

## 2<sup>nd</sup> YEAR

### EEE401 : CIRCUITS & NETWORKS

Department	Electrical & Electronics Engineering
Course code & Title of Course	EEE401 : Circuits & Networks
Course Coordinator	Bengia Taday
Designation as a required or elective course	Compulsory (Basic Technology Course)
Pre-requisites	Basic concepts of generation, transmission & distribution in electrical power system.
Contact hours & type of course (Lecture, tutorial, seminar, project etc.)	Contact hours: 70 ; 5 Credits (L-T-P) : 3-1-2
Course assessment methods (both continuous & semester-end assessment)	(i) Assignment/ Class test: It is a part of continuous evaluation. It helps students in their academic activities & enables them to understand better. (ii) End semester exam: It evaluates the students' level of understanding of the subject which is reflected as marks/ grades.
Course outcomes*	CO1: Able to identify elements of electrical circuits. CO2: Simplify complex circuits. CO3: Distinguish between dc & ac circuits. CO4: Able to find various parameters of electrical circuits & networks. CO5: Understand the role of transients in circuits.

Topics covered	
Unit I	Magnetic circuits
Unit II	Passive circuit elements
Unit III	D.C. circuit analysis
Unit IV	A.C. circuit analysis
Unit V	Series & parallel resonating circuits
Unit VI	Transients: Transients in RC circuits, Transients in RL circuits
Textbooks and/ or reference materials	<ol style="list-style-type: none"> <li>1. Electronics &amp; electrical engineering by Lionel Warnes</li> <li>2. Circuits &amp; networks, analysis &amp; synthesis by A. Sudhakar</li> <li>3. Circuit theory, analysis &amp; synthesis by Abhijit Chakrabarti</li> </ol>

## 2<sup>nd</sup> YEAR

### G301 : ENVIRONMENTAL EDUCATION

Department	Electrical & Electronics Engineering, Automobile Engineering, & Computer Science & Engineering
Course code & Title of Course	G301 : Environmental Education
Course Coordinator	Bengia Taday
Designation as a required or elective course	Required/Compulsory

Pre-requisites	Basics of geography
Contact hours & type of course (Lecture, tutorial, seminar, project etc.)	Contact hours: 42 ; 3 Credits (L-T-P) : 3-0-0
Course assessment methods (both continuous & semester-end assessment)	(iii) Assignment/ Class test: It is a part of continuous evaluation. It helps students in their academic activities & enables them to understand better. (iv) End semester exam: It evaluates the students' level of understanding of the subject which is reflected as marks/ grades.
Course outcomes*	CO1: Learn the basic components of environment & their importance. CO2: Can identify the environmental problems & their impacts. CO3: Know the natural resources & pollutions related to them. CO4: Learn about the clean technology. CO5: Know the various environmental laws.

Topics covered	
Unit I	Introduction
Unit II	Ecological aspects of environment
Unit III	Natural resources
Unit IV	Global environmental issues
Unit V	Environmental pollution
Unit VI	Clean technology

Unit VII	Environmental legislation	
Unit VIII	Environment impact assessment	
Textbooks and/ or reference materials	<ol style="list-style-type: none"> <li>4. Environment Engineering by Pandya &amp; Carny, Tata Mcgraw Hill, New Delhi.</li> <li>5. Introduction to Environmental Engineering &amp; Science by Gilbert M Masters, Tata Mcgraw Hill, New Delhi.</li> <li>6. Environmental Engineering by Peavy, TMH International, New York.</li> <li>7. Environmental Science by Aluwalia &amp; Malhotra, Ane Books Pvt. Ltd., New Delhi.</li> <li>8. Environmental Science &amp; Ethics by Sing, Malviya &amp; Sing, Acme Learning, New Delhi.</li> </ol>	

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CSE-401: Digital Electronics

Department	Computer science Engineering
Course name	Digital Electronics
Course coordinator	Lipi Karso Ete
Designation as a required or elective course	Required/compulsory course
Pre-requisites	-
Contact hours and type of course(lecture,tutorial and Seminar,project etc..)	Contact hours: 70; 5credits(L-T-P): 1-3-2
Course assessment methods(both continuos and semester end assessment)	<ol style="list-style-type: none"> <li>i) assignment/class test: It is part of the continuous evaluation that keep the students in touch with the topics covered</li> <li>ii) End semester exam: It evaluates the students level</li> </ol>

	of understanding of the subject matter and reflect on their individual grades
Course outcomes	<ul style="list-style-type: none"> <li>i) acquire knowledge about number systems</li> <li>ii) acquire knowledge about solving problems related to number system and Boolean algebra</li> <li>iii) able to identify ,analyze and design different combinational circuits</li> <li>iv) able to design different synchronous and asynchronous circuits</li> <li>v) acquire knowledge about internal circuitry and logic behind any digital system</li> </ul>
Topics covered	
Unit 1	Number systems: binary number system, conversion of decimal number to binary, octal, hexa decimal and vice-versa
Unit 2	Binary arithmetic: binary addition, binary subtraction, binary multiplication, binary division, negative number and compliment arithmetics, elements of logic and truth tables
Unit 3	Logic Gates: OR and AND gates, NOT operation, NOR and NAND gates, EXOR and EX NOR gate
Unit 4	Boolean Algebra: theorems of Boolean algebra,

	karnaugh map and entering data in the map, minimization tools, minimization of Boolean expression
Unit 5	Binary code: BCD-weighted EBCDIC, ASCII CODES ERROR detection and correction - alphanumeric codes, decoder and display- decimal decoder, seven segment display
Unit 6	Flip Flop: RS flip flops, T flip flop, D flip flop, Jk flip flop in detail and their operation
Unit 7	Types of digital circuits: combinational circuits, sequential circuits
Unit 8	Elements of ICs: internal configuration of TTL-RTL-ECL-IIL
Text books and /or reference materials	Digital circuits and designs by S.Salivahanan,

