Cloud using GSM module.

NOTE: Each student has to perform atleast three experiments from each section ,out of which 40% shall be simulation based. Additional experiments will be performed based upon course content requirement.



**B.Tech. Electronics & Communication Engineering 6th Semester Examination to be held in the year  
May 2025, 2026,2027, 2028**

**CLASS: B.TECH. 6<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: MOC-1611  
COURSE TITLE: MOOC**

**CREDIT: 2**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	50

The Students shall select a MOOC of 8 weeks/minimum 60 hours; available at the time on any reputed platform and shall pursue the same after due approval of the same from the departmental Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

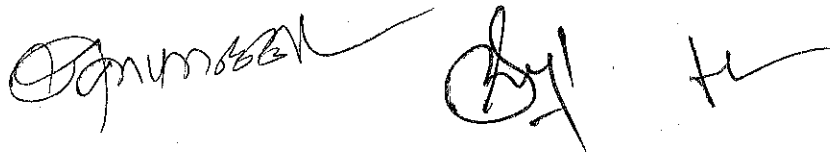
The overall monitoring of the MOOC course will be under the supervision of the teacher Incharge of the department The Departmental Academic Committee shall assess the student work based on a presentation of the Course undertaken/Project completed along with a relevant course completion certificate.

**Note:** In case a student opts for 8 week NPTEL course, the following points need to be followed:

*(i) The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course .The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.*

*(ii) The Student must select their College name from the drop down box while registering for a particular course. There after the option of sharing the result with the Institute also needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by NPTEL to college authorities.*

**No certificate will be accepted without this and student will be marked absent in college records.**



**E.Tech. Electronics & Communication Engineering 6th Semester Examination to be held in the year  
May 2025, 2026, 2027, 2028**

**CLASS: B.E. 6<sup>TH</sup> SEMESTER**  
**BRANCH: E&C ENGINEERING**  
**COURSE NO: MOC-1601**  
**COURSE TITLE: SWAYAM / NPTEL**

Hours/ Week			Credits: 3	
L	T	P	Theory	Sessional
2	1	0	100	00

The department shall offer the 12 weeks NPTEL course, out of the list of courses listed by NPTEL around the time of commencement of the semester. The courses offered shall be related to the core stream but should not be similar to the regular courses offered as a part of the department curriculum. The overall monitoring of the NPTEL course will be under the supervision of the faculty Incharge of the department.

The NPTEL certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per notified schedule.

The marks obtained by the student in the NPTEL certification course will be tabulated by the concerned department.

**Note:**

*(i) The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course. The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.*

*(ii) The Student must select their College name from the drop down box while registering for a particular course. There after the option of sharing the result with the Institute also needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by NPTEL to college authorities.*

**No certificate will be accepted without this and student will be marked absent in college records.**

# UNIVERSITY OF JAMMU

**B.Tech. Electronics & Communication Engineering 7<sup>th</sup> Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028**

**B.TECH 7<sup>th</sup> semester**

**Contact Hours: 24**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
ECT-1701	Professional Core Course	Digital VLSI Techniques	2	1	0	25	75	100	3	100%
ECT-1702	Professional Core Course	Antenna and Wave Propagation	2	1	0	25	75	100	3	100%
ECT-1703	Professional Elective Course/MOOC	Digital Image Processing	2	1	0	25	75	100	3	100%
ECT-1704		Artificial Neural Networks								
MOC-1701 ✓		SWAYAM/NPTEL								
ECT-1705	Professional Elective Course/Engineering Science courses	Fiber Optics and Communication	2	1	0	25	75	100	3	100%
ECT-1706 ✓		Information Theory and coding								
CST-3706 ✓		AI & ML								
PRJ-1711 ✓	Mini Project	Mini Project	0	0	4	100	0	100	2	100%
ECT-1711 ✓	Professional Core Course Lab	Digital VLSI Design Techniques Lab	0	0	2	25	0	25	1	100%
NCC-6701 ✓	Non-Credit Course	Disaster management	2	0	0	Satisfactory/ Unsatisfactory			0	100%
SIT-1711 ✓	Summer Industrial Internship	Summer Training-II	0	0	0	50	0	50	2	100%
SEM-1711 ✓	Seminar	Seminar	0	0	4	50	0	50	2	100%
<b>TOTAL</b>			<b>10</b>	<b>4</b>	<b>10</b>	<b>325/300*</b>	<b>300/325*</b>	<b>625</b>	<b>19</b>	

\* In case of SWAYAM/NPTEL



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**B.Tech. Electronics & Communication Engineering 7th Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028**

**CLASS: B.TECH. 7<sup>th</sup>SEMESTER**

**CREDITS: 3**

**BRANCH: E&C ENGINEERING**

**COURSE NO:ECT-1701**

**COURSE TITLE: DIGITAL VLSI TECHNIQUES**

**DURATION OF EXAM: 3 HOURS**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
3	1	0	75	25

<b>COURSE OUTCOMES:</b>	
At the end of the course the student will be able to: -	
<b>CO1</b>	Comprehend and utilize digital VLSI circuit design techniques and their advancements
<b>CO2</b>	Identify, select and design any static and dynamic CMOS VLSI logic circuits and memory design
<b>CO3</b>	Analyse CMOS circuits with equivalent parameters and build upon the theoretical, mathematical and experimental models.
<b>CO4</b>	Analyze various circuit and logic design techniques for dynamic and leakage power reduction. .
<b>CO5</b>	Understand the concepts of high performance logic circuit

**SECTION-A**

**MOSFETS:** Fundamentals of Enhancement Mode MOSFETs, Depletion Mode MOSFETs, Weak & strong Inversion Conditions, Threshold Voltage Concept in MOSFETs, Current-Voltage (IV), Characteristics of a MOSFET, Limitations in IV Model and MOSFET parasitics, Trends & Projections in VLSI Design & Technology, Flow of VLSI Circuit Design, Scaling in MOS devices. **(6 Hours)**

**VLSI Design Styles:** NMOS, CMOS Process flow, Noise Margin, Inverter Threshold Voltage, NMOS Inverter design and characteristics, CMOS Inverter Design and Properties, Delay and Power Dissipation, Parallel & Series Equivalent circuits, Static CMOS Circuit Design. **(9 Hours)**

**VLSI Physical Design:** Stick Diagrams, Physical Design Rules, Layout Designing, Euler's Rule for Physical Design, Reliability issues in CMOS VLSI, Latching. **(5 Hours)**

**SECTION-B**

**High Performance Logics:** Precharge-Evaluate logic, Dynamic CMOS logic, NORA logic, Complementary Pass Logic (CPL), Transmission gate logic. **(7 Hours)**

**MOS Memory Design:** MOS memories: ROM design, SRAM Cell design and DRAMs. **(5 Hours)**

**Low Power VLSI Design Techniques:** Need for Low Power VLSI Chips, Sources of Power Dissipation in Digital Integrated Circuits, Physics of Power Dissipation in CMOS Devices, Dynamic Dissipation in CMOS, Leakage Power Dissipation, Low Power Figure of Merits, Impact of Technology Scaling, Device Innovation and Channel Engineering. **(5 Hours)**

**Low Power Circuit Level Design:** Circuit Level Transistor and Gate Sizing, Circuit Techniques for Leakage Power Reduction, Transistor Stacking, Supply Voltage Scaling Techniques, DTCMOS, MTCMOS, Flip Flops and Latches Design. **(8Hours)**

**Books Recommended:**

- CMOS Digital Integrated Circuits-Analysis & Design by S.M. Kang and Y. Leblebici, TMH. .
- Introduction to VLSI by K. Eshraghian and Pucknell, PHI
- Practical Low Power Digital VLSI Design by Gary K. Yeap, Kluwer Academic Press.
- Low-Power CMOS VLSI Circuit Design by Kaushik Roy, and Sharat Prasad, Wiley.
- Low Power VLSI CMOS Circuit Design by A. Bellamour, and M. I. Elmasri, Kluwer Academic Press.

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed

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CLASS: B.TECH. 7<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO: ECT-1702  
COURSE TITLE: Antenna and Wave Propagation  
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

COURSE OUTCOME	
At the end of the course student will be able to:	
CO1	Explain basic Antenna parameters and design antenna arrays.
CO2	Describe and analyze design parameters related to practical antennas
CO3	Illustrate and understand wave propagation

#### SECTION - A

**Antenna Radiation:** Antenna Parameters: Antenna impedance, Directional patterns, Effective length, Radiation Intensity, Directivity, Power gain, Efficiency, Effective area, Equivalent circuit, Front to back ratio, polarization and antenna temperature. Application of reciprocity theorem in antennas Radiation from short dipole and thin linear antenna  
(13Hours)

**Antenna Arrays:** Array factor, Multiplication of patterns, Linear array of n point sources broadside and end fire arrays and their directivities.  
(5Hours)

#### SECTION - B

**Practical Antennas:** VLF and LF antennas. High frequency antenna (Rhombic antenna), VHF and UHF antennas (Yagi Uda, antenna with parabolic reflector, microstrip antenna, log periodic antenna).  
(5Hours)

**Wave Propagation:** Modes of Propagation: Surface Wave Propagation, Sky Wave (Ionospheric) Propagation- Virtual height, Maximum usable Frequency, Skip Distance, Optimum working frequency, Space Wave (Tropospheric) Propagation- line of sight distance.  
(12Hours)

#### TEXT BOOKS

- Antennas and Radio Wave Propagation K D Prasad Satya Prakashan

#### BOOKS RECOMMENDED:

- Antennas and Wave Propagation G S N Raju Pearson
- Antenna and Radio Wave Propagation Krauss TMH
- Antenna and Radio Wave Propagation Ballanis John Wiley & Sons

NOTE: There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed

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**B.Tech. Electronics & Communication Engineering 7th Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028**

**CLASS: B.TECH. 7<sup>th</sup> SEMESTER**

**CREDITS: 3**

**BRANCH: E&C ENGINEERING**

**COURSE NO: ECT-1703**

**Hours/ Week**

**Marks Distribution**

**COURSE TITLE: DIGITAL IMAGE PROCESSING**

L	T	P	Theory	Sessional
2	1	0	75	25

**DURATION OF EXAM: 3 HOURS**

<b>COURSE OUTCOMES</b>	
<b>At the end of the course the student will be able to: -</b>	
<b>CO1</b>	Attain the knowledge of fundamentals required for image acquisition and processing, and apply transform functions on image
<b>CO2</b>	Design frequency domain filters and spatial filters for image enhancement.
<b>CO3</b>	Analyze the methodologies required for image Segmentation.
<b>CO4</b>	Design the error free compressed images by using different compression techniques.

**SECTION-A**

**Digital Image Processing Fundamentals:** Fundamental concepts of image processing, Image sensing & acquisition, Image sampling & quantization, basic relationship between pixels. **(8 Hours)**

**Image Transforms:** Discrete Fourier transform and some properties of 2-D Discrete Fourier Transform, Fast Fourier Transform and IFFT. **(8 Hours)**

**Image Enhancement in Spatial and Frequency Domain :** Basic gray level transformation, Histogram processing, Basics of spatial filter ,smoothing & sharpening filters. **(6Hours)**

**SECTION-B**

**Image Restoration & Segmentation :**A model of image degradation & restoration process, Linear position invariant degradation ,estimating degradation function, Inverse filtering. **(8Hours)**

Detection of discontinuities & Edge Linking Thresholding

**Image Compression :** Coding, interpixel & Psychovisual redundancy, Error free compression-variable length coding, Lossy compression, Lossy prediction coding. **(6 Hours)**

**BOOKS RECOMMENDED:**

- |                                            |                               |
|--------------------------------------------|-------------------------------|
| • Digital Image Processing                 | RafaclGanzalez& Richard Woods |
| • Digital Image Processing Using Matlab    | Ganzalez& Woods               |
| • Fundamentals of Digital Image Processing | A.K. Jain                     |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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**B.Tech. Electronics & Communication Engineering 7<sup>th</sup> Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028**

**CLASS: B.TECH. 7<sup>th</sup>SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO: ECT-1704  
COURSE TITLE: ARTIFICIAL NEURAL NETWORK  
DURATION OF EXAM: 3 HOURS**

**CREDITS: 3**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

<b>COURSE OUTCOMES</b>	
At the end of the course the student will be able to: -	
<b>CO1</b>	Comprehend the concepts of neural network topologies and different types of learning.
<b>CO2</b>	Have knowledge in developing different algorithms for neural networks.
<b>CO3</b>	Analyze data using neural networks.
<b>CO4</b>	Knowledge in fuzzy logic principles.
<b>CO5</b>	Determine different methods of defuzzification.

**SECTION-A**

**Neural Networks Characteristics:** History of development in Neural Networks. Principles used in the working of neural networks, Artificial Neural Net Terminology, Model of a Neuron, Topology and types of learning Supervised, Unsupervised Learnings. **(6 Hours)**

**Learning Rules:** The perception, Linear reparability, Basic learning laws, Hebb's rule, Delta rule, Widrow & Hoff, LMS learning rule, Correlation learning rule, Instars and out star learning rules. Unsupervised learning, Competitive learning, K-Means clustering algorithm, Korhonen's feature maps. **(8 Hours)**

**Different Neural Networks:** Basic learning laws in Radial Basis Function nets, Back Propagation Algorithm, Feed Forward Networks, ART networks. **(6 Hours)**

**SECTION-B**

**Application of Neural Nets:** Pattern Recognition using Back Propagation Neural Networks, working of Associative Memories, Linear Regression. **(4 Hours)**

**Fuzzy Logic:** Basic concepts of Fuzzy Logic, Fuzzy vs Crisp set, Linguistic variables, Membership Function, Operation of Fuzzy sets, Fuzzy IF-THEN rules, Variable inference, Techniques, Defuzzication Techniques, Basic fuzzy inference algorithm, Applications of fuzzy logic, Fuzzy system design, Implementation of fuzzy system. **(8 Hours)**

**BOOKS RECOMMENDED:**

- Artificial Neural Networks Zurada
- Artificial Neural Networks Vegna Narayanan
- Neural Networks Simon Haykin

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed.

**B.Tech. Electronics & Communication Engineering 7th Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028**

**CLASS: B.E. 7<sup>TH</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO: MOC-1701  
COURSE TITLE: SWAYAM / NPTEL**

Hours/ Week			Credits: 3	
L	T	P	Theory	Sessional
2	1	0	100	00

The department shall offer the 12 weeks NPTEL course, out of the list of courses listed by NPTEL around the time of commencement of the semester. The courses offered shall be related to the core stream but should not be similar to the regular courses offered as a part of the department curriculum. The overall monitoring of the NPTEL course will be under the supervision of the faculty Incharge of the department.

The NPTEL certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per notified schedule.

The marks obtained by the student in the NPTEL certification course will be tabulated by the concerned department.

**Note:**

*(i) The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course. The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.*

*(ii) The Student must select their College name from the drop down box while registering for a particular course. There after the option of sharing the result with the Institute also needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by NPTEL to college authorities.*

***No certificate will be accepted without this and student will be marked absent in college records.***

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**CLASS: B.TECH. 7<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO: ECT-1705**

**CREDITS: 3**

**COURSE TITLE: FIBRE OPTICS AND COMMUNICATION  
DURATION OF EXAM: 3 HOURS**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

<b>COURSE OUTCOMES</b>	
At the end of the course the student will be able to: -	
<b>CO1</b>	Overview about the optical fiber communication.
<b>CO2</b>	Identify and characterise different types of optical fibre configuration and fiber modes.
<b>CO3</b>	Analyze different reasons for signal degradation in optical fibers.
<b>CO4</b>	Study the optical fiber link design parameters, fabrication and connectors.
<b>CO5</b>	Understanding various optical sources, detectors and amplifiers with applications.

**SECTION-A**

**Overview of Optical Fiber Communication:** Block diagram of Fiber Optical Comm. system, Evolution of fiber optic system, Elements of transmission link, Nature of light, Basic optical laws, Advantages and Disadvantage of optical fiber Communication. **(6 Hours)**

**Optical Fiber Structure and Waveguiding:** Mode and configuration, Fiber types, Rays and modes, Step-index fiber structure, Wave equation for step index fiber, Modes in step index fiber, Graded index fiber structure, Numerical Aperture of fibers. **(8 Hours)**

**Signal Degradation in Optical Fiber:** Attenuation, Absorption, Scattering and bending losses, signal degradation in fiber, Group delay, Material dispersion, Waveguide dispersion, Intermodal & intermodal dispersion, Pulse broadening in graded index fiber. **(8 Hours)**

**SECTION-B**

**Fiber Material Fabrication and Connectors:** Glass fibers, Halide glass, Chalgenide glass, Plastic fiber, Fiber fabrication, Outside vapor phase oxidation, modified chemical vapor deposition, Plasma activated chemical vapor deposition, Double crucible method, optical fiber connectors, Requirements of good design, Connector types, Single mode fiber connector. **(8 Hours)**

**Optical Sources, Detectors and Amplifier:** Optical sources and detectors, Semiconductor amplifier, External pumping and gain-erbium doped amplifiers, Amplification mechanism. **(6 Hours)**

**Applications:** Optical WDM, TDM networks and their switching, SDH/SONET, Optical ATM. **(6 Hours)**

**BOOKS RECOMMENDED:**

- Optical Fiber Communication principles and practice J.Senior
- Optical Fiber Communication Gerd Keiser

NOTE: There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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**B.Tech. Electronics & Communication Engineering 7th Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028**

**CLASS: B.TECH. 7<sup>th</sup> SEMESTER**  
**BRANCH: E&C ENGINEERING**  
**COURSE NO: ECT-1706**  
**COURSE TITLE: INFORMATION THEORY AND CODING**  
**DURATION OF EXAM: 3 HOURS**

**CREDITS: 3**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

<b>COURSE OUTCOMES</b>	
At the end of the course the student will be able to: -	
<b>CO1</b>	Determine the amount of information per symbol and information rate of a discrete memory less source
<b>CO2</b>	Design lossless source codes for discrete memory less source to improve the efficiency of information transmission and channel capacities.
<b>CO3</b>	Construct efficient codes for data on imperfect communication channels

**SECTION-A**

**Information Sources, measurement of information and the Entropy Function:** Introduction to Communication process and the nature of information, Optimum detection: Correlation demodulator & matched filter Entropy, measures of information, marginal entropy, joint entropy, Conditional entropy. **(10 Hours)**

**Source Coding & Channel Coding :** Lossless coding for discrete-valued sources, Discrete memory less source (DMS) Discrete stationary source, Lossy coding for discrete-time sources. Channel models, Channel capacity, The noisy channel coding theorem, Huffman codes. **(8 Hours)**

**SECTION B**

**Block Codes:** Introduction to block codes, , Linear block codes, Important binary linear block codes, Binary linear block code decoding & performance analysis, Non-binary block codes - Reed-Solomon (RS) codes. **(8 Hours)**

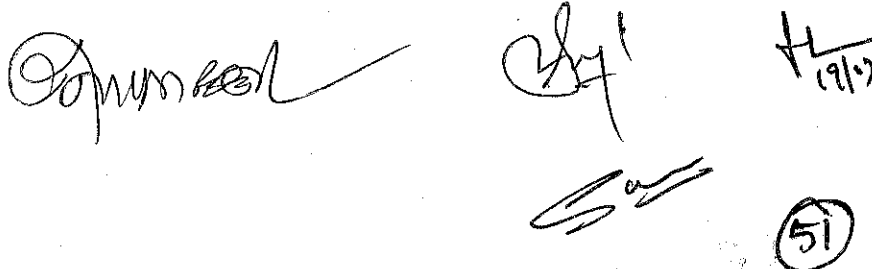
**Cyclic codes:** Introduction to Cyclic codes, polynomial and matrix description, generation and decoding of Cyclic codes. **(6Hours)**

**Convolution Codes:** Linear convolution codes & their descriptions, Transfer function representation & distance properties, Decoding convolution codes, Soft-decision MLSE, Hard-decision MLSE, The Viterbi algorithm for MLSE, Performance of convolutional code decoders. **(9 Hours)**

**BOOKS RECOMMENDED:**

- |                                                       |                               |
|-------------------------------------------------------|-------------------------------|
| • Information theory ,coding and cryptography         | Ranjan bose                   |
| • Communication system Engineering                    | John G. Proakis Masoud Salehi |
| • Applied coding and information Theory for Engineers | Richard B.Wells               |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed.


  
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**B.Tech. Electronics & Communication Engineering 7th Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028**

**BRANCH: ECE**

**SEMESTER: 7<sup>th</sup>**

**COURSE NO.: CST-3706**

**COURSE TITLE: AI & ML**

**DURATION OF EXAM: 3 HOURS**

**CREDITS: 3**

L	T	P	Marks	
			External	Internal
2	1	0	75	25

**COURSE OUTCOMES**

At the end of the semester the students will be able to

CO1	Remember and understand the concept and fundamental methods of AI.
CO2	Apply basic AI algorithms to solve the problems and Demonstrate an understanding of various searching algorithms
CO3	Identify different knowledge representation techniques used in AI
CO4	Apply supervised and unsupervised machine learning algorithms to solve various problems.
CO5	Implement and evaluate ensemble learning methods and advanced regression and classification models.

**Section- A**

**Introduction:** - AI History, The AI problems, AI techniques, AI Applications, AI tasks, Goals of Artificial Intelligence, Advantages and disadvantages of AI, Types of AI, Types of Agents, Turing Test in AI, Production system, Problem characteristics, Production system characteristics. **(08 hours)**

**Problem solving techniques:** Solving Problems by searching: State space search, control strategies, Blind Search: Breadth first Search, Depth First Search, heuristic search, Heuristic Search Techniques: Generate and test, Hill climbing. **(08 hours)**

**Knowledge Representation Issues:** - Representation and mappings, Approaches to knowledge representation, Issues of knowledge representation, The frame problem, procedural vs declarative knowledge.

**(04 hours)**

**Section- B**

**Machine Learning Fundamentals:** Introduction to machine learning, Supervised vs. unsupervised learning, Classification vs Regression, Decision trees, Rule learners, Linear regression, logistic regression, Support vector machines, K-means clustering. **(08 Hours)**



**Measuring performance of a model:** Confusion Matrix, Accuracy, Precision, Recall, F1-Score, ROC curves, AUC-ROC, precision-recall curves, Interpretation of results- Confidence interval for accuracy, Hypothesis tests for comparing models and algorithms. **(07 Hours)**

**Feature Engineering and Pre-processing:** Data Cleaning (Handling missing values, outlier detection and treatment), Feature Scaling (Normalization & standardization), Feature Selection (Filter, Wrapper and Embedded methods), Feature Extraction (PCA and LDA) **(07 Hours)**

**BOOKS RECOMMENDED:**

- 1 Artificial Intelligence Elaine Rich Kevin Knight
- 2 Principles of A.I Expert system development David W. Rolston.
- 3 Feature Engineering for Machine Learning: Alice Zheng and Amanda Casari  
Principles and Techniques for Data Scientists

**NOTE:** There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B.Tech. Electronics & Communication Engineering 7th Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028

CLASS: B.TECH. 7<sup>th</sup> SEMESTER

BRANCH: E&C ENGINEERING

COURSE NO.: ECT-1711

COURSE TITLE: DIGITAL VLSI DESIGN TECHNIQUES LAB

CREDIT: 1

Hours/ Week

L	T	P
0	0	2

Marks Distribution

Practical
25

COURSE OUTCOMES

At the end of the course the student will be able to: -

CO1	Write VHDL and Verilog Codes Combinational Circuits.
CO2	Write VHDL and Verilog Codes of Sequential Circuits.
CO3	Verify VHDL and Verilog Codes of Combinational Circuits.
CO4	Verify VHDL and Verilog Codes of Sequential Circuits.

**List of Experiments:**

Student has to perform/write at least eight programs for combinational and sequential circuits using VHDL/Verilog Hardware Description Languages.

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**B.Tech. Electronics & Communication Engineering 7th Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028**

**CREDIT: 0**

**CLASS: B.TECH. 7<sup>th</sup> SEMESTER  
BRANCH: E&C/ CSE/IT ENGINEERING  
COURSE NO.: NCC-6701  
COURSE TITLE: DISASTER MANAGEMENT**

Hours/ Week			Marks Distribution
L	T	P	Satisfactory/Unsatisfactory
2	0	0	

<b>COURSEOUTCOMES:</b> On completion of the course the students will be able to:	
CO1	Identify various types of disasters ,their causes and Impacts
CO2	To understand the disaster management principles, objectives and approaches
CO3	To understand various various elements of disaster management.
CO4	To study the modern techniques used in disaster mitigation and management.

**ModuleI**

Introduction to Disaster Management: Define and describe disaster, hazard, emergency, vulnerability, risk and disaster dimensions. Important phases of Disaster Management Cycle.  
Disasters classification-Natural disaster (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.)

**ModuleII**

Disaster Management: principles, objectives, and approaches. Element of disaster management; role of NGOs, community – based organizations and media; central, and state  
Disaster Mitigation: Hazard assessment, Vulnerability assessment, and Risk assessment. Emergency Management Systems (EMS): Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

**BOOKSRECOMMENDED:**

- |                                              |                |
|----------------------------------------------|----------------|
| • DisasterManagement                         | BYHarshK Gupta |
| • DisasterManagementTechniquesand Guidelines | BYBKSingh      |
| • DisasterRiskReduction inSouth Asia         | BYPradeepSahni |
| • Disaster management, A P H Publishers      | Sharma.S.R     |

NOTE: There will be internal evaluation based on the two Sessional tests. The students are required to score at least 40% or above in totality to be considered qualified in the course.



**CLASS: B.TECH. 7<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: PRJ-1711  
COURSE TITLE: MINI PROJECT**

**CREDIT: 2**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	4	100

COURSE OUTCOMES	
After learning this course students will be able to:	
CO1	Identify a problem statement either from a rigorous literature survey or the industry requirements analysis.
CO2	Design a solution for the identified problem by applying acquired technical knowledge
CO3	Simulate, Develop and Test the Prototype with a standard solution/ process.
CO4	Learn to work in a team and coordinate within the group for timely completion of targeted work.

**Mini Project Guidelines:**

The mini project is a team activity having 3-4 students in a team. This is electronic product design work with a focus on electronic circuit design. The mini project may be a complete hardware or a combination of hardware and software. Mini Project should cater to a small system required in laboratory or real life. It should encompass components, devices, analog or digital ICs, micro controllers with which functional familiarity is introduced.




Based on comprehensive literature survey/ Industry requirements analysis, the student shall identify the title and define the aim and objectives of the mini project. Students are expected to detail out specifications, methodology, resources required, involved in design and implementation and submit the proposal by the second week of the semester. The student is expected to exert on design, development, and testing of the proposed work as per the schedule.


Layout should be made using CAD based PCB simulation software.

Completed mini project and documentation in the form of mini project report is to be submitted at the end of semester.

**Distribution of Marks as per University statues:**

<b>Total Marks for End semester Evaluation</b>	=	<b>100 marks</b>	
Presentation/Demonstration	=	30marks	30%
Viva-voce	=	30 marks	30%
Actual work done	=	40marks	40%





**B.Tech. Electronics & Communication Engineering 7th Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028**

**CLASS: B.TECH. 7<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.:SIT-1711  
COURSE TITLE:SUMMER TRAINING II**

**CREDIT: 2**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	0	50

<b>COURSE OUTCOMES</b>	
<b>At the end of the course the student will be able to: -</b>	
<b>CO1</b>	Interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.
<b>CO2</b>	Understand the engineering code of ethics and be able to apply them as necessary.
<b>CO3</b>	Demonstrate knowledge of practical application of training.

Students are required to undertake 4 to 6 weeks Practical Training during the summer vacations in the field of Electronics and Communication Engineering and applications in Govt./Semi-Govt./Private sector. Thereafter, each student shall be required to submit a report on the practical training to the concern HOD for evaluation.

**Guidelines for evaluation of Practical Training:** The evaluation shall be done by the departmental committee by the end of 7<sup>th</sup> semester. The committee shall have a convener and at least two members.

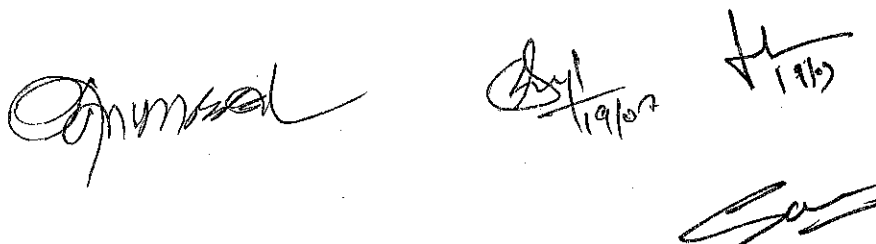
**Distribution of Marks as per the University statutes:**

Total Marks for Evaluation	= 50 marks	
i) Report	= 20	40%
ii) Viva-Voce	= 15	30%
iii) Miscellaneous Marks	= 15	30%

Due weightage will be given to those who have opted for Industrial Training outside the State as well as keeping in view the profile of that Industry.

**Award of the Marks:**

Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose.

  
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**B.Tech. Electronics & Communication Engineering 7th Semester Examination to be held in the year  
Dec 2025,2026, 2027,2028**

**CLASS: B.TECH. 7<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: SEM-1711 ✓  
COURSE TITLE: SEMINAR**

**CREDIT: 2**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	4	50

<b>COURSE OUTCOMES</b>	
At the end of the course the student will be able to: -	
<b>CO1</b>	Select a topic relevant to the field of Electronics and Communication engineering.
<b>CO2</b>	Undertake a review of the literature on the chosen topic.
<b>CO3</b>	Prepare and present a technical report.

This will involve a detailed study of a topic of interest reproduced in the candidate's own style. For this, a student has to prepare a seminar by doing proper survey of literature, compilation of information so gathered and then presentation of the same followed by question-answer session. The report of which has to be submitted by the student well before the conduct of seminar. The handout submitted by the student will be in accordance with the standards of technical papers.

**Guidelines and evaluation of Seminar in 7th semester:**

The topic of the Seminar is to be finalized and approved by the departmental committee by the end of 6th Semester. The committee shall have a convener and at least two members.

**Distribution of Marks:**

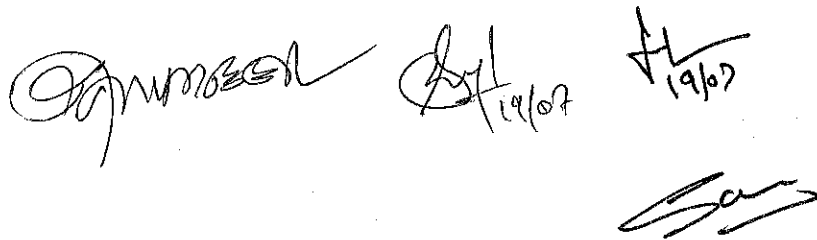
Total Marks for Seminar Evaluation = 50 marks

1	Project Report	15 marks
2	Presentation	25 marks
3	Attendance	10 marks.

**Award of Marks:**

Marks Under (1) will be awarded by the Seminar In charge.

Marks Under (2) and (3) will be awarded by the Departmental committee constituted for the purpose.

  
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## UNIVERSITY OF JAMMU

**B.Tech. Electronics & Communication Engineering 8<sup>th</sup> Semester Examination to be held in the year  
May 2026,2027, 2028,2029**

**B.TECH. 8<sup>th</sup> semester**

### SCHEME-I

**Contact Hours: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
ECT-1801	Professional Elective Course	Satellite Communication	2	1	0	25	75	100	3	100%
ECT-1802		Biomedical Electronics								
ECT-1803	Professional core Course	Computer Networks	2	1	0	25	75	100	3	100%
ECP-1813	Professional core Course	Computer Networks lab	0	0	2	25	0	25	1	100%
MOC-1811	Massive open online course	MOOC	0	0	2	25	0	25	1	100%
PRJ-1811	Project	Project	0	0	16	150	50	200	8	100%
<b>TOTAL</b>			<b>4</b>	<b>2</b>	<b>20</b>	<b>250</b>	<b>200</b>	<b>450</b>	<b>16</b>	

**OR**

### SCHEME-II

**B.TECH. 8<sup>th</sup> semester**

**Contact Hrs: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
PII-1811	Professional Industry Course	Industry Internship	0	0	24	325	100	425	15	100%
MOC-1811	Massive open online course	MOOC	0	0	2	25	0	25	1	100%
<b>TOTAL</b>			<b>0</b>	<b>0</b>	<b>26</b>	<b>350</b>	<b>100</b>	<b>450</b>	<b>16</b>	

**REMARKS: Students have the choice to opt one scheme among SCHEME-I and SCHEME -II .**

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**B.Tech. Electronics & Communication Engineering 8<sup>th</sup> Semester Examination to be held in the year  
May 2026,2027, 2028,2029**

**CLASS: B.TECH. 8<sup>th</sup> SEMESTER**

**CREDITS: 3**

**BRANCH: E&C ENGINEERING**

**COURSE NO: ECT-1801**

**COURSE TITLE: SATELLITE COMMUNICATION**

**DURATION OF EXAM: 3 HOURS**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Describe the various advantages and disadvantages of satellite communication.
CO2	Analyze the requirement for frequency allocation and spectrum.
CO3	Define orbital mechanics and launch methodologies.
CO4	Explain different satellite access techniques.
CO5	Compare competitive satellite services.

**SECTION-A**

**Introduction and Orbital Mechanics:** Evolution and growth of Communication Satellite, Principle of Satellite Communication, Elements of a Satellite Communication, Different types of Satellite, Advantage and Disadvantage of Satellite Communication, Frequency Allocation and Band spectrum. Kepler laws, Describing the orbit, Orbital period and velocity, Apogee and perigee height, Locating the Satellite in the orbit and with respect to earth. (11Hours)

**Satellite Subsystem:** Introduction to satellite subsystems, power supply system, attitude and orbital control systems, Telemetry, Tracking and command systems, Transponder, Earth station subsystem--LNA, HPA. (12Hours)

**SECTION-B**

**Satellite link Design**--Introduction, Basic Transmission theory, System Noise temperature, C/N and G/T ratio, Uplink design, Down link design, Effects of rain, complete link design, FM improvement factor. (8Hours)

**Multiple Access Techniques**--Introduction, TDMA--Frame structure, Frame efficiency, Super frame, Burst structure, FDMA - Demand assigned FDMA, SPADE system. (8 Hours)

**Satellite Applications** - VSAT, MSAT, DBS system, GPS system. (4 Hours)

**BOOKS RECOMMENDED:**

- |                                                     |                 |
|-----------------------------------------------------|-----------------|
| • Digital Satellite Communications (Second Edition) | Tri T. Ha. 1990 |
| • Satellite Communications                          | T. Pratt        |
| • Satellite Communications                          | Dennis Roddy    |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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**B.Tech. Electronics & Communication Engineering 8th Semester Examination to be held in the year  
May 2026,2027, 2028,2029**

**CLASS: B.TECH. 8<sup>th</sup>SEMESTER**

**CREDITS: 3**

**BRANCH: E&C ENGINEERING**

**COURSE NO: ECT-1802**

**COURSE TITLE: BIO-MEDICAL ELECTRONICSSS**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

**DURATION OF EXAM: 3 HOURS**

<b><u>COURSE OUTCOMES</u></b>	
<b>At the end of the course the student will be able to: -</b>	
<b>CO1</b>	Describe the various advantages and disadvantages of satellite communication.
<b>CO2</b>	Analyze the requirement for frequency allocation and spectrum.
<b>CO3</b>	Define orbital mechanics and launch methodologies.
<b>CO4</b>	Explain different satellite access techniques.
<b>CO5</b>	Compare competitive satellite services.

**SECTION-A**

**Introduction to Bio-Medical Instrumentation:** Basic Medical Instrumentation system, Sources of Bio Medical signal, Origin of Bio electric potential, ECG, EEG, EMG, Skin contact impedance and its measurement, Electrode for ECG-limb electrodes, Floating electrodes, Pregelled disposable electrodes for EEG & EMG. **(05Hours)**

**Anatomy and Physiology:** Basics of cell, types of tissues and organ systems; Homeostasis; Basics of organ systems - musculoskeletal, respiratory, circulatory, excretory, endocrine, nervous, gastro-intestinal and reproductive, Anatomy of heart, Cardiovascular system (Physiology), Conduction system of heart, Anatomy of brain, Nervous system (Physiology). Classification of muscles - muscle contraction mechanism, myoelectric voltages, Electromyography (EMG). **(07Hours)**

**Bio-Medical Recorders:** ECG recorder (Basic and Microprocessor Based), EEG recorder (EEG machine & 10-20 electrode system) and EMG recorder, ECG lead configuration & electrode placement, Phonocardiography. **(05Hours)**

**Sensors -** resistive, capacitive, inductive, piezoelectric, Hall effect. Principles of measuring blood pressure, body temperature, volume and flow in arteries, veins and tissues, respiratory measurements and cardiac output measurement. Operating principle of medical equipment-sphygmomanometer, ventilator, cardiac pacemaker, defibrillator, pulse oximeter, hemodialyzer Electrical Isolation (optical and electrical) and Safety of Biomedical Instruments. **(10Hours)**

**Section-B**

**Medical Imaging Instrumentation:** Introduction to image processing. Imaging systems X-rays, image intensifiers, Ultrasound-Introduction, Basic pulse echo system, A scan- Echo-encephalography, Echo-ophthalmoscope, M-scan-Echo-cardiograph, B-scan-linear, Sector, Compound scan, Biological effects of ultrasounds. **(05Hours)**

**Therapeutic Instrument:** Cardiac pacemakers, need for pacemakers, External pacemakers (continuous & on-demand), Voltage, Current, & current limited voltage pacemakers, Implantable pacemakers i.e fixed rate, Demand and its types. Cardiac defibrillators, their need, de defibrillators, Implantable defibrillators, pacer-cardiovertor defibrillators. **(10Hours)**

**Patient Safety:** Electric shock hazard, Leaking currents, Test instruments for checking safety parameters of Biomedical equipments. **(03Hours)**

**BOOKS RECOMMENDED:**

- Handbook of Biomedical Instrumentation by R.S.Khandpur.
- Biomedical Instruments: Theory and Design by Walter Welko- Witz and Sid Doutsch
- Leslie Cromwell, Fred J. Weibull, Erich A. Pfeiffer, "Biomedical Instrumentation and Measurements", Pearson Education, 2nd edition, 1980.
- Tompkins, "Biomedical Digital Signal Processing", PHI, 5th edition, 2010.

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**NOTE:** There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

**B.Tech. Electronics & Communication Engineering 8th Semester Examination to be held in the year  
May 2026,2027, 2028,2029**

**CLASS: B.TECH. 8<sup>th</sup> SEMESTER**  
**BRANCH: E&C ENGINEERING**  
**COURSE NO: ECT-1803**  
**COURSE TITLE: COMPUTER NETWORKS**  
**DURATION OF EXAM: 3 HOURS**

**CREDITS: 3**

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	75	25

<b>COURSE OUTCOMES</b>	
<b>At the end of the course the student will be able to: -</b>	
<b>CO1</b>	Have thorough knowledge of different models required for communication networks.
<b>CO2</b>	Implement encoding techniques, switching techniques
<b>CO3</b>	Introduce the concepts of communication protocols used in various types of computer networks.
<b>CO4</b>	Gain knowledge about how a signal is transmitted using various access techniques.

**SECTION-A**

**Introduction:** Goal of Network, Network classification (LAN, MAN, WAN), Network Topologies, Reference models-OSI & TCP/IP and comparison. **(8 Hours)**

**Data Communication :** Synchronous and asynchronous, Encoding techniques, (NRZ, RZ, Manchester, AMI), Transmission media, Guided and unguided, Switching techniques-circuit switching, Message switching, Packet switching-datagram & virtual circuit, Example physical layer protocol-RS232, Error detection and correction, flow control stop and wait protocol, Sliding window protocol, Example of Data link protocol (HDLC). **(9Hours)**

**Medium Access Control:** Multiple Access control-ALOHA, Slotted ALOHA, CSMA, CSMA/CD, LAN protocol IEEE 802.3. **(4 Hours)**

**SECTION-B**

**Routing and Congestion Control:** Routing algorithm-Shortest path algorithm, flooding, distance vector routing, Link state routing, Congestion control of virtual circuit subnets, Congestion control in datagram subnets, leaky bucket algorithm. **(10 Hours)**

**Internet Protocol:** IP addressing, Address resolution protocol (ARP), Reverse ARP, Subnetting & supernetting. **(6 Hours)**

**Application Layer:** Introduction to Email, FTP, Telenet, DNS. **(4 Hours)**

**BOOKS RECOMMENDED:**

- |                                          |                      |
|------------------------------------------|----------------------|
| • Computer Networks                      | Andrew S. Tanenbaum  |
| • Data Communication & Computer Networks | William D. Stallings |
| • Computer Networking                    | Behrouz A. Forouzn   |

**NOTE:** There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

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**B.Tech. Electronics & Communication Engineering 8th Semester Examination to be held in the year  
May 2026,2027, 2028,2029**

**CLASS: B.TECH. 8<sup>th</sup> SEMESTER**  
**BRANCH: E&C ENGINEERING**  
**COURSE NO.: ECP-1813**  
**COURSE TITLE: COMPUTER NETWORKS LAB**

**CREDIT: 1**

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	25

<b>COURSE OUTCOMES</b>	
After Completion of this course the student will be able to: -	
CO1	Understand fundamental underlining principles of computer networking.
CO2	Understand details and functionality of layered network architecture.
CO3	Apply mathematical foundations to solve computational problems in Computer Networking.
CO4	Analyze performance of various communication protocols.

**Lab Experiments:**

Experiment 1	To study different types of networking cables.
Experiment 2	To implement the cross-wired cable and straight through cable using crimping tool.
Experiment 3	To study about different networking devices.
Experiment 4	To connect two computers in a local area network and to share file between them.
Experiment 5	To study about IP addressing.
Experiment 6	To implement various topologies using the LAN trainer kit.
Experiment 7	To study the UDP protocol and TCP protocol using the LAN trainer software.

**NOTE: Additional Lab experiments/practical will be performed based on the course requirements. S**

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**B.Tech. Electronics & Communication Engineering 8th Semester Examination to be held in the year  
May 2026,2027, 2028,2029**

**CLASS: B.TECH. 8<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO: MOC-1811  
COURSE TITLE: MOOC**

**CREDITS: 1**

Hours/ Week			Marks Distribution
L	T	P	Sessional
0	0	2	25

The Students shall select a MOOC of 4 weeks/minimum 40 hours; available at the time on any reputed platform and shall pursue the same after due approval of the same from the departmental Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

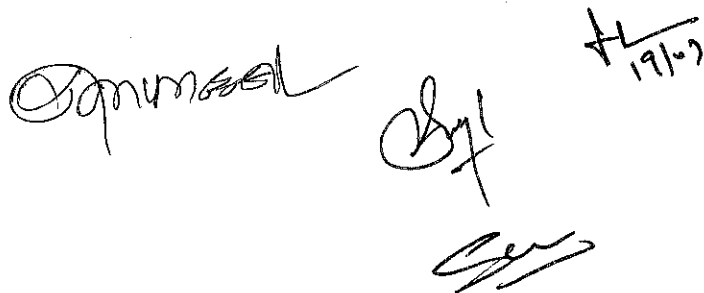
The overall monitoring of the MOOC course will be under the supervision of the teacher Incharge of the department The Departmental Academic Committee shall assess the student work based on a presentation of the Course undertaken/Project completed along with a relevant course completion certificate.

**Note:** In case a student opts for a four week NPTEL course the following points need to be followed:

*(i) The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course. The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.*

*(ii) The Student must select their College name from the drop down box while registering for a particular course. There after the option of sharing the result with the Institute also needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by NPTEL to college authorities.*

**No certificate will be accepted without this and student will be marked absent in college records.**

  
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**B.Tech. Electronics & Communication Engineering 8<sup>th</sup> Semester Examination to be held in the year  
May 2026,2027, 2028,2029**

**CLASS: B.TECH. 8<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: PRJ-1811  
COURSE TITLE: PROJECT**

**CREDIT: 8**

Hours/ Week			Marks Distribution		Total
L	T	P	Internal	External	
0	0	16	150	50	200

<b>COURSE OUTCOMES: At the end of the course the student will be able to: -</b>	
<b>CO1</b>	Identify a problem statement from a rigorous literature survey or the industry requirements analysis.
<b>CO2</b>	Simulate and design a solution for the identified problem by applying acquired technical knowledge.
<b>CO3</b>	Develop and test the prototype/algorithm to solve the engineering problem.
<b>CO4</b>	Accomplish all objectives of the project in an allocated period with efficient teamwork.
<b>CO5</b>	Present project work orally and through a comprehensive report.

**Project Guidelines:**

After interactions with project guides/industry experts, based on a comprehensive literature survey/ Industry requirements analysis, the student shall identify the title and define the aim and objectives of a project. The student is expected to work on details specifications, methodology, resources required, critical issues in design and implementation, and submit the project proposal within the first two weeks of semester. The student is expected to work on the design, development, and testing of the proposed project work as per the schedule. The project report is to be submitted at the end of the semester. This report includes a summary of the literature survey, detailed objectives, project specifications, design, developed system/Algorithm, results, contributions, and innovations in project work.

**Guidelines for evaluation of Project work in 8th semester:**

There shall be a mid-semester evaluation, followed by an End Semester (Final) Evaluation

**Sub distribution of Marks:**

**External Examiner: 50**

**Internal Examiner: 150**

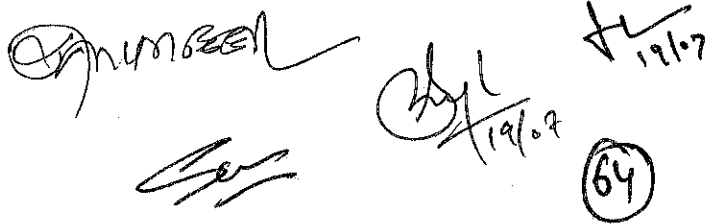
**Sub-distribution of internal marks:** Out of the total 150 marks for internal evaluation, 50 marks are for mid-sem evaluation and 100 marks are for final internal evaluation

• Mark distribution of internal Project work as per the University statutes shall be based on:

Distribution		Mid-Sem		Internal Final	
a.	Viva-Voce	50%	25	30%	30
b.	Presentation	50%	25	30%	30
c.	Report	-	-	40%	40
			<b>50</b>		<b>100</b>
<b>Total Internal</b>		<b>150</b>			

The External evaluation of 50 marks shall be done by External expert and shall be based on work done, viva-voce and presentation.

**NOTE:** The students will submit a detailed project report individually to the Head of the department and a copy of the certificate if awarded should also be appended to the report


  
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**B.Tech. Electronics & Communication Engineering 8th Semester Examination to be held in the year  
May 2026,2027, 2028,2029**

**B.TECH. 8<sup>th</sup> semester**

**SCHEME-II**

**Contact Hrs: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
PII-1811	Professional Industry Course	Industry Internship	0	0	24	325	100	425	15	100%
MOC-1811	Massive open online course	MOOC	0	0	2	25	0	25	1	100%
<b>TOTAL</b>			<b>0</b>	<b>0</b>	<b>26</b>	<b>350</b>	<b>100</b>	<b>450</b>	<b>16</b>	

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**B.Tech. Electronics & Communication Engineering 8th Semester Examination to be held in the year  
May 2026,2027, 2028,2029**

**CLASS: B.TECH. 8<sup>th</sup> SEMESTER  
BRANCH: E&C ENGINEERING  
COURSE NO.: PII-1811  
COURSE TITLE: INDUSTRY INTERNSHIP**

**CREDIT: 15**

Hours/ Week			Marks Distribution		Total
L	T	P	Internal	External	
0	0	24	325	100	425

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	To provide exposure to work independently in the Industry/Organisation
CO2	To develop skills in the emerging technologies
CO3	To utilize the knowledge for seeking placements in the Industry

The Project Industrial Internship letters shall be issued to the students in the 7<sup>th</sup> Semester based on the student request application, specifying the details of the company /industry/organisation from where they intend to do their Industrial Internship; along with company's consent letter and the detailed plan of the Project/Internship to be undertaken during the 8<sup>th</sup> Semester, as per the Performa provided. The Departmental Academic Committee will finalize and approve the projects. Subsequently, an internal Supervisor shall be allotted to each student who will periodically review the student's performance during the Internship/project as decided by the department.

At the Completion of the Project internship, the students have to submit a detailed project/Internship report individually to the department through their internal guides and a copy of the successful completion certificate should also be appended to the report. They shall also submit a monthly progress of their Internship/project duly signed by the concerned authority in the Organisation/Company via mail to their respective Supervisor. Following guidelines must be followed by the department while permitting the students for Industrial Internship:

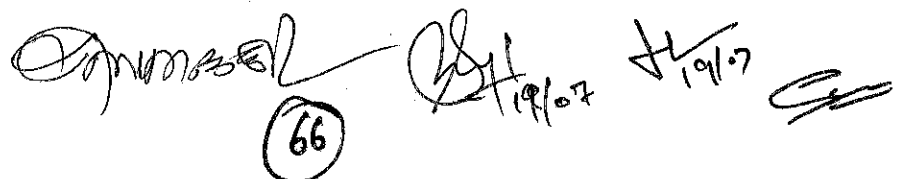
Case 1:

- i. Preference shall be given to the Students who are placed in the company/Industry and their respective companies/Industries etc mandates the student to work in their Industries for 8<sup>th</sup> Semester before joining the Jobs after Completion of course. The students shall have to submit an undertaking that he/she will join the company after the completion of the course.

Case 2:

- i. No student shall be allowed to undertake Industrial Internship having backlog in any subject (Theory/Practical) upto the semester for which the result is declared by the University of Jammu (Except case1).
- ii. The aggregate % of marks for applying shall be minimum 60% upto the Semester for which the result is declared by the university. (Except case 1).
- iii. Number of students permitted (case 1 and 2) in any batch for the Industrial Internship shall not be more than the 50% of the strength of the class.
- iv. If the number of applications are more, then the permission shall be granted as per the merit drawn (aggregate % of marks) upto the semester for which the result is declared by the university (Except case1).
- v. Students with offer letters from reputed organisations/Industries and National Institutions, preferably with stipend, shall be given preference.
- vi. Students who wish to initiate a Start Up shall submit a Detailed plan for the same and may be allowed if the DAC approves their proposal.

**NOTE:** The Final decision to allow external Project Industrial Internships shall be taken by the Department Academic Committee in accordance with the above listed guidelines and shall be binding on all the students.

  
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Guidelines for evaluation of Industrial Internship in 8<sup>th</sup> semester:

There shall be a mid-semester online/offline evaluation, followed by an End Semester (Final) Evaluation

**Sub-distribution of marks:**

- For External Evaluation : 100
- For Internal Evaluation : 325

**Sub-distribution of internal Evaluation:**

Out of the total 325 marks for internal evaluation, 125 marks are for mid-sem evaluation and 200 marks are for final internal evaluation.

Mark distribution of internal evaluation of Industrial Internship shall be as per below table:

	Distribution	Mid-Sem (Internal Supervisor)	Internal Final (Departmental Committee)	
a.	Viva-Voce	50	60	30%
b.	Presentation/Demonstration	75	60	30%
c.	Report	—	80	40%
		125	200	
	<b>Total Internal</b>		325	

The External Evaluation of 100 marks shall be done by the External Expert and shall be based on the Profile of Company/ Organisation, level of the work done, Viva-voce and Presentation.

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**B.Tech. Electronics & Communication Engineering 8th Semester Examination to be held in the year  
May 2026,2027, 2028,2029**

**CLASS: B.TECH. 8<sup>th</sup> SEMESTER**  
**BRANCH: E&C ENGINEERING**  
**COURSE NO: MOC-1811**  
**COURSE TITLE: MOOC**

**CREDITS: 1**

Hours/ Week			Marks Distribution
L	T	P	Sessional
0	0	2	25

The Students shall select a MOOC of 4 weeks/minimum 40 hours; available at the time on any reputed platform and shall pursue the same after due approval of the same from the departmental Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

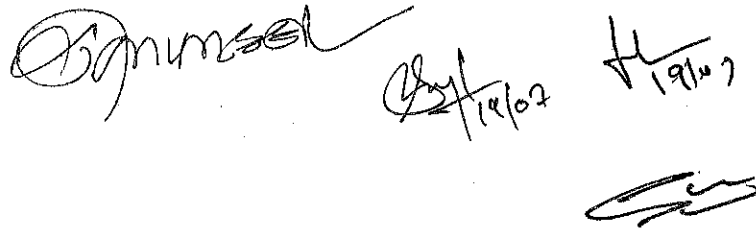
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*(ii) The Student must select their College name from the drop down box while registering for a particular course. There after the option of sharing the result with the Institute also needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by NPTEL to college authorities.*

*No certificate will be accepted without this and student will be marked absent in college records.*

  
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