UNIVERSITY OF JAMMU

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

NOTIFICATION

(24/Aug/Adp/59)

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 Electrical 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
Electrical	**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.

-Sd/
DEAN ACADEMIC AFFAIRS

No. F.Acd/III/24/ 8639-48
Dated: 08/08/2024

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.

Sumita Sharma 7/8/2024
Deputy Registrar (Academic)

Sukanya 7/8/24 7/8/24 7/8/2024

Annexure

Item No- 01

Resolved the syllabus of B. Tech 5th Semester for Batch -2022 and onwards in Electrical Engineering branch:-

B.Tech Electrical Engineering 5th Semester Examination to be held in the Year December 2024,2025,2026,202

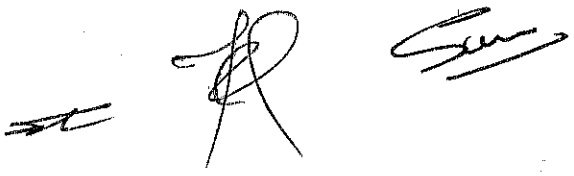
Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total	Credits	% Change
			L	T	P	Internal	External			
EET-2501	Professional Core Course	Power System-I	2	1	0	25	75	100	3	100%
EET-2502	Professional Core Course	Electrical Machine Design	2	1	0	25	75	100	3	100%
EET-2503	Professional Core Course	Signal and System	2	1	0	25	75	100	3	100%
EET-2504	Professional Elective Course	Renewable Energy	2	1	0	25	75	100	3	100%
EET-2505		Energy Economics								
EET-2506		Energy Resources								
ECO-1505	Professional Open Elective Course	Introduction To The Internet Of Things	2	1	0	25	75	100	3	100%
CSO-3505		Python Programming								
ITO-4505		Linux Programming								
MEO-5505		3D Printing								
CEO-6505		Essentials Of Civil Engineering								
MOC-2501	Massive Open Online Course	SWAYAM/ NPTEL	3	0	0	-	100	100	3	100%
SIT-2511	Professional Core Course	Summer Training-I	0	0	0	25	-	25	1	100%

EEP-2511	Professional Core Course	Power System I Lab	0	0	3	50	-	50	1.5	100%
ECO-1515	Professional Open Elective Lab	Introduction To The Internet Of Things Lab	0	0	2	25	-	25	1	100%
CSO-3515		Python Programming Lab								
ITO-4515		Linux Programming Lab								
MEO-5515		3D Printing Lab								
CEO-6515		Essential of Civil Engineering Lab								
NCC-2501	Non-Credit Course	Fundamental of Electromagnetic Field	2	0	0	Satisfactory/unsatisfactory			0	100%
TOTAL			**15**	**05**	**5**	**225**	**475**	**700**	**21.5**	

Remarks:

1. The course titled **"Electrical Measurement & Instruments"** with Lab. having code **PEE-502** and Lab. code **PEE-512** has been changed with **"Signal & System"** having course Code **EET-2503.**
2. The Elective course titled **"Electrical Machine Design"** having course code **EEE-502(A)** has been kept professional core course having course code **EET-2502.**
3. The elective course titled **"Electrical Machine Design & Power Plant Engineering** "having course code **EEE- 502(A)** and **EEE- 502(B)** has been replaced with" **Energy Economics & Energy Resources"** having Code **EET-2505** and **EET-2506.**
4. The elective course titled **"Renewable Energy"** having code **EEE-502(C)** has been replaced with new course Code **EET-2504.**
5. The professional open elective course titled **"Introduction to the Internet of things, Python programming, Linux Programming, 3D printing & Essential of Civil Engineering"** with labs. having code **ECO-1505, CSO-3505, ITO-4505, MEO-5505 & CEO-6505** with lab. Code **ECO-1515, CSO-3515, ITO-4515, MEO-5515 & CEO-6515** has been introduced.
6. The course titled **"Fundamental of Electromagnetic field"** with course code NCC-2501 has been introduced.

7. The course titled "**Microprocessor (8085) & peripheral interfacing** "with Lab. having course code **EEC-501** and Lab. Code **EEC-511** has been removed.
8. The course titled "**SWAYAM/NPTEL**" having code **MOC-603** has been shifted from core to elective course with code **MOC-2601. The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.**
9. The course titled "**Essence of Indian Traditional Knowledge** "having code **NCC-503** has been shifted to 4th semester.



Item No- 02

Resolved the syllabus of B.Tech. 6th Semester for Batch – 2022 and onwards of Electrical Engineering branch:

B.Tech Electrical Engineering 6th Semester Examination to be held in the Year MAY 2025,2026,2027,2028

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
EET-2601	Professional Core Course	Power System-II	2	1	0	25	75	100	3	100%
EET-2602	Professional Core Course	Power Electronics	2	1	0	25	75	100	3	100%
HMT-7601	Humanities & Social Science course	Fundamental of Economics	2	1	0	25	75	100	3	100%
EET-2603	Professional Elective Course/ Massive Open Online Course	Power Plant Engineering	2	1	0	25	75	100	3	100%
EET-2604		Installation and Maintenance								
EET-2605		Fundamental of Electrical Vehicles								
MOC-2601		SWAYAM/ NPTEL				-	100			
ECT-1605	Professional Core Course	Microprocessors and Microcontrollers	2	1	0	25	75	100	3	100%
EEP-2611	Professional Core Course	Power System-II Lab	0	0	2	25	-	25	1	100%
EEP-2612	Professional Core Course	Power Electronics Lab	0	0	2	25	-	25	1	100%
ECP-1615	Professional Core Course	Microprocessors And Microcontrollers Lab	0	0	2	25	-	25	1	100%
MOC-2611	Massive Open Online Course	MOOC	0	0	2	25	-	25	1	100%
NCC-2601	Non-Credit Course	Network Filters & Transmission Line	2	0	0	Satisfactory/ Unsatisfactory			0	100%
TOTAL			**12**	**05**	**8**	**225/ 200***	**375/400***	**600**	**19**	

*If the student choose SWAYAM/ NPTEL course.

REMARKS:

1. The course titled" Managerial **Economic**"having code **HMC-601** and has been changed with course titled "**Fundamental of Economics"** Code having code **HMT-7601.**
2. The course titled" Power **System Protection**"with Lab. Having course code **PEE-603** and Lab. course code **PEE-613** has been changed with course title "**Microprocessor and Microcontroller"** having code **ECT-1605** and Lab. Course code **ECP-1615**.
3. The course titled "**Power Quality & Facts**" having code **EEE-602(A)** has been replaced with" **Power Plant Engineering**" having course code **EET-2603.**
4. The course titled" **Power System Dynamics & Control**" having course code **EEE-602(B)** and has been replaced with" **Installation and Maintenance**" having Code **EET-2604**
5. The course titled "**Digital Control System**" having code **EEE-602(C)** has been replaced with" **Fundamental of Electrical Vehicles**" having Code **EET-2605.**
6. The course titled "**SWAYAM/NPTEL**" having code **MOC-603** has been shifted from core to elective course with code **MOC-2601. The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.**
7. The course titled "**Matlab**" having code **PEE-614** has been replaced with" **MOOC**" having Code **MOC-2611** to incorporate multidisciplinary courses as per NEP and also to facilitate skill upgradation of students.
8. The course **MATLAB** has been shifted from 6th semester to 4th semester with the new Course Code **EEP2414.**
9. The Non-Credit Course title "**Network Filters & Transmission Line**" has been introduced with the new Course Code **NCC-2601.**

Item No-

Resolved the syllabus of B.Tech. 7th Semester for Batch – 2022 and onwards of Electrical Engineering branch:

B. Tech Electrical Engineering 7th Semester Examination to be held in the Year December 2025,2026,2027,2028

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
EET-2701	Professional Core Course	Power System-III	2	1	0	25	75	100	3	100%
EET-2702	Professional Core Course	Power System Protection	2	1	0	25	75	100	3	100%
EET-2703	Professional Core Course	Utilization of Electrical Energy	2	1	0	25	75	100	3	100%
EET-2704	Professional Elective Course/ Massive Open Online Course	High Voltage Engineering	2	1	0	25	75	100	3	100%
EET-2705		EHV AC/DC Transmission								
MOC-2701		SWAYAM/NPTEL				-	100			
HMT-7701	Humanities & Social Science course	International Economics	2	1	0	25	75	100	3	100%
HMT-7702		Industrial & Production Management								
SIT-2711	Summer Industry Internship	Summer Training-II	–	–	–	50	–	50	2	100%
SEM-2711	Seminar	Seminar	0	0	4	50	-	50	2	100%
EEP-2711	Professional Core Course	Power System III Lab.	0	0	2	25	–	25	1	100%
EEP-2712	Professional Core Course	Power System Protection Lab	0	0	2	25	-	25	1	100%
NCC-2701	Professional Core Course	Electrical Engineering Materials	2	0	0	Satisfactory/ Unsatisfactory Non- Credit				100%
TOTAL			**12**	**10**	**8**	**275/250***	**375/400***	**650**	**21**	

*If the student choose SWAYAM/ NPTEL course.

REMARKS:

1. The course titled "**Electronics Measurement**" with Lab. having course code **PEE-702** and Lab. course code **PEE-712** has been changed with course title "**Power System Protection**" having code **EET-2702** and Lab. Course code **EEP-2712**.
2. The course titled "**Electrical Utilization**" Having course code **EEE-701(A)** has been changed from elective to core course with course title "**Utilization of Electrical Energy**" having code **EET-2703.**
3. The course titled "**Energy Economics**" having code **EEE-701(B)** has been replaced with" **High Voltage Engineering**" having course code **EET-2704.**
4. The course titled" **Power System Operation & Control**" having course code **EEE-701(C)** and has been replaced with"**EHV AC/DC Transmission**" having Code **EET-2705.**
5. The course titled "**SWAYAM/NPTEL**" has been kept elective having Code **MOC-2701** to incorporate multidisciplinary courses as per NEP and also to facilitate skill upgradation of students. **The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.**
6. The course titled "**Business Environment and Production Management**" having code **HMC-701(B)** has been replaced with" **International Economics**" having Code **HMT-7701**.
7. The course titled "**Energy Resources**" having code **NCC-702** has been replaced with" **Electrical Engineering Material**" having Code **NCC-2701**.
8. **The open elective Lab. courses has been shifted from 7th to 5th semester.**

Item No- 04

Resolved the syllabus of B.Tech. 8th Semester for Batch – 2022 and onwards of Electrical Engineering branch:

Tech Electrical Engineering 8th Semester Examination to be held in the Year May 2026,2027,2028,2029

Scheme- I

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
EET-2801	Professional Core Course	Electronics Measurement	2	1	0	25	75	100	3	100%
EET-2802	Professional Core Course	Electrical Drives	2	1	0	25	75	100	3	100%
MOC-2811	Massive Open Online Course	MOOC	0	0	2	25	–	25	1	100%
EEP-2811	Professional Core Course	Electronics Measurement Lab.	0	0	2	25	–	25	1	100%
NCC-2801	Non-Credit Course	Fundamental of Smart Grid Technology	2	0	0	Satisfactory/ Unsatisfactory			0	100%
PRJ-2811	Project	Project	0	0	16	150	50	200	8	100%
TOTAL			**6**	**4**	**18**	**250**	**200**	**450**	**16**	

OR

Scheme-II

COURSE CODE	COURSE TYPE	COURSE TITLE	Load Allocation			Marks Distribution		Total	Credits	% Change
			L	T	P	Internal	External			
MOC-2811	Massive Open Online Course	MOOC	0	0	2	25	–	25	1	100%
PII-2811	Professional Industry Internship	Industry Internship	0	0	24	325	100	425	15	100%
		TOTAL	**0**	**0**	**26**	**350**	**100**	**450**	**16**	**100%**

REMARKS:

1. The course titled "**Elective-I**" having course code **EEE-801** has been changed with course title "**Electronics Measurement**" with Lab. having code **EET-2801** and Lab. Course code **EEP-2811**.
2. The course titled "**Electrical Drives**" Having course code **EEE-801(A)** has been changed from elective to core course with course code **EET-2802.**
3. The course titled " **Electrical & Hybrid Vehicles/ Disaster Management**" having code **NCC-802/ NCC-806** has been replaced with "**Fundamental of Smart Grid Technology**" having course code **NCC-2801.**
4. **The open elective courses has been shifted from 8th to 5th semester.**

UNIVERSITY OF JAMMU

B.Tech Electrical Engineering 5th Semester Examination to be held in the Year December 2024,2025,2026,2027

Contact hours: 25

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total	Credits	% Change
			L	T	P	Internal	External			
EET-2501	Professional Core Course	Power System-I	2	1	0	25	75	100	3	100%
EET-2502	Professional Core Course	Electrical Machine Design	2	1	0	25	75	100	3	100%
EET-2503	Professional Core Course	Signal and Systems	2	1	0	25	75	100	3	100%
EET-2504	Professional Elective Course	Renewable Energy	2	1	0	25	75	100	3	100%
EET-2505		Energy Economics								
EET-2506		Energy Resources								
ECO-1505	Professional Open Elective Course	Introduction To The Internet Of Things	2	1	0	25	75	100	3	100%
CSO-3505		Python Programming								
ITO-4505		Linux Programming								
MEO-5505		3D Printing								
CEO-6505		Essentials Of Civil Engineering								
MOC-2501	Massive Open Online Course	SWAYAM/ NPTEL	3	0	0	-	100	100	3	100%
SIT-2511	Professional Core Course	Summer Training-I	0	0	0	25	-	25	1	100%
EEP-2511	Professional Core Course	Power System I Lab	0	0	3	50	-	50	1.5	100%
ECO-1515	Professional Open Elective Lab	Introduction To The Internet Of Things Lab	0	0	2	25	- +	25	1	100%
CSO-3515		Python Programming Lab								
ITO-4515		Linux Programming Lab								
MEO-5515		3D Printing Lab								
CEO-6515		Essentials of Civil Engineering Lab								
NCC-2501	Non-Credit Course	Fundamental of Electromagnetic Field	2	0	0	Satisfactory/ Unsatisfactory			0	100%
TOTAL			**15**	**05**	**05**	**225**	**475**	**700**	**21.5**	

Note:- The students will have a choice to choose between Elective Courses and open elective courses of their choice

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B.Tech Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th **CREDITS: 3**
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2501
COURSE TITLE: POWER SYSTEM-I
DURATION OF EXAM: 3 HOURS

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understand different types of distribution system and electrical design aspects of transmission lines.
CO2	Analysis the performance of transmission lines
CO3	Study of different types of insulators and their applications
CO4	Analysis the corona effect and mechanical design aspects of transmission lines.

Detailed Syllabus
Section- A

Unit-I: D.C & A.C. Distribution Systems: Introduction to a Power System (an overall view). Distribution Systems-Feeder, Distribution, service mains. Classification of distribution system. Various types of D.C. & A.C. distributors, Voltage drop calculations. **(10 hours)**

Unit-II: Overhead AC Transmission Lines Parameters: Types and bundling of conductors, Resistance calculations, skin effect, proximity effect. Inductance and Capacitance of single phase and 3- phase, single circuit and double circuit lines. Interference of power Lines with communication lines: Electrostatics & electromagnetic effects . **(12 hours)**

Section- B

Unit-III: Insulators for overhead Lines: Performance of transmission lines, Representation & performance of short, medium and long lines, A, B, C, D constants, surge impedance, Ferranti effect. Materials for insulators, types of insulators, potential distribution over a string of suspension insulators, methods for equalizing the potential. **(10 hours)**

Unit-IV: Corona: Visual & critical disruptive voltage conditions effecting corona, power loss due to corona, practical considerations. Mechanical design of transmission line, Calculation of sag and tension, Equivalent span length and sag, effect of ice & wind loading, Conductor vibration& vibration dampers. . **(12 hours)**

BOOKS RECOMMENDED:

1. Elements of Power System Analysis -C.W. Stevenson
2. Transmission & distribution of Electric Energy - H. Cotton & H. Barber
3. Electric Power System - C.L. Wadhwa

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.

SEMESTER: 5th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2502
COURSE TITLE: ELECTRICAL MACHINE DESIGN
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machine.
CO2	Understand the design of transformer.
CO3	Understand the design of Induction Motors
CO4	Understand the design of Synchronous Machines

Detailed Syllabus

Section- A

Unit-I: Introduction: Major considerations in electrical machine design, choice of specific electrical and magnetic loadings, thermal considerations, heat flow, temperature rise, rating of machines. **(08 hours)**

Unit-II: Transformers :-Sizing of a transformer, main dimensions, kVA output for single- and three-phase transformers, window space factor, overall dimensions, design for minimum cost, design for minimum loss, temperature rise in transformers, design of cooling tank, methods of cooling transformers, operating characteristics. **(12 hours)**

Section- B

Unit-III: Induction Motors:-Sizing of an induction motor, main dimensions, length of air gap, rules for selecting rotor slots ofsquirrel cage machines, design of rotor bars & slots, design of end rings, design of wound rotor, and turn per phase and stator conductors, stator core and teeth, operating characteristics. **(11 hours)**

Unit-IV: Synchronous Machines:-Sizing of a synchronous machine, main dimensions, design of salient pole machines, short circuit ratio, shape of pole face, armature design, armature parameters, estimation of air gap length, design of rotor, design of damper winding. **(10 hours)**

BOOKS RECOMMENDED:

1. A Course in Electrical Machine Design - A. K. Sawhney
2. Theory & Performance & Design of A.C. Machines - M.G. Say
3. A Text Book of Electrical Engineering Drawings - K. L. Narang

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 Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2503
COURSE TITLE: SIGNAL AND SYSTEM
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understand the concepts of signal and systems.
CO2	Understand the concepts of continuous time and discrete time systems.
CO3	Analyse systems in complex frequency domain.
CO4	Understand sampling theorem and its implications

Detailed Syllabus

Section- A

Unit-I: Introduction to Signals: Introduction of signal, Classification of Signals, Some special signals of importance: the unit step, the unit impulse, the sinusoid, the complex exponential, random and characteristics signals, energy and power signals, Mathematical operations on the signals. **(10 hours)**

Unit-II: Introduction to system: Definition, classification of system, impulse response and step response, convolution and cascadeinterconnection of system, characterization of causality and stability of LTI systems. Signal flow graph representation of LTI system, System representation through differential equations and difference equations. **(12 hours)**

Section-B

Unit-III: Fourier, Laplace and z- Transforms: Fourier series representation of periodic signals, Waveform Symmetries, Calculation of Fourier Coefficients. Fourier Transform, Fourier domain duality. The Discrete- Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). The z- Transform for discrete time signals and systems, system functions, poles and zeros of systems and sequences, z-domain analysis. **(13 hours)**

Unit-IV: Sampling and Reconstruction: The Sampling Theorem and its implications. Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold. Introduction to the applications of signal and system theory: modulation for communication, filtering, feedback control systems. **(8 hours)**

Text/References:

1. A. V. Oppenheim, A. S. Willsky and S. H. Nawab, "Signals and systems", Prentice Hall India, 1997.
2. J. G. Proakis and D. G. Manolakis, "Digital Signal Processing: Principles, Algorithms, and Applications", Pearson, 2006.
3. H. P. Hsu, "Signals and systems", Schaum's series, McGraw Hill Education, 2010.
4. S. Haykin and B. V. Veen, "Signals and Systems", John Wiley and Sons, 2007.

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 Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2504
COURSE TITLE: RENEWABLE ENERGY
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understand the concepts, construction and working of solar energy
CO2	Understand the concepts, construction and working of wind energy
CO3	Understand the concepts, construction and working of Biomass energy
CO4	Understand the concepts, construction and working of small hydro

Detailed Syllabus

Section- A

Unit-I: Solar Energy: - Primary and Secondary Solar energy and Utilization of Solar Energy. Characteristic advantages and disadvantages. Solar concentrators and tracking; Dish and Parabolic trough concentrating generating systems, Centraltower solar thermal power plants; Solar Ponds. **(10 hours)**

Unit-II: Wind Electricity Generation:-Introduction ,Types of turbines, Coefficient of Power, Wind electric generators, Power curve; wind characteristics and site selection; Wind farms for bulk power supply to grid; Potential of wind electricity generation in India and its current growth rate. **(11 hours)**

Section- B

Unit-III: Biomass Energy:-Biomass: Sources and Characteristics; Wet biogas plants; Biomass gasifiers: Classification and Operating characteristics; Updraft and Downdraft gasifiers; Gasifier based electricity generating systems; Maintenanceof gasifiers. Types of biogas plants, biogas generation, advantages and disadvantages, applications of gasifiers. **(12 Hours)**

Unit-IV: Hydro Energy:- Overview of micro, mini and small hydro systems; Hydrology; Elements of pumps and turbine; Selection and design criteria of pumps and turbines; Site selection and civil works; Speed and voltage regulation; tariff collection, Potential of small hydro power in India **(9 hours)**

BOOKS RECOMMENDED:

1. Power Plant Engineering - Nag. P.K
2. Power Plant Technology - El-Wakil. M.M
3. Non-conventional energy resources - Shobh Nath Singh
4. Non-conventional energy resources - R.P.Jain

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 Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ELECTRICAL ENGINEERING **CREDITS: 3**
COURSE NO: EET-2505
COURSE TITLE: ENERGY ECNOMICS
DURATION OF EXAM: 3 HOURS

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understanding of economic and ability to apply economic and financial evaluation of energy projects.
CO2	Learn different economic models and statistical approaches can be deliberated.
CO3	Familiar with tools of decision making and uncertainty in the technology implementation.
CO4	To provide relevant inputs on energy economy-environment interaction related policy studies.

Detailed Syllabus

Section- A

Unit-I:Introduction: System economics, Reference energy systems, Econometrics, Statistical approach, Langrangian multiplier, Input–output economics, Macroeconomic growth models. **(9 hours)**

Unit-II: Economics fundamentals: Simple Payback Period, IRR, NPV, Life Cycle Costing, Cost of Saved Energy, Cost of Energy generated, Examples from energy generation and conservation, Energy Chain, Primary energy analysis and Life Cycle Assessment . **(10 hours)**

Section-B

Unit-III: Energy and Economics:- Introduction , sector wise consumption of energy resources: Electricity-Fuel-Transportation, Energy Scenario and supply position of different energy sectors: Indian and International Level – Coal, Oil, Natural Gas, RE, Hydro, Nuclear **(11 hours)**

Unit-IV:Demand Forecasting: Simple and advanced Techniques, Econometric Approach to Energy Demand Forecasting, End-Use Method of Forecasting, Input–Output Model, Scenario based approach, ANN based approach, Hybrid Approach, Energy Demand Analysis. **(11hours)**

RECOMMENDED BOOKS:

1. Bhattacharyya, Subhes C. Energy economics: concepts, issues, markets and governance. Springer Science &Business Media, 2011, ISBN 978-0-85729-268-1.
2. Financial evaluation of renewable energy technologies, a book by TC Kandpal, 1982.
3. Zweifel, Peter, Aaron Praktiknjo, and Georg Erdmann. Energy economics: theory and applications. Springer,2017
4. Aris Spanos, "Statistical Foundations of Econometric Modelling" Cambridge University Press.

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 Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2506
COURSE TITLE: ENERGY RESOURCES
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understand the global energy scenario and role of energy in economic development
CO2	Understand about different energy resources available and their consumption and economics
CO3	Working of different energy sources to convert it in other energy and various mechanism used in it.
CO4	Understand about the cogeneration, Tri-generation and waste heat recovery system

Detailed Syllabus

Section- A

Unit-I: Classification of Energy Sources: Principle fuels for energy conversion: Fossil fuels, Nuclear fuels. Conventional & Renewable Energy **(4 hours)**

Unit-II: Electricity generation using Renewable Energy Sources: Basic Principles and Applications. Conversion of Electromagnetic energy and natural energy sources like solar radiation, Wind, Ocean waves etc. to electricity. Conversion of chemical energy into electrical energy (fuel ceil). **(6 hours)**

Unit-III: Energy Crisis: Electricity Act-2003 & its features. Framework of Central Electricity Authority (CEA), Central & States Electricity Regulatory Commissions (CERC & ERCs), Environmental aspects of Electric energy generation **(10 hours)**

SECTION-B

Unit-IV: Turbines: Steam turbines, Hydraulic turbines, Wind Turbines. **(5 hours)**

Unit-V: Co-generation & Tri-generation: Definition, need, application, advantages, classification, saving Potential. **(8 hours)**

Unit-VI: Waste Heat Recovery: Concept of conversion efficiency, energy waste, waste heat recovery classification, advantages and applications, commercially viable waste heat recovery devices. **(8 hours)**

Recommended Books:

1. Non Conventional Energy Sources: G.D Rai
2. Direct Energy Conversion : W.R.Corliss
3. Electrical power Generation: J.B Gupta
4. Practical Heat Recovery : Boyen J.L, John Wiley,

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 Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th **CREDITS: 3**
BRANCH: EE/CSE/IT/MECH/CIVIL
COURSE NO: ECO-1505
COURSE TITLE: INTRODUCTION TO THE INTERNET OF THINGS
DURATION OF EXAM: 3 HOURS

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student 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.

Detailed Syllabus

Section- A

Unit-I: Introduction to IOT : 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 **(10Hours)**

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. **(06 Hours)**

Unit-III: Sensor & Actuators with Arduino: 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. **(11 Hours)**

Unit-V: Challenges in IoT Design challenges: Development Challenges, Security Challenges, Other challenges IoT Applications: 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. **(10Hours)**

Textbooks:
1. Olivier Hersent, David Boswarthick, Omar Elloumi "The Internet of Things key applications and protocols", Willey
2. Boswarthick, Omar Elloumi "The Internet of Things key applications and protocols", Willey
3. Jeeva Jose, Internet of Things, Khanna Publishing House
4. Michael Miller "The Internet of Things" by Pearson
5. Raj Kamal "INTERNET OF THINGS", McGraw-Hill, 1ST Edition, 2016
6. Arshdeep Bahga, Vijay Madisetti "Internet of Things (A hands-on approach)" 1ST edition, VPI publications,2014

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 Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ECE/EE/IT/MECH/CIVIL
COURSE NO: CSO-3505
COURSE TITLE: PYTHON PROGRAMMING
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of 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.
CO4	Demonstrate proficiency in handling and creation of functions.

Detailed Syllabus

Section- A

Unit-I: 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)**

Unit-II: 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)**

Unit-III: 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

Unit-IV: 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)**

Unit-V: 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:

1. Gowrishankar S, Veena A, "Introduction to Python Programming", 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372

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.

CLASS: B.TECH. 5TH SEMESTER **CREDITS: 3**
BRANCH: ECE /EE/CSE/ ME/ CIVIL ENGG.
COURSE NO: ITO-4505
COURSE TITLE: LINUX PROGRAMMING

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

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

Detailed Syllabus

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), nohup command, 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, Comparisons between 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 uers ,Changing permissions and ownerships ,Creating and 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.

B.Tech Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ECE/EE/CSE/IT/CIVIL
COURSE NO: MEO-5505
COURSE TITLE: 3D PRINTING
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
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

Detailed Syllabus

Section–A

Unit-I: 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.

Unit-II: Introduction to Design, Prototyping fundamentals. Introduction to 3D printing, its historical development, Commonly used terms in3D modelling, Data Conversion, and transmission, Checking and preparing, Building, Post processing, RP data formats, Classification of 3D printing process, Applications to various fields.

Unit-III: 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

Unit-IV: 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.

Unit-V: 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:

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

TEXT & REFERENCES:

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

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 Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ECE/EE/CSE/IT/MECH
COURSE NO: CEO-6505
COURSE TITLE: ESSENTIALS OF CIVIL ENGINEERING
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:-	
On completion of course the Student 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
CO4	Carry Out Surveying In The Field For Engineering Projects.

Detailed Syllabus

Section–A

Unit-I: Brick: Classification of Bricks, Constituents of Good Brick Earth, Harmful Ingredients, Manufacturing Of Bricks,Testing Of Bricks.

Unit-II: Timber: Classification Of Timber, Structure Of Timber, Seasoning Of Timber, Defects In Timber And Prevention Of Timber.

Unit-III: Aggregates: Classification Of Aggregates And Various Tests Conducted On Aggregates

Unit-IV: Cement: Composition Of Cement, Types Of Cement, Manufacturing Of Cement, Tests On Cement.

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

SECTION-B

Unit-VI: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.

Unit-VII: Foundations: Purpose, Site Exploration, Methods Of Testing Bearing Capacity Of Soils, Types Of Foundations.

Unit-VIII: 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.

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

BOOKS RECOMMENDED:

1	BUILDING MATERIAL & CONSTRUCTION	SUSHIL KUMAR
2	BUILDING MATERIAL	PRABIN SINGH
3	SURVEYING VOL.- I	B.C PUNMIA.
4	CONCRETE TECHNOLOGY	M.L GAMBHIR

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 Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: MOC-2501
COURSE TITLE: SWAYAM/NPTEL

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
3	0	0	-	100

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 Proctored 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 :-

1. *The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.*

2. *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.*

3. *The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities. The students have to select the **SWAYAM/NPTEL** course out of the selected list of said courses.*

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

B.Tech Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: SIT-2511
COURSE TITLE: SUMMER TRAINING-I

CREDITS: 1

Hours/Weeks			Marks
L	T	P	INTERNAL
0	0	0	25

COURSE OUTCOMES	
On completion of the course the students will be able to	
CO1	Interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.
CO2	Understand the engineering code of ethics and be able to apply them as necessary.
CO3	Demonstrate knowledge of practical application of training.

Students are required to undertake 4 weeks Practical Training during the summer vacations in the field of Electrical 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 department for evaluation.

OR

The students can opt to undertake an online course / MOOC (related to the discipline) from a reputed platform of not less than 40 hours (with Certificate).

OR

The students have an option to take a 4 week SWAYAM/NPTEL Course and earn a certificate for the same.

Guidelines for evaluation of Practical Training: The evaluation shall be done by the departmental committee during 5th semester. The committee shall have a convener and at least two members.

Distribution of Marks as per University statues:

Total marks of evaluation =25

i)	Report	=7.5	30%
ii)	Viva-Voce & Presentation	=12.5	50%
iii)	Level of IT	=5	20%

NOTE:

In Case a student has earned a certificate from Swayam / Nptel Platform, the marks so obtained shall be awarded on a proportionate basis.

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

B.Tech Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEP-2511
COURSE TITLE: POWER SYSTEM-I LAB

CREDITS: 1.5

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	3	50	-

LABORATORY OUTCOMES On completion of the course the students will be able to -	
CO1	Understand the D.C distribution system
CO2	Determine the various parameters of transmission lines.
CO3	Understand types of overhead line conductors, insulators and corona formation

Lab Experiments:

Experiment 1	Various types of d.c distributors can be studied by using DC Network Analyzer.
Experiment 2	To study the radial distribution fed at one end and calculates the various load currents using trainer module.
Experiment 3	To study the ring main d.c distribution fed at one end and calculates the various load currents using trainer module.
Experiment 4	To determine A, B, C, D Parameters of single phase transmission line using single phase transmission line trainer kit.
Experiment 5	To determine voltage distribution and string efficiency of suspension insulator with and without guard ring.
Experiment 6	Study of all types of overhead line conductors.
Experiment 7	Study of all types of Insulators.
Experiment 8	Study of Corona formation of high voltage overhead lines.

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

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B.Tech Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: EE/CSE/IT/MECH/CIVIL
COURSE NO: ECO-1515
COURSE TITLE: INTRODUCTION TO THE INTERNET OF THINGS LAB

CREDITS: 1

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

LABORATORY OUTCOMES On completion of the course 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 at least ten experiments at least two from each section, out of which 40% shall be simulation-based. Additional Practicals / Experiments will be performed based on the course content requirements.

B.Tech Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ECE/EE/IT/MECH/CIVIL
COURSE NO: CSO-3515
COURSE TITLE: PYTHON PROGRAMMING LAB

CREDITS: 1

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

LABORATORY OUTCOMES On completion of the course the students will be able to	
CO1	To write, test, and debug simple Python programs.
CO2	To implement Python programs with conditions and loops.
CO3	Use functions for structured Python programs.
CO4	Represent compound data using Python lists, tuples, and dictionaries.

Lab Experiments:

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 contents requirements.

B.Tech Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th **CREDITS: 1**

BRANCH: ECE/EE/CSE/IT/CIVIL

COURSE NO: MEO-5515

COURSE TITLE: 3D PRINTING LAB

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

LABORATORY OUTCOMES On completion of the course the students will be able to	
CO1	Develop CAD models for 3D printing and import and export AD data andgenerate.stl file.
CO2	Select a specific material and a 3D printing process for the given application.
CO3	Produce a product sing 3D Printing.

LIST OFEXPERIMENTS:

1. To study the basic features of a 3D printing machine.
2. To study the different components of 3D printer.
3. To study the various type 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

B.Tech. Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ECE/EE/CSE/IT/MECH
COURSE NO: CEO-6515
COURSE TITLE: ESSENTIALS OF CIVIL ENGINEERING LAB

CREDITS: 1

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

LABORATORY OUTCOMES	
On completion of the course the students will be able to:	
CO1	Perform tests on bricks and aggregates
CO2	Determine the physical properties of cement.
CO3	Determine the Workability and Compressive strength of concrete
CO4	Determine the Specific gravity, Atterberg limits, Compaction characteristics of Soil

LIST OF THE EXPERIMENTS

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

B.Tech Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

SEMESTER: 5th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: NCC-2501
COURSE TITLE: FUNDAMENTAL OF ELECTROMAGNETIC FIELD

CREDITS: 0

Hours/Weeks			Marks
L	T	P	Satisfactory/ Unsatisfactory
2	0	0	

COURSE OUTCOMES	
At the end of the course the student will be able to:	
CO1	Attain knowledge about vector analysis, coordinate system, electric and magnetic fields, and calculation of flux density, potential and energy densities.
CO2	Analyze the Maxwell's equations and the wave propagation equation in free space and in different media.
CO3	Study the transmission lines and its parameters.
CO4	Solve for transmission line parameters at high frequencies and principles of impedance matching and Smith Chart.

Detailed Syllabus

Section-A

Unit-I: ELECTROSTATICS: Rectangular, cylindrical, spherical and polar coordinate system, Electric Field Intensity, Field due to line charge, Electrostatic Potential, Potential Gradient, Energy stored in an electrostatic field, Method of images, Energy density in electrostatic field, Electric field in dielectric media, Capacitance, Solution of Electrostatics problem using Poisson's and Laplace equations. **(10 Hours)**

Unit-II: MAGNETOSTATICS AND TIME VARYING FIELDS: Magnetic flux density, Magnetic potential, Energy density in magnetic field, Equation of continuity in time varying field, Uniform plane wave and relation between E and H, Plane wave in Lossy dielectric, Propagation in good conduction, Polarization. **(12 Hours)**

Section – B

Unit-III: TRANSMISSION LINE: Basic principles of T.L, Equivalent circuit of T.L, Basic T.L equation, Input impedance, infinite T.L, Characteristic impedance (Zo), Propagation constant, Attenuation constant, Phase constant, open and short circuit T.L. **(11 Hours)**

Unit-IV: LINE AT HIGH FREQUENCIES: Line equation, Waveform on line terminated in various impedances, SWR and its relation with reflection coefficient. Principle of Impedance matching and use of Smith Chart for impedance matching. **(12 Hours)**

BOOKS RECOMMENDED:

1. Engineering Electromagnetic- Jseph A. Edminister
2. Introduction to Electromagnetic- Griffith
3. Elements of Electromagnetic Fields- S. P. Seth
4. Network Line and Filters- J. D Ryder
5. Antenna and Wave Propagation- K. D Prasad

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 cours

B.Tech Electrical Engineering Examination to be held in the Year December 2024,2025,2026,2027

CLASS: B.TECH. 5th SEMESTER **CREDIT: 1**
BRANCH: E&C/EE / CSE/ MECHANICAL/ CIVIL ENGG
COURSE NO.: ITO-4515
COURSE TITLE: LINUX PROGRAMMING LAB.

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

LABORATORY OUTCOMES On completion of the course the students will be able to -	
CO1	Install LINUX and its working environment.
CO2	Understand Linux commands to manage files and file systems
CO3	Write a shell programs to solve a given problems
CO4	Write Regular expressions for pattern matching and apply them to various filters for a specific task
CO5	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

OF

UNIVERSITY, JAMMU

B.Tech Electrical Engineering 6th Semester Examination to be held in the Year MAY 2025,2026,2027,2028

Contact hours: 25

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
EET-2601	Professional Core Course	Power System-II	2	1	0	25	75	100	3	100%
EET-2602	Professional Core Course	Power Electronics	2	1	0	25	75	100	3	100%
HMT-7601	Humanities & Social Science course	Fundamental of Economics	2	1	0	25	75	100	3	100%
EET-2603	Professional Elective Course/ SWAYAM/ NPTEL	Power Plant Engineering	2	1	0	25	75	100	3	100%
EET-2604		Installation and Maintenance								
EET-2605		Fundamental of Electrical Vehicles								
MOC-2601		SWAYAM/ NPTEL				-	100			
ECT-1605	Professional Core Course	Microprocessors and Microcontrollers	2	1	0	25	75	100	3	100%
EEP-2611	Professional Core Course	Power System-II Lab	0	0	2	25	-	25	1	100%
EEP-2612	Professional Core Course	Power Electronics Lab	0	0	2	25	-	25	1	100%
ECP-1615	Professional Core Course	Microprocessors And Microcontrollers Lab	0	0	2	25	-	25	1	100%
MOC-2611	Massive Open Online Course	MOOC	0	0	2	25	-	25	1	100%
NCC-2601	Non-Credit Course	Network Filters & Transmission Line	2	0	0	Satisfactory/ Unsatisfactory			0	100%
TOTAL			**12**	**05**	**08**	**225 /200***	**375/400***	**600**	**19**	

*If the student choose SWAYAM/ NPTEL course.

Note:- The students will have a choice to choose between Elective Courses of their choice.

B.Tech Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2601
COURSE TITLE: POWER SYSTEM-II
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES On completion of course the students will be able to	
CO1	Acquire and apply the knowledge of p.u. representation of power system
CO2	Analyse balanced and unbalanced faults.
CO3	Understand about the construction and working of different types of underground cables.
CO4	Investigate the concept of insulation co-ordination, over voltages, lightening surges, switching surges and switching operation.

Detailed Syllabus

Section- A

Unit-I: Per Unit Representation of Power System: Single line diagram, impedance & reactance diagram of a power system, per unit calculations, per unit representation of a power system. **(8hours)**

Unit-II: Fault analysis: Symmetrical components, sequence impedance's, sequence networks, types of faults,3-phase balanced faults, calculation of fault currents ,unsymmetrical faults: single line to ground, line-to- line, double line ground faults on unload alternator and on power system. **(12 hours)**

Section- B

Unit-III: Underground Cables: Construction of cable, insulating materials, classification of cables, types of cables- Mass impregnated, oil filled & gas filled cables, Solid dielectric cables, Electrostatic stresses in a cable, grading of cables, Insulation resistance of cables, capacitance of single core and three core cables, heating of cables, current carrying capacity of cable. Methods of laying of underground cables. **(10 hours)**

Unit-IV: Over voltages and insulation requirements: Generation of over voltages, lightening phenomenon, lightning surges, switching surges, interruption of short circuits and switching operations, switching surge interruption of capacitive circuits, resonance over voltages, protection of power system components against over voltage-ground wires, lightening arrestors, concept of insulation coordination, basic impulse insulation level, standard impulse test wave, volt-time curve, location and ratings of lightening arrestors. **(10 hours)**

Books Recommended:

1. J.J. Grainger and W.D Stevenson, "Power System Analysis", McGraw Hill.
2. B.R. Gupta, "Power System Analysis and Design", S. Chand publishers.
3. C.L. Wadhwa, "Electric Power Systems", New Age Intl. (P) Ltd.
4. Kothari and Nagrath, "Power System Engineering", McGraw Hill Edu. (I) Pvt. Ltd

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 Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ECE / ELECTRICAL ENGINEERING
COURSE NO: EET-2602
COURSE TITLE: POWER ELECTRONICS
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

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

Detailed Syllabus

Section- A

Unit-I: 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)**

Unit-II: 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. **(7 hours)**

Unit-III: Commutation: Introduction and Methods of forced Commutation (Class A-F). **(4 hours)**

Section- B

Unit-IV: AC Voltage Controller: Operation of Single-phase half and full-wave AC controller with R & R-L Load, Integral cycle control. **(4 hours)**

Unit-V: Choppers: Principle and basic chopper circuits, classification, Steady–state Analysis of chopper circuits, control strategies, Commutation in Chopper circuits. **(7hours)**

Unit-VII: Inverters: Single-phase voltage source inverters, voltage control of single phase inverter. **(4 hours)**

Unit-VIII: Cycloconverters: Classification, single phase to single phase Cycloconverters with resistive inductive load. **(6 hours)**

BOOKS RECOMMENDED:

1. Elements of Power ElectronicS -P.S.Bimbra
2. Power Electronics -M.Ramamoorty

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 Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ECE/EE/CSE/MECH/IT
COURSE NO: HMT-7601
COURSE TITLE: FUNDAMENTAL OF ECONOMICS
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES At the end of the course the student will be able to: -	
CO1	To understand the basic concepts of economics such as demand analysis , utility analysis, and its role in decision making process
CO2	To develop skills to create the goods and services at minimum cost by studying in detail about the production and cost analysis
CO3	To understand about the market structure and pricing decisions.
CO4	To understand the concepts of National Income, Banking, inflation, Problem of Unemployment and Poverty in India

Detailed Syllabus

Section A

Unit-I: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. **(5 hours)**

Unit-II;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) **(6 hours)**

Unit-III: 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). **(5 hours)**

Unit-IV: 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. **(6 hours)**

Section B

Unit-V: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) **(5 hours)**

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

Unit-VII: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. **(6 hours)**

Unit-VIII: 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 **(6 hours)**

BOOKS RECOMMENDED :

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

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.

Sweta 19/7/2024 Ritu Sharma 19/07/2024 19/7/24 19/7/24 19/7/24 19/7/24 19/7/24 (32)

B.Tech Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2603
COURSE TITLE: POWER PLANT ENGINEERING
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES At the end of the course the student will be able to: -	
CO1	Understand layout, construction and working of the components inside a thermal power plant.
CO2	Understand layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
CO3	Understand layout, construction and working of the components inside nuclear power plants.
CO4	Understand layout, construction and working of the components inside hydro power plants.

Detailed Syllabus

Section A

Unit-I:Coal Based Thermal Power Plants:-Introduction, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers, Turbines, Condensers, Steam & Heat rate, Subsystems of thermal power plants – Fuel and ash handling, Draught system, Feed water treatment. Binary Cycles. **(10 hours)**

Unit-II:Diesel, Gas Turbine and Combined Cycle Power Plants:-Introduction, Layout of Components of Diesel and Gas Turbine power plants. Combined Cycle Power Plants. Integrated Gasifier based Combined Cycle systems. **(08 hours)**

Section B

Unit-III:Nuclear Power Plants:-Introduction, Atomic Nuclei, Atomic Number and Mass Number, Isotopes, Atomic Mass Unit, Radioactivity and Radioactive Change Rate of Radioactive Decay, Mass – Energy Equivalence, Binding Energy, Nuclear Reaction, types of Nuclear Reactions, Initiation of Nuclear Reaction, , Nuclear Fission, The Fission Chain Reaction, moderation. **(12 hours)**

Unit-IV:Hydro Power Plant:-Introduction, Potential of hydropower in India. General hydrology-hydrological cycle, precipitation, run-off and its measurement, hydrography, flow duration and mass curve. Site investigations. Classification of hydroelectric power plants. Dams, spillways, Canals, penstocks, surge tanks, draft tubes etc; Power – house structure. **(12 hours)**

BOOKS RECOMMENDED:

1. Power Plant Engineering - Nag. P.K
2. Power Plant Technology - El-Wakil. M.M
3. Power Plant Engineering - Thomas C. Elliott
4. Power Plant Engineering - Black & Veatch

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 Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2604
COURSE TITLE: INSTALLATION AND MAINTENANCE
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Understand the fundamental concept of installation and maintenance of electrical equipment.
CO2	Understand the concept of installation of transformers, induction motors, underground cables, circuit breakers, bus-bar, lightening arresters, batteries.
CO3	Understand the basic concept of maintenance, maintenance schedules, procedure for preventive maintenance schedule and factors affecting preventive maintenance of electrical equipment.
CO4	Understand the concept of trouble shooting of electrical equipments like AC and DC machines, underground cables, circuit breakers, batteries.

Detailed Syllabus

Section- A

Unit-I:Introduction: Necessity and objectives of installation and maintenance of electrical equipments, requirements and duties, requirements and organizational work of electrical maintenance department, technical details for maintenance work, maintenance record, job card and log book, machine history.

(8 hours)

Unit-II: Installation: General guidelines for loading and unloading of heavy electrical equipments, precautions to be taken during loading and unloading of heavy electrical equipments, Installation of transformers, indoor and outdoor transformers, installation of induction motors, installation of underground cables, installation of circuit breakers, bus-bar, lightening arresters and batteries.

(12 hours)

Section- B

Unit-III: Maintenance: Maintenance and its types, Faults occurred due to poor maintenance, requirements of preventive maintenance of transformers, transformer oil, transmission line, induction motors, underground cables, circuit breakers, bus-bar, isolators, insulators, lightening arresters, batteries. Procedure for preventive maintenance schedule and factors affecting preventive maintenance of electrical equipment.

(13 hours)

Unit-IV: Trouble Shooting of Electrical Equipments: Trouble shooting, causes and remedies of AC and DC machines, underground cables, circuit breakers, batteries and other electrical equipments. **(7 hours)**

RECOMMENDED BOOKS:

1. Installation, Maintenance and Repair of electrical machines and equipments — Madhvi Gupta
2. Electrical Maintenance & Repair — P.P Gupta
3. Testing, Commissioning Operation & Electrical Maintenance electrical equipments — S. Rao
4. Electrical Maintenance & Repair — J.I Watts

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 Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2605
COURSE TITLE: FUNDAMENTAL OF ELECTRICAL VEHICLES
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Analyse the basic concept of Electric Vehicles and their component.
CO2	Understand the classification of EV motors and concept of EV battery management system
CO3	Understand the AC & DC charging system design technology for EV applications.
CO4	Analyse the impact of EV charging & energy storage integration into microgrid.

Detailed Syllabus

Section- A

Unit-I: Introduction of Electric Vehicles: Concept of Electrified transportation, Past, present status of electric vehicles, Recent developments and trends in electric vehicles, Comparison of EVs and IC Engine vehicles, Understanding electric vehicle components, Basic EV components and architecture, Autonomy and vehicle computing needs.

Unit-II: Electric Motor Drives for EV applications: Concept of EV motors, Classification of EV motors, Comparison of Electric motors for EV applications, Recent EV motors, BLDC and SRM, axial flux motor. Introduction to power electronics converters, DC-DC converter, speed control of dc motor.

Unit-III: EV Batteries and Battery Management System: EV batteries, Lead Acid batteries – Basics, Characteristics, Lithium batteries- Basics, Characteristics, Selection of battery for EVs, Smart battery pack design, Mechanical and reliability aspects of Li Ion packs, UN38 regulation familiarity, Cell balancing in Li Ion, Battery second life and usage in BESS (energy storage systems). BMS - Global price trends, volumetric and gravimetric efficiency trends

(20 hours)

Section- B

Unit-IV: Charging system design technology for EV applications: Charging system design considerations, AC & DC Charging, Charging methods, On-board/Off-board chargers, Vehicle to charger communication system, billing and authentication types, understand the computing needs in a charging system, Understand internal major block diagrams and subsystems of low and high power chargers

Unit-V: EV Charging Facility Planning: Identification of EV demand, Impact of EV charging on power grid, Energy generation scheduling, different power sources, centralized charging schemes, Energy storage integration into micro-grid, Overview and applicability of AI for the EV ecosystem.

(20 hours)

Books Recommended:

01. Iqbal Husein. "Electric and Hybrid Vehicles Design Fundamentals CRC Pro
02. Ronald K. Jurgen. "Electric and Hybrid-electric Vehicles

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 Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: MOC-2601
COURSE TITLE: SWAYAM/NPTEL

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	-	100

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 Proctored 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 :-

1. *The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.*
2. *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.*
3. *The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities. The students have to select the **SWAYAM/NPTEL** course out of the selected list of said courses.*

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

B.Tech Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING **CREDITS: 3**
COURSE NO: ECT-1605
COURSE TITLE: MICROPROCESSORS AND MICROCONTROLLERS
DURATION OF EXAM: 3 HOURS

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Understand the basics of 8085, and 8086 microprocessors
CO2	Understand the basics of 8087,8089 microprocessors and its interfacing with 8086
CO3	To understand the basics of Microcontroller 8051
CO4	To understand the concept of Advanced processors.
CO5	Understand the concept and applications of DC motors and indicators (Display Devices like LEDs, Seven Segment Displays, LCD) and its interfacing with 8051.

Detailed Syllabus

Section-A

Unit-I: Microprocessor 8085: Pin diagram, Architecture, addressing modes, Stack & Subroutines, Advanced subroutines concept, Call & Ret instructions. (No Programming Required) **(8Hours)**

Unit-II: Microprocessor 8086: Pin diagram, Architecture, assembler directives, macros and procedures, min-max mode. Introduction to 8087 and 8089 and interfacing with 8086 (No Programming required) **(8 Hours)**

Unit-III: Advanced Processors: Introduction to Pentium, Dual Core, Quad Core, Octa Core Processors, i3, i5, and i7 Processors along with its features. RISC and CISC-based Processors. **(8 Hours)**

Section-B

Unit-IV: 8051 Microcontrollers: Architecture, Pin description of 8051, addressing modes, 8051 assembly language programming JUMP, LOOP and CALL instructions, arithmetic and logic instructions, I/O PORT functions. Single-bit instruction programming, Reading Input Pins vs. port latch, Programming using 8051 timers, counter-programming, simplex, half duplex, full duplex transmission, synchronous and asynchronous communication, Interfacing A/D, D/A Converter to 8051. **(11Hours)**

Unit-V: Timers, Serial Interface and Interrupts: Timer: Control Word, mode of timers, Interfacing of Display devices like LEDs, seven segment displays with 8051, Serial interface: Introduction, Control Word, mode of serial interface, interrupts: Interrupt-based programming. Working of IR& temperature Sensor, Relays. **(10 Hours)**

Text Books:

1. "The Microprocessor Architecture, Programming and Application with the 8085", Ramesh Gaonkar, Fifth Edition, PRI (India) Private Ltd.
2. "Microprocessor and Interfacing Programming and Hardware", 2nd Edition, Tata Mc Graw Hill Edition,
3. "The 8051 Microcontroller and Embedded Systems – using assembly and C", Muhammad Ali Mazidi and Janice Gillespie Mazidi and Rollin D. McKinlay; PHI, 2006 / Pearson, 2006.
4. "The 8051 Microcontroller", Kenneth J. Ayala, 3rd Edition, Thomson/Cengage Learning.

Reference Books:

1. "The 8051 Microcontroller Based Embedded Systems", Manish K Patel, McGraw Hill, 2014, ISBN: 978-93-329-0125-4.
2. "Microcontrollers: Architecture, Programming, Interfacing and System Design", Raj Kamal, Pearson Education, 2005.

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 Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEP-2611
COURSE TITLE: POWER SYSTEM-II LAB

CREDITS: 1

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

LABORATORY OUTCOMES After Completion of this course the student will be able to: -	
CO1	Measure the capacitance and charging current in three core underground cable and study of various underground cables
CO2	Find the fault location using Murray loop bridge and determine the positive, negative and zero sequence impedance of 3 phase transformer.
CO3	Calculate fault currents for transmission lines

Lab Experiments:

Experiment 1 : To study the various types of underground cables.

Experiment 2 : To measure the core capacitance, core to earth capacitance and charging current in three core underground cable.

Experiment 3 : To find cable fault location using Murray loop bridge.

Experiment 4: To determine the positive, negative and zero sequence impedance of 3 phase transformer using 3 phase transformer.

Experiment 5 : To analyse and calculate different fault currents that occurs due to the introduction of faults (L-G, L-L, L-L-G) in short transmission lines using 3 phase fault analysis trainer kit.

Experiment 6 : To analyse and calculate different fault currents that occurs due to the introduction of faults(L-G, L-L, L-L-G) in medium transmission lines using 3 phase fault analysis trainer kit

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

Sweta

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B.Tech Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEP-2612
COURSE TITLE: POWER ELECTRONICS LAB

CREDITS: 1

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

LABORATORY OUTCOMES
After Completion of this course the student will be able to: -

CO1	Understand the different characteristics of SCR, IGBT and TRIAC.
CO2	Perform the operation of half and fully controlled bridge rectifier with different loads.
CO3	Understand the various Forced Commutation Techniques and the operation of AC voltage regulator with different loads.
CO4	Analyse the operation of AC voltage regulator, Chopper, Inverter and Cycloconverter with different loads.

Lab Experiments:

Experiment 1 To study the V-I characteristics of SCR.

Experiment 2 To study the V-I and Transfer Characteristics of IGBT (Insulated Gate Bipolar Transistor).

Experiment 3 To study the characteristics of TRIAC and its application as AC power control using phase control technique.

Experiment 4 To study the operation of fully-controlled bridge Rectifier with R and RL Load.

Experiment 5 To study the operation of Half-controlled bridge Rectifier with R and RL load.

Experiment 6 To study various Forced Commutation Techniques.

Experiment 7 To study single-phase AC Voltage Regulator with R and RL loads.

Experiment 8 To study the operation of various Commutated Chopper.

Experiment 9 To study the operation of series Inverter.

Experiment 10 To study the operation of Cycloconverter with R and RL load

Experiment 11 To study the speed control of Universal Motor.

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

B.Tech Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: ECP-1615
COURSE TITLE: MICROPROCESSORS AND MICROCONTROLLERS LAB

CREDITS: 1

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

LABORATORY OUTCOMES After Completion of this course the student will be	
CO1	Write assembly language programs including interrupt-based programming using 8051 microcontrollers
CO2	Displaying messages using LCD, LED indicator, seven seven-segment display with a delay.
CO3	Generate various waveforms like square, saw tooth, ramp and triangle with the simulator of 8051
CO4	Send data using serial communication Techniques with 8051

List of Practicals

Note: All programs shall be done on 8051 Microcontroller only with Assembly/C language

1. ALP to transfer a block of data from one memory location to another memory location
2. ALP to sum of first 'n' natural numbers.
3. To find the largest number in a given array of numbers
4. To find the smallest number in a given array of numbers.
5. Arrange 'n' numbers in Ascending order
6. Arrange 'n' numbers in Descending order
7. Write a program 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
8. Program to send values 00-FF to Port 1
9. Program to toggle bits of P1 with time delay, Program to read a byte from P1, wait 1/2 second and then send to P2.
10. Write a program for 8051 to transfer the letter "A" serially at 9600 baud continuously. Use 8-bit data and 1-stop bit.
11. Write an 8051 program to transfer the message "SJC" serially at 9600 baud, 8-bit data, 1 stop bit. Do this continuously.
12. Write an 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
13. 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.
14. Program to interface 8051 with seven-segment LED and display no-0-9.
15. Program to interface LCD with 8051 and display the message "AT 89C51"

Note: Each student has to perform at least Eight experiments out of which 40% shall be simulation-based. Additional Practical / Experiments will be performed based on the course content requirements

B.Tech Electrical Engineering Examination to be held in the Year May 2025,2026,2027,2028

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: MOC-2611
COURSE TITLE: MOOC

CREDITS: 1

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

The student 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, from the Departmental Academic Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the departmental 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 were 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 4 week NPTEL course the following points need to be followed;

1. *The course is declared pass in the semester only after the production of the NPTEL certificate, by the student. In case the student doesn't pass the certificate 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.*

2. *The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities.*

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

B.Tech Electrical Engineering Examination to be held in the Year May 2025,2026,2027,202

SEMESTER: 6th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: NCC-2601
COURSE TITLE: NETWORK FILTERS & TRANSMISSION LINES

CREDITS: 0

Hours/Weeks			Marks
L	T	P	Satisfactory/ Unsatisfactory
2	0	0	

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Understand the concept of Symmetrical and Asymmetrical network.
CO2	Understand the working of Attenuators.
CO3	Study the use of Filters in communication system.
CO4	Understand the concept and use of transmission lines.

Detailed Syllabus
SECTION-A

Unit-I: Network: Basic concept of two port network, Symmetrical network: Concept and significance of the terms characteristics impedance, propagation constant, attenuation constant, phase shift constant and insertion loss, T-network and pi network, Asymmetrical Network: Concept and significance of iterative impedance, image impedance, the half section (L-section); symmetrical T and Pi sections into half section **(12 Hours)**

Unit-II: Attenuators: Introduction, Units of attenuation, General characteristics of attenuators, Analysis and design of simple attenuator of following types; Symmetrical T and Pi type, L section attenuator, Variable attenuator and balanced attenuator. **(8 Hours)**

Unit-III: Filters: Brief idea of the use of the filter networks in different communication systems, concept of low pass, high pass, band pass and band stop filters, Prototype Filter Section, Impedance characteristics of a low and high pass filter and their significance, m-derived filter Sections, Limitation of prototype filters, need of m-derived filters, Crystal Filters, Crystal and its equivalent circuits, special properties of piezoelectric filters and their use. **(12 Hours)**

Unit-IV:Transmission Lines: Transmission Lines, their types and applications, Distributed constants, T and Pi representation of transmission line section, Concept of infinite line, Condition for minimum distortion and minimum attenuation of signal on-the-line and introduction to loading methods, Concept of transmission lines at high frequencies. **(10 Hours)**

RECOMMENDED BOOKS :

1. Network Filters Transmission Lines — B.R.Gupta & V.Singhal
2. HVDC Power Transmission Systems — K.R. Padiyar

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

OF

UNIVERSITY JAMMU

B.Tech.Electrical Engineering 7th Semester Examination to be held in the Year December 2025,2026,2027,2028

Contact hours: 25

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
EET-2701	Professional Core Course	Power System-III	2	1	0	25	75	100	3	100%
EET-2702	Professional Core Course	Power System Protection	2	1	0	25	75	100	3	100%
EET-2703	Professional Core Course	Utilization of Electrical Energy	2	1	0	25	75	100	3	100%
EET-2704	Professional Elective Course/ SWAYAM/ NPTEL	High Voltage Engineering	2	1	0	25	75	100	3	100%
EET-2705		EHV AC/DC Transmission								
MOC-2701		SWAYAM/NPTEL				-	100			
HMT-7701	Humanities & Social Science course	International Economics	2	1	0	25	75	100	3	100%
HMT-7702		Industrial & Production Management								
SIT-2711	Summer Industry Internship	Summer Training-II	–	–	–	50	–	50	2	100%
SEM-2711	Seminar	Seminar	0	0	4	50	-	50	2	100%
EEP-2711	Professional Core Course	Power System III Lab.	0	0	2	25	–	25	1	100%
EEP-2712	Professional Core Course	Power System Protection Lab	0	0	2	25	-	25	1	100%
NCC-2701	Non- Credit Course	Electrical Engineering Materials	2	0	0	Satisfactory/ Unsatisfactory			0	100%
TOTAL			**12**	**05**	**8**	**275/250***	**375/400***	**650**	**21**	

***If the student choose SWAYAM/ NPTEL course.**

Note:- The students will have a choice to choose between Elective Courses of their choice.

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B.Tech Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2701
COURSE TITLE: POWER SYSTEM-III
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Compute Y bus and Z bus matrices for power system networks.
CO2	Formulate the power flow problem and solving the same by using different methods.
CO3	Acquire the knowledge of transient stability.
CO4	Acquire knowledge of optimal power system.

Detailed Syllabus
Section- A

Unit-I: Network Equations: Introduction, Formation of Y bus and Z bus matrices. **(6 hrs)**

Unit-II: Load flow studies: Introduction, Gauss- Siedel method, Netwon-Raphson method, Decoupled load flow studies, comparison of load flow methods. **(14 hrs)**

Section- B

Unit-III: Power System stability: Introduction to stability, Simplified synchronous machine model and system equivalent, Power Angle curve, Swing equation, Equal area criterion, Numerical integration of Swing Equation, Multi Machine Stability,Methods for improving transient stability. **(10 hrs)**

Unit-IV: Optimum Power System: Introduction, Optimal operation of generators on a bus bar, Optimal unit commitment, Optimal generation scheduling, Surge performance of transmission lines. **(10 hrs)**

RECOMMENDED BOOKS:

1. Power System Analysis — Stevenson
2. Power System Analysis — Nagrath & Kothari
3. Electrical Power — Bhatnagar/ Soni
4. Electrical power system — C.L Wadhwa
5. Power System Analysis & Design — B.R Gupta

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 Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th **CREDITS: 3**
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2702
COURSE TITLE: POWER SYSTEM PROTECTION
DURATION OF EXAM: 3 HOURS

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO 1	Understand the concepts of travelling waves
CO 2	Study different types of protective relay.
CO 3	Study various types of circuit breakers.
CO 4	Understand the concept of fuse and grounding

Detailed Syllabus
Section- A

Unit-I Travelling Waves: Switching Surges, traveling waves, surge impedance, open and short-circuited lines, reflected and transmitted waves. **(8 hrs)**

Unit-II:Protective Relay: Relay principles and types, general equations for relays, phase and amplitude comparator, static over current, directional and distance relays, carrier current protection, protection of transformers, alternators, bus bars and lines. **(12 hrs)**

Section- B

Unit-III:Circuit breaker: Principle of arc interruption, recovery and restriking voltage, RRRV, current chopping, air blast CB, Bulk and minimum oil CB, Vacuum interrupters, SF6, rating and testing of CBs. **(8 hrs)**

Unit-IV:Fuses: Introduction, Types of Fuse, HRC fuses, Selection of Fuse. **(6 hrs)**

Unit-V:Power System Earthing: Neutral grounding, effectively grounded system, resonant grounding. **(6 hrs)**

RECOMMENDED BOOKS:

1. A Course in Electrical Power — Soni Gupta & Bhatnagar
2. Electric Power System — C.L. Wadhwa
3. Travelling Waves — Bewley
4. Power System Engg. — Nagrath & Kothari

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 Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2703
COURSE TITLE:UTILIZATION OF ELECTRICAL ENERGY
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO 1	Choose a right electric drive for a particular application.
CO 2	Figure-out the different schemes of traction and its main components &Choose proper traction systems depending upon application.
CO 3	Recognize different process of utilizing electric energy for heating and welding purposes in commercial and domestic applications.
CO 4	Select a proper lighting system and implement it in real life applications.

Detailed Syllabus

Section- A

Unit-I: Electrical Utilization: (a) Braking of Motors. (b) Choice of Motors **(8 hrs)**

Unit-II: Electric Traction: Advantages and disadvantages of electric traction, types of railway electrification, overhead equipments, , types of railway services: urban, sub-urban, and main lines with their speed time curves, tractive effort, accelerating force, specific energy consumption, specific energy output. Traction motors. **(12 hrs)**

Section- B

Unit-III: Electric Heating & Welding: Electric heating: Advantages of electric heating, direct and indirect resistance heating, properties and design of heating element, electric oven, arc heating, induction heating, dielectric heating, high frequency eddy current heating. Electric welding: Arc welding: metal arc welding and carbon arc welding, welding equipments **(10 hrs)**

Unit-IV: Illumination: Introduction, terms used in photometry and their units, laws of illumination, various types of lighting scheme, illumination at point due to one and several points sources, street lighting, flood lighting, various types of lamps: incandescent, fluorescent, vapour, CFL and LED. **(10 hrs)**

Books Recommended:

1. H. Partap, Art and Science of Utilization of Electrical Energy, Dhanpat Rai & Sons.
2. J. B. Gupta, Utilization of Electric Power & Electric Traction, S. K. Kataria & Sons.
3. G. K. Dubey, Fundamentals of Electric Drives, Narosa Publications, New Delhi
4.

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 Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2704
COURSE TITLE:HIGH VOLTAGE ENGINEERING
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understand discharge in gases
CO2	Understand breakdown of solids and liquids.
CO3	Understand lightning phenomenon.
CO4	Understand impulse generator

Detailed Syllabus

Section- A

Unit-I:DISCHARGES IN GASES: General characteristics of gaseous insulation, basic processes of ionization in a gas, discharges in uniform and non-uniform fields, Paschen's law, commonly used gases for insulation and their properties. **(10 hrs)**

Unit-II:BREAKDOWN OF SOLIDS AND LIQUIDS: Different mechanisms of breakdown of solids, Intrinsic breakdown, theories of intrinsic breakdown, different theories of breakdown in liquids, commonly used solid and liquid insulating materials and their properties. **(11 hrs)**

Section- B

Unit-III:LIGHTNING PHENOMENON: Charge accumulation in clouds – formation of lightning stroke, characteristics of lightning stroke, current and voltage magnitudes, protection of transmission lines and substations against lightning, lightning arrestors, switching surges, Insulation co-ordination. **(11 hrs)**

Unit-IV:IMPULSE GENERATOR: Definition of impulse wave, single stage and multistage impulse generators and equivalent circuits, determination of front and tail resistance to produce a given wave shapes. **(10 hrs)**

RECOMMENDED BOOKS:

1. High Voltage Engineering byM.S.Naidu&V.Kamaraju.
2. Power System Transients and High Voltage Principles –by B.Thapar, B.R.Gupta&L.K.Khera.
3. High Voltage Engineering – by C.L.Wadhwa.
4. A course in Electrical power by Soni, Gupta, Bhatnagar.
5. D.C.transmission by E.W.Kimbark, Wiley Publication

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 Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th
BRANCH: ELECTRICAL ENGINEERING .
COURSE NO: EET-2705
COURSE TITLE:EHV AC/DC TRANSMISSION
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- . On completion of course the Student will be able to	
CO1	Provide the knowledge of Power handling capacity of different Transmission systems.
CO2	Understand the effect of load frequency control.
CO3	Study the voltage control system for power flow control in HVDC system.
CO4	Develop an overview of HVDC system for power transmission.

Detailed Syllabus

Section- A

Unit-I:EHV AC Transmission: Need of EHV transmission lines, power handling capacity and surge impedance loading. Problems of EHV transmission, Bundled Conductors, geometric mean radius of bundle, properties of bundle conductors. Electrostatic fields of EHV lines and their effects, corona effects: Corona loss, audio and radio noise. **(12 hours)**

Unit-II:Load Frequency Control: Introduction to control of active and reactive power flow, turbine speed governing system. Speed governing characteristic of generating unit and load sharing between parallel operating generators. **(8 hours)**

Section- B

Unit-III:Voltage Control: No load receiving end voltage and reactive power generation. Methods of voltage control. Synchronous phase modifier for Shunt capacitors and reactors, Saturable reactors, use of thyristors, field of application and circuit breaking. **(11 hours)**

Unit-IV:HVDC Transmission: Types of D.C. links, advantages and disadvantages of HVDC transmission. Basic scheme and equipment of converter station, Basic principles of DC link control and basic converter control characteristics, Application of HVDC transmission. **(12 hours)**

RECOMMENDED BOOKS :

3. EHV-AC Transmission — Beghamudrae
4. HVDC Power Transmission Systems — K.R. Padiyar
5. Power System — J.B.Gupta

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 Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: MOC-2701
COURSE TITLE:SWAYAM/NPTEL

CREDITS: 3

Hours/Weeks			Marks
L	T	P	TOTAL
2	1	0	100

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.

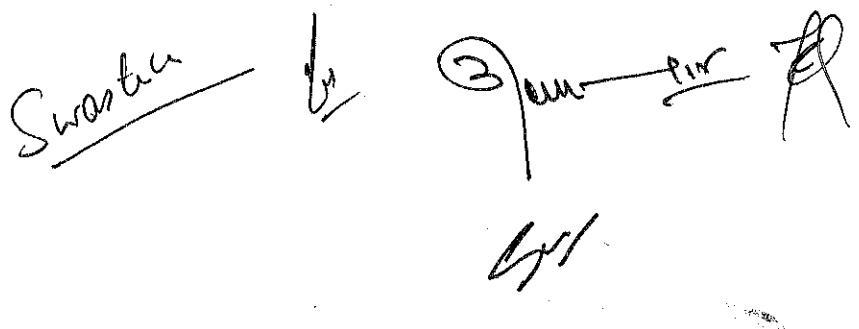
Note :-

1. *The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.*

2. *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.*

3. *The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities. The students have to select the **SWAYAM/NPTEL** course out of the selected list of said courses.*

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



B.Tech Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th
BRANCH: ECE/EE/CSE
COURSE NO: HMT-7701
COURSE TITLE: INTERNATIONAL ECONOMICS
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understand the concept of international trade in general as well as with the classical and modern theories.
CO2	Analyze the concept of foreign exchange rate and exchange control in detail and hence shall be able to understand the international market conditions.
CO3	Compete in international corporate world by understanding the various concepts of terms of trade like tariffs, quotas etc
CO4	Understand the concept of balance of trade, balance of payment and role of international organizations in economic development.

Detailed Syllabus

Section- A

Unit-I:Concept of International Trade Meaning, Significance and scope of International Economics, concepts of internal, interregional and international trade and their comparison, Theories of international trade: Absolute Cost Advantage, Comparative Cost Advantage, Opportunity cost theory (features, assumptions and limitations). **(7hrs)**

Unit-II:Theories of International Trade Modern Theories of International Trade:,Heckscher- Ohilin Theory, Rybznski Theorem, The Stopler – Samuelson Theorem. **(6hrs)**

Unit-III:Terms of trade: Concepts and Significance Meaning, Concept and significance of Terms of Trade, Different Terms of Trade Indexes (Net Barter, Gross Barter, Income, Single and Double Factoral), Factors influencing Terms of Trade. **(7hrs)**

Section B

Unit-IV:Foreign Exchange Rate: Meaning, Types of Foreign exchange rate, Fluctuating Exchane Rate system, Fixed Exchange Rate system. Exchange Control: Meaning, Features, Objectives and methods of Exchange Control; Merits and Demerits of Exchange Control **(7hrs)**

Unit-V:Trade barriers: Tariffs (Meaning, classifications and their impact), Import Quotas: Meaning, types and effects of Quotas, devaluation (concept, merits and demerits) **(6hrs)**

Unit-VI:Balance of payment and International organizations: Concept and components of balance of trade and balance of payment, equilibrium and disequilibrium in BOP, consequences of disequilibrium in BOP, Various measures to correct deficit in BOP. International organisations: IMF, World bank, World Trade organisations- objectives, functions. **(7hrs)**

Suggested Readings

1. International Economics -H.G Mannur
2. International Economics -Paul R. Krugman and Maurice Obstfeld
3. International Economics - Dominick Salvatore
4. International Economics - Sodersten Bo
5. International Economics - OsShrivastva
6. International Economics - M.L. Jhingan

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.

Ritu Sharma 19/07/2024

B.Tech Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th **CREDITS: 3**
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: HMT-7702
COURSE TITLE: INDUSTRIAL & PRODUCTION MANAGEMENT
DURATION OF EXAM: 3 HOURS

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	To understand the concept of Management, its evolution, Authority relationships and Departmentation
CO2	To analyse about the concept of HRM, wage payment, job evaluation & job satisfaction
CO3	To manage about production, planning, control & process design
CO4	To Suggest appropriate plant locations and manage layouts according to the need of the organizations and shall be able to control inventory properly.

Detailed Syllabus

Section- A

Unit-I:Management: Meaning, Characteristics, Objectives, Functions of management, Classical Theory of Management: Henry Fayol's Administrative Management Theory & Taylor's Scientific Management Theory, Elton Mayo's Neo-Classical Theory of Human Relations Prospective and Modern Management Theory. **(6 hrs)**

Unit-II:MBO – Definition, Features, Process, Advantages & Limitations of MBO, Human Resource Management: Concept, Importance, Difference between personnel management and human resource management, Recruitment- Concept, Sources, Importance; Selection: Selection process. **(5hrs)**

Unit-III:Departmentation & Delegation of Authority: Meaning, Importance, Basis or pattern of Departmentation, Delegation of Authority: Meaning, Characteristics, Importance, Process, Obstacles/ Barriers to effective delegation of authority, Authority Relationships - Line Organization, Line & Staff Organization, Functional Organization. **(5hrs)**

Unit-IV:Wage Administration and job analysis: Concept of Wages, Characteristics of good wage, Factors affecting wages, Methods of wage payments. Job Evaluation-Objectives, Principles &Methods of job evaluation. **(5hrs)**

Section- B

Unit-V:Production Planning and Control: Meaning, Definition, Objectives, Stages, Functions/ scope and factors affecting Production Planning and Control. Advantages of Production Planning and Control, Production Planning System, Role of production planning and control in manufacturing industry. **Just in Time (JIT) Production:** Concept, Characteristics, Goals, Components and Elements of JIT Production. **(5hrs)**

Unit-VI:Inventory Control: Meaning, Objectives, Classification, Functions of Inventories. Inventory Costs: Simple Economic Order Quantity (EOQ) Model, Good inventory management practices, Inventory planning, Inventory management techniques. **(5hrs)**

Unit-VII:Plant Location and layout: Importance, Nature of Plant location, Choice of Site for Plant Location. Plant Layout: Definition, Objectives, Types of layout, Factors influencing Plant Layout, Steps in Plant Layout.

Quality Control: Objectives, Significance, Methods of Quality Control. **(5hrs)**

Unit-VII:Production and Process Design: Product Selection, concept and need of Product Design and development, sources of product innovation, characteristics of a good design, Reverse Engineering, Concurrent Engineering, Process Design-Meaning, needs, factors and types, Process Planning Procedure. **(6 hrs)**

BOOKS RECOMMENDED :

George Terry & Stephen G. Franklin –Principles of Management.
Harold Koontz & Heinz –Essentials of Management
S. A .Sherlekar –Principles of Business Management
M. Mahajan –Industrial Engineering & Production Management
Dr. Neeru Vasisth –Principles of Management
Dr. B. P. Singh & Dr. T. N. Chhabra –Business Organisation & Management

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.

Ritu Sharma 19/07/2024 19/7/2024 19/7/2024 19/7 19/7

B.Tech Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: SIT-2711
COURSE TITLE:SUMMER TRAINING-II

CREDITS: 2

Hours/Weeks			Marks
L	T	P	INTERNAL
0	0	0	50

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.
CO2	Understand the engineering code of ethics and be able to apply them as necessary.
CO3	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 Computer 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 department for evaluation.

OR

The students can opt to undertake an online course / MOOC (related to the discipline) from a reputed platform of not less than 60 hours (with Certificate).

OR

The students have an option to take an 8 week SWAYAM/NPTEL Course and earn a certificate for the same. Guidelines for evaluation of Practical Training: The evaluation shall be done by the departmental committee during 5th semester. The committee shall have a convener and at least two members.

Distribution of Marks as per University statues:

Total marks of evaluation =50

i.	Report	=15	30%
ii.	Viva-Voce & Presentation	=10	50%
iii.	Level of IT	=25	20%

NOTE:
In Case a student has earned a certificate from Swayam/ Nptel Platform, the marks so obtained shall be awarded on a proportionate basis.
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

B.Tech Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: SEM-2711
COURSE TITLE:SEMINAR

CREDITS: 2

Hours/Weeks			Marks
L	T	P	INTERNAL
0	0	4	50

COURSE OUTCOMES:-	
On completion of course the Student will be able to	
CO1	Select a topic relevant to the field of Computer engineering.
CO2	Undertake a review of the literature on the chosen topic.
CO3	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 having a convener and at least two faculty members.

Distribution of Marks:

Total Marks for Seminar Evaluation = 50 marks

i)	Project Report	15 marks
ii)	Presentation	25 marks
iii)	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

B.Tech Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEP-2711
COURSE TITLE: POWER SYSTEM-III LAB

CREDITS: 1

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

LABORATORY OUTCOMES:- On completion of course the Student will be able to	
CO1	Formulate Y bus and Z bus.
CO2	Understand the load flow analysis by GS and NR technique.
CO3	Understand transient stability analysis.
CO4	Apply equal area criteria for any power system network.

LIST OF PRACTICALS:

1) To formulate Y bus using appropriate algorithm for at least 4 bus system
2) To develop a program for the formation of Z bus
3) Load flow analysis of a given power system by GS technique
4) Load flow analysis of a given power system by NR technique
5) To study transient stability analysis.
6) To find the critical clearing angle by applying equal area criteria for any power system network

NOTE:

1. At least four practicals should be performed.
2. Additional labs/ experiment will be performed based on course content requirements.
3. Simulation/ virtual labs are used to enhance the practical ability of students.

B.Tech Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th **CREDITS: 1**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEP-2712

COURSE TITLE: POWER SYSTEM PROTECTION LAB

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	2	25	-

LABORATORY OUTCOMES:- On completion of course the Student will be able to	
CO1	Study the characteristic , working and testing of different relays.
CO2	Study the characteristic of fuse wires and MCBs of different ratings.
CO3	Study the working of Bucholz relay
CO4	Measure the PT Ratio and phase error using test set and dielectric strength of transformer oil

Lab Experiments:

Experiment 1 To study the characteristic of static over current relay.

Experiment 2 To study the characteristics of electromechanical over current relay.

Experiment 3 To study the working of Bucholz relay.

Experiment 4 To study the different types of single phase relay test set

Experiment 5 To study the characteristics of fuse wires of different ratings.

Experiment 6 To study the characteristics of MCBs of different ratings.

Experiment 7 To measure PT Ratio & Phase Error by using the PT Test set.

Experiment 8 To measure the dielectric strength of oil using oil testing set.

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

B.Tech Electrical Engineering Examination to be held in the Year December 2025,2026,2027,2028

SEMESTER: 7th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: NCC-2701
COURSE TITLE: ELECTRICAL ENGINEERING MATERIAL

CREDIT: 0

Hours/Weeks			Marks
L	T	P	Satisfactory/ Unsatisfactory
2	0	0	

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Analyze crystal structure and comparing different structures imperfections and classification of materials.
CO2	Understand the basic concept of magnetic properties of the materials.
CO3	Understand the mechanism of conduction in semiconductor.
CO4	Understand the basic materials used in electrical Engineering.

Detailed Syllabus

Section- A

Unit-I:Atomic Structure and Inter-atomic Bounding: Classification of materials, structure of an atom, Solid state & its types, crystal Structure (unit cell & space lattice), bonds in solid, Imperfection in crystal, voids, point defect, surface defect, factors affecting Electrical conductivity of metals (resistance variation, Temperature, mechanical, stressing, resistivity), Atomic radius & Atomic factors, Atomic packing factors, Miller indices (calculation of Density & Lattice constant).
(12 hours)

Unit-II: Magnetic Properties of Materials: Origin of permanent magnetic dipole in material, classification of Diamagnetism, Paramagnetism, Ferromagnetism, Antiferromagnetic, magnetostriction, properties of magnetic material, soft and hard magnetic material, permanent magnetic material, Magnetic Hysteresis loop, Dielectric material, classification of Dielectric material, properties of dielectric material (dielectric constant, dielectric strength, dielectric losses), piezoelectricity, Lorentz field. **(11 hours)**

Section- B

Unit-III:Semiconductor Materials: Classification of materials as semiconductors, Intrinsic and Extrinsic semiconductors, Fermi level in Intrinsic & Extrinsic semiconductor, Mass Action law, PN junction, PN junction as Diode, Semiconductor diode, Hall Effect, Working application of Semiconductor, Photovoltaic cell, commonly used material as Semiconductor, Application of semiconductor devices, Thermoelectric effect (Seebeck effect).
(11 hours)

Unit-IV:Electrical Materials: Conductors, Electric circuit, General properties of conductor, Electrical conductors, specific resistance, Factors affecting the resistivity of electric materials, Materials for lamp filament, material for transmission lines, Electrical contact materials, Electrical carbon materials, carbon and graphite brushes, stranded conductors' materials, Fuse wire materials, soft & hard Solders, Thermocouple materials, superconductivity.
(11 hours)

Books Recommended:

1. K.M Gupta, *"Electrical Engineering Materials,"* Umesh Publications.
2. A. J. Dekker, *"Electrical Engineering Materials,"* Prentice-hall, Inc.
3. R.K Rajput, *"Material Science & Engineering,"* Katson Books.
4. J.B Gupta, "Electrical and Electronic Engineering Materials," Katson Books, New Delhi
5. R.K.Dogra and A.K.Sharma, "Material science for Engineering and technologists"

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.

UNIVERSITY OF JAMMU

B.Tech Electrical Engineering 8th Semester Examination to be held in the Year May 2026,2027,2028,2029

Scheme- I **Contact hours: 26**

COURSE CODE	COURSETYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
EET-2801	Professional Core Course	Electronics Measurement	2	1	0	25	75	100	3	100%
EET-2802	ProfessionalCore Course	Electrical Drives	2	1	0	25	75	100	3	100%
MOC-2811	Massive Open online Course	MOOC	0	0	2	25	–	25	1	100%
EEP-2811	ProfessionalCore Course	Electronics MeasurementLab.	0	0	2	25	–	25	1	100%
NCC-2801	Non- Credit Course	Fundamental of Smart Grid Technology	2	0	0	Satisfactory/ Unsatisfactory			0	100%
PRJ-2811	Project	Project	0	0	16	150	50	200	8	100%
TOTAL			**6**	**2**	**18**	**250**	**200**	**450**	**16**	

** NOTE:-The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course shouldnot be similar to the regular courses offered as a part of the department curriculum.*

OR **Scheme-II**

Contact hours:26

COURSE CODE	COURSE TYPE	COURSE TITLE	Load Allocation			Marks Distribution		Total	Credits	% Change
			L	T	P	Internal	External			
MOC-2811	MassiveOpen Online Course	MOOC	0	0	2	25	–	25	1	100%
PII-2811	Professional Industry Internship	Industry Internship	0	0	24	325	100	425	15	100%
		TOTAL	**0**	**0**	**26**	**350**	**100**	**450**	**16**	**100%**

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B.Tech Electrical Engineering Examination to be held in the Year May 2026,2027,2028,2029

SEMESTER: 8th **CREDITS: 3**
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2801
COURSE TITLE: ELECTRONICS MEASUREMENT
DURATION OF EXAM: 3 HOURS

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Acquire knowledge about magnetic measurement and signal analysers.
CO2	Acquire knowledge about oscilloscopes
CO3	Know about different types of phase and frequency meters
CO4	Acquire knowledge about Transducers and High voltage Measurement.

Detailed Syllabus

Section- A

Unit-I: Magnetic Measurements: Determination of B-H curve Determination of hysteresis loop, Measurement of Iron losses, Iron loss curves, separation of losses **(04 hrs)**

Unit-II: Signal Analyzers: Introduction, Wave Analyzers:- Frequency selective wave analyzer, Heterodyne wave Analyzer, Harmonic Distortion Analyzers, Total Harmonic distortion, Spectrum Analyzers:- Basic Spectrum analyzer, spectral Displays, Spectra of different signals. **(08 hrs)**

Unit-III: Oscilloscopes: Introduction: CRO, Cathode ray tube, Block diagram of CRO, Electostatic deflection,Oscilloscope amplifiers, delay line, sweep modes, vertical input and sweep generator signal synchronization, Dual trace Oscilloscopes, Measurement of frequency & phase. **(08 hrs)**

Section- B

Unit-VI:Power Factor Meters: Single-phase and three phase Electrodynamometer power factor meter, Moving iron power factor meters. Frequency meters; Mechanical resonance type frequency meter. Weston type frequency meter, Ratiometer type frequency meter, Saturable core type frequency meter. **(08 hrs)**

Unit-V:Transducers: Introduction, Principles of operation, Classification of transducers, Summary of factors influencing the choice of transducers, Strain Gauge theory, LVDT, Thermocouple, photoelectric transducers. **(08 hrs)**

Unit-VI:High Voltage Measurements: Measurement of direct, alternating and impulse voltages by electrostatic voltmeters, sphere gap, uniform field gap, ammeter in series with high voltage resistors and voltage divider. **(05hrs)**

Recommended Books:

1. Electrical Measurements — Golding
2. Electronics Measurements — Petit &Terman
3. Electronic Instrumentation — J.A. Alloca
4. Electronic Instrumentation — B.H. Oliver & J.M. Cage
5. Electrical and Electronic Measurement — A.K Sawhney

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 Electrical Engineering Examination to be held in the Year May 2026,2027,2028,2029

SEMESTER: 8th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EET-2802
COURSE TITLE: ELECTICAL DRIVES
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/Weeks			Marks	
L	T	P	Internal	External
2	1	0	25	75

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understand the electric drive system.
CO2	Understand the electric drive control and motor rating and duty.
CO3	Understand the principles of speed-control of dc motors and induction motors.
CO4	Understand the power electronic converters and special purpose drives

Detailed Syllabus

Section- A

Unit-I: Introduction to an electric drive system: Dynamic equation of an electric drive, torque equation, multi quadrant operation, types of loads, energy loss during transient and load equalization **(10 hrs)**

Unit-II:Control of Electric Drives: Speed control, closed loop position and speed control. Selection of motor rating thermal model of motor, classes of duty and determination of motor rating for different classes duty. **(11 hrs)**

Section- B

Unit-III: DC Motor Drives: Starting, braking, transient analysis, speed control, controlled rectifier converters for DC drives and chopper fed DC drives. **(10 hrs)**

Unit-IV: Induction Motor Drives: Starting, braking, transient analysis, speed control, ac controller fed induction motor, voltage source inverter, current source inverter and cylco-converter fed induction motor drive. **(11 hrs)**

RECOMMENDED BOOKS:

1. G. K. Dubey, "Power Semiconductor Controlled Drives", Prentice Hall, 1989.
2. R. Krishnan, "Electric Motor Drives: Modeling, Analysis and Control", Prentice Hall, 2001
3. .G. K. Dubey, "Fundamentals of Electrical Drives", CRC Press, 2002
4. Electrical Drives BY S.K Pillai

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 Electrical Engineering Examination to be held in the Year May 2026,2027,2028,2029

SEMESTER: 8th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: MOC-2811
COURSE TITLE: MOOC

CREDITS: 1

Hours/Weeks			Marks
L	T	P	Internal
0	0	2	25

The student 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, from the Departmental Academic Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the departmental 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 were 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 4 week NPTEL course the following points need to be followed;

1. *The course is declared pass in the semester only after the production of the NPTEL certificate, by the student. In case the student doesn't pass the certificate 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.*

2. *The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities.*

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

B.Tech Electrical Engineering Examination to be held in the Year May 2026,2027,2028,2029

SEMESTER: 8th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEP-2811
COURSE TITLE: ELECTRONICS MEASUREMENT LAB

CREDIT: 1

Hours/Weeks			Marks
L	T	P	Internal
0	0	2	25

LABORATORY OUTCOMES:- On completion of course the Student will be able to	
CO1	Measure phase and frequency using CRO
CO2	Measure displacement using LVDT
CO3	Employ strain gauge for measuring pressure
CO4	Determine the temperature using thermocouple

LIST OF PRACTICALS:

1) To observe waveform of a signal on CRO and measure its amplitude and frequency.
2) To measure frequency of an unknown signal using Lissajous patterns on CRO.
3) To study LVDT and plot its response to an application.
4) To study Strain Gauge and plot its response to an application.
5) To plot the characteristics of a Thermistor and calibrate it for temperature measurement.
6) To plot the characteristics of a Thermocouple and calibrate it for temperature measurement.
7) To study the working of a Digital Multimeter.

NOTE:

1. At least five practicals should be performed.
2. Additional labs/ experiment will be performed based on course content requirements.
3. Simulation/ virtual labs are used to enhance the practical ability of students.

B.Tech Electrical Engineering Examination to be held in the Year May 2026,2027,2028,2029

SEMESTER: 8th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: NCC-2801
COURSE TITLE: FUNDAMENTAL OF SMART GRID TECHNOLOGY

CREDIT: 0

Hours/Weeks			Marks
L	T	P	Satisfactory/ Unsatisfactory
2	0	0	

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understand the basic concept of smart grid
CO2	Understand the concept of smart technologies
CO3	Analyze microgrid and integration of renewable energy sources
CO4	Study power quality management involved in smart grid system

Detailed Syllabus

Section- A

Unit-I: Introduction: Introduction to Smart Grid: Evolution of Electric Grid, Concept of Smart Grid, Definitions, Need of Smart Grid, Functions of Smart Grid, Opportunities & Barriers of Smart Grid, Difference between conventional & smart grid, Concept of Resilient & Self Healing Grid, Present development & International policies in Smart Grid. Case study of Smart Grid. CDM opportunities in Smart Grid.

Unit-II: Smart Grid Technologies: Introduction to Smart Meters, Real Time Prizing, Smart Appliances, Automatic Meter Reading (AMR), Outage Management System (OMS), Plug in Hybrid Electric Vehicles (PHEV), Vehicle to Grid, Smart Sensors, Home & Building Automation.

Unit-III: Smart Grid Technologies: Smart Substations, Substation Automation, Feeder Automation, Geographic Information System (GIS), Intelligent Electronic Devices (IED) & their application for monitoring & protection, Smart storage like Battery, SMES, Pumped Hydro, Compressed Air Energy Storage, Wide Area Measurement System (WAMS), Phase Measurement Unit (PMU), PMUs application to monitoring & control of power system.

Section- B

Unit-IV: Microgrids and Distributed Energy Resources: Concept of microgrid, need & application of microgrid, formation of microgrid, Issues of interconnection, protection & control of microgrid, Plastic & Organic solar cells, thin flim solar cells, Variable speed wind generators, fuel cells, microturbines, Captive power plants, Integration of renewable energy sources.

Unit-V: Power Quality Management in Smart Grid: Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring.

Books Recommended:

1. Ali Keyhani, Mohammad N. Marwali, Min Dai, "Integration of Green and Renewable Energy in Electric Power Systems", Wiley.
2. Clark W. Gellings, "The Smart Grid: Enabling Energy Efficiency and Demand Response", CRC Press.
3. Janaka Ekanayake, Nick Jenkins, KithsiriLiyanage, Jianzhong Wu, Akihiko Yokoyama, "Smart Grid: Technology and Applications", Wiley.
4. Stuart Borlase, "Smart Grids (Power Engineering)", CRC Press.

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

B.Tech Electrical Engineering Examination to be held in the Year May 2026,2027,2028,2029

SEMESTER: 8th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: PRJ-2811
COURSE TITLE: PROJECT

CREDITS: 8

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	16	150	50

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

Guidelines for evaluation of Project work in 8th Semester:

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.

Sub-distribution of marks:

For External Examiner 50
For Internal Examiner 150

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

Distribution	Mid –Sem		Internal Final	
Viva-Voce	25	30%	30	30%
Presentation	25	30%	30	30%
Report	--	40%	40	40%
	50		100	
Total	150			

The External Evaluation of 100 marks shall be done by the External Expert and shall be based on the 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 repo

OR

Scheme-II

B.Tech Electrical Engineering Examination to be held in the Year May 2026,2027,2028,2029

SEMESTER: 8th **CREDITS: 1**
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: MOC-2811
COURSE TITLE: MOOC

Hours/Weeks			Marks
L	T	P	Internal
0	0	2	25

The student 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, from the Departmental Academic Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the departmental 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 were 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 4 week NPTEL course the following points need to be followed;

1. *The course is declared pass in the semester only after the production of the NPTEL certificate, by the student. In case the student doesn't pass the certificate 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.*

2. *The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities.*

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

SEMESTER: 8th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: PII-2811
COURSE TITLE: INDUSTRY INTERNSHIP

CREDITS: 15

Hours/Weeks			Marks	
L	T	P	Internal	External
0	0	24	325	100

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO 1	To provide exposure to work independently in the Industry/Organisation
CO 2	To develop skills in the emerging technologies
CO 3	To utilize the knowledge for seeking placements in the Industry

The Project Industrial Internship letters shall be issued to the students in the 7th 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 8th 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 8th 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 that 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.

Guidelines for evaluation of Industrial Internship in 8th 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	
	Total Internal	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.

B.Tech Electrical Engineering Examination to be held in the Year May 2026,2027,2028,2029

SEMESTER: 8th **CREDIT: 1**
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEP-2811
COURSE TITLE: ELECTRONICS MEASUREMENT LAB

Hours/Weeks			Marks
L	T	P	Internal
0	0	2	25

LABORATORY OUTCOMES:- On completion of course the Student will be able to	
CO1	Measure phase and frequency using CRO
CO2	Measure displacement using LVDT
CO3	Employ strain gauge for measuring pressure
CO4	Determine the temperature using thermocouple

LIST OF PRACTICALS:

1) To observe waveform of a signal on CRO and measure its amplitude and frequency.
2) To measure frequency of an unknown signal using Lissajous patterns on CRO.
3) To study LVDT and plot its response to an application.
4) To study Strain Gauge and plot its response to an application.
5) To plot the characteristics of a Thermistor and calibrate it for temperature measurement.
6) To plot the characteristics of a Thermocouple and calibrate it for temperature measurement.
7) To study the working of a Digital Multimeter.

NOTE:

1. At least five practicals should be performed.
2. Additional labs/ experiment will be performed based on course content requirements.
3. Simulation/ virtual labs are used to enhance the practical ability of students.

B.Tech Electrical Engineering Examination to be held in the Year May 2026,2027,2028,2029

SEMESTER: 8th
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: NCC-2801
COURSE TITLE: FUNDAMENTAL OF SMART GRID TECHNOLOGY

CREDIT: 0

Hours/Weeks			Marks
L	T	P	Satisfactory/
2	0	0	Unsatisfactory

COURSE OUTCOMES:- On completion of course the Student will be able to	
CO1	Understand the basic concept of smart grid
CO2	Understand the concept of smart technologies
CO3	Analyze microgrid and integration of renewable energy sources
CO4	Study power quality management involved in smart grid system

Detailed Syllabus

Section- A

Unit-I: Introduction: Introduction to Smart Grid: Evolution of Electric Grid, Concept of Smart Grid, Definitions, Need of Smart Grid, Functions of Smart Grid, Opportunities & Barriers of Smart Grid, Difference between conventional & smart grid, Concept of Resilient & Self Healing Grid, Present development & International policies in Smart Grid. Case study of Smart Grid. CDM opportunities in Smart Grid.

Unit-II: Smart Grid Technologies: Introduction to Smart Meters, Real Time Prizing, Smart Appliances, Automatic Meter Reading (AMR), Outage Management System (OMS), Plug in Hybrid Electric Vehicles (PHEV), Vehicle to Grid, Smart Sensors, Home & Building Automation.

Unit-III: Smart Grid Technologies: Smart Substations, Substation Automation, Feeder Automation, Geographic Information System (GIS), Intelligent Electronic Devices (IED) & their application for monitoring & protection, Smart storage like Battery, SMES, Pumped Hydro, Compressed Air Energy Storage, Wide Area Measurement System (WAMS), Phase Measurement Unit (PMU), PMUs application to monitoring & control of power system.

Section- B

Unit-IV: Microgrids and Distributed Energy Resources: Concept of microgrid, need & application of microgrid, formation of microgrid, Issues of interconnection, protection & control of microgrid, Plastic & Organic solar cells, thin flim solar cells, Variable speed wind generators, fuel cells, microturbines, Captive power plants, Integration of renewable energy sources.

Unit-V: Power Quality Management in Smart Grid: Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring.

Books Recommended:

1. Ali Keyhani, Mohammad N. Marwali, Min Dai, "Integration of Green and Renewable Energy in Electric Power Systems", Wiley.
2. Clark W. Gellings, "The Smart Grid: Enabling Energy Efficiency and Demand Response", CRC Press.
3. Janaka Ekanayake, Nick Jenkins, KithsiriLiyanage, Jianzhong Wu, Akihiko Yokoyama, "Smart Grid: Technology and Applications", Wiley.
4. Stuart Borlase, "Smart Grids (Power Engineering)", CRC Press.

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