2nd year

EEE-502: Digital Electronics

Department	Electrical and Electronics Engineering
Course name	Digital Electronics
Course coordinator	Lipi Karso Ete
Designation as a required or elective course	Required/compulsory course

Pre-requisites	-
Contact hours and type of course(lecture,tutorial and Seminar,project etc..)	Contact hours: 70; 5credits(L-T-P): 1-3-2
Course assessment methods(both continuous and semester end assessment)	i) assignment/class test: It is part of the continuous evaluation that keep the students in touch with the topics covered ii) End semester exam: It evaluates the students level of understanding of the subject matter and reflect on their individual grades
Course outcomes	i) acquire knowledge about number systems ii) acquire knowledge about solving problems related to number system and Boolean algebra iii) able to identify ,analyze and design different combinational circuits iv) able to design different synchronous and asynchronous circuits v) acquire knowledge about internal circuitry and logic behind any digital system
Topics covered	

Unit 1	Number systems: binary number system, conversion of decimal number to binary, octal, hexa decimal and vice-versa
Unit 2	Binary arithmetic: binary addition, binary subtraction, binary multiplication, binary division, negative number and compliment arithmetics, elements of logic and truth tables
Unit 3	Logic Gates: OR and AND gates, NOT operation, NOR and NAND gates, EXOR and EX NOR gate
Unit 4	Boolean Algebra: theorems of Boolean algebra, karnaugh map and entering data in the map, minimization tools, minimization of Boolean expression
Unit 5	Binary code: BCD-weighted EBCDIC, ASCII CODES ERROR detection and correction - alphanumeric codes, decoder and display-decimal decoder,



	seven segment display
Unit 6	Flip Flop: RS flip flops, T flip flop, D flip flop, Jk flip flop in detail and their operation
Unit 7	Types of digital circuits: combinational circuits, sequential circuits
Unit 8	Elements of ICs: internal configuration of TTL-RTL-ECL-IIL
Text books and /or reference materials	

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EEE-406: Electronic Devices and Circuits

Department	Electrical and Electronics Engineering
Course name	Electronic Devices and Circuits
Course coordinator	Lipi Karso Ete
Designation as a required or elective course	Required/compulsory course
Pre-requisites	Basic concept of physics and chemistry
Contact hours and type of course(lecture,tutorial and Seminar,project etc..)	Contact hours: 70; 5 credits(L-T-P): 3-1-2
Course assessment methods(both	i) assignment/class test: It is part of the continuous evaluation thus keep the

continuous and semester end assessment)	students in touch with the topics covered ii) End semester exam: It evaluates the students level of understanding of the subject matter and reflect on their individual grades
Course outcomes	<ul style="list-style-type: none"> <li>i) acquire knowledge about semiconductor physics</li> <li>ii) learn basics of semiconductor diodes, transistors(BJT), their characteristics and applications</li> <li>iii) learn about rectifiers, filters and their applications</li> <li>iv) learn about the application of transistor as amplifier</li> <li>v) learn the concept of feedback in feedback amplifiers</li> <li>vi) learn about multistage amplifiers</li> <li>vii) learn and analyze the performance of FET on the basis of their operation</li> </ul>
Topics covered	
Unit 1	Semiconductor Diodes: types and properties of semiconductors, doping, diodes:principle of operation, types, specifications, forward and reverse characteristics,Half wave and Full wave rectifiers,their efficiency, ripple factor and average values, diode clipping ,clamping circuits, special purpose diodes
Unit 2	Tansistors
Unit 3	
Unit 4	
Unit 5	
Unit 6	
Unit 7	

Unit 8	
Text books and /or reference materials	

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EEE-410: Electrical and Electronic workshop

Department	Electrical and Electronics Engineering
Course name	Electrical and Electronic Workshop
Course coordinator	Lipi Karso Ete
Designation as a required or elective course	Required/compulsory course
Pre-requisites	-
Contact hours and type of course(lecture,tutorial and Seminar,project etc..)	Contact hours: 56; 4 credits(L-T-P): 0-2-4
Course assessment methods(both continuous and semester end assessment)	<p>i) assignment/class test: It is part of the continuous evaluation that keep the students in touch with the topics covered</p> <p>ii) End semester exam: It evaluates the students level of understanding of the subject matter and reflect on their individual grades</p>
Course outcomes	i) acquire knowledge about different tools

	<p>used in electrical workshop</p> <p>ii) understand the use of multimeters for measuring different electrical parameters</p> <p>iii) understand the use of voltmeters and ammeters for measuring different electrical parameters</p> <p>iv) understand the functions of function generator, CRO</p> <p>v) make basic circuits on PCB using soldering method</p>
Topics covered	
Unit 1	Identification of different tools used in Electrical workshop and prepare a list
Unit 2	Study of safety practices in electrical workshop and preparation of instruction manual
Unit 3	Dismantling of Ceiling fan and preparation of list of components
Unit 4	Dismantling and assembling of single and three phase pump motor
Unit 5	Perform the wiring connection of incandescent lamp

Unit 6	Assembly of DOL starter using contactor, thermal over load
Unit 7	Perform megger testing
Unit 8	Soldering of simple circuits on PCB
Text books and /or reference materials	

Semester: THIRD  
EEE 411: HEAT ENGINE

Department	EEE
Course Code and Title	EEE 411: HEAT ENGINE
Course Coordinator	Mr. RinchinTashiTsumkhapa
Designation as required or elective course	Required or compulsory course
Pre-requisites	Basic concept of Physics and Mathematics
Contact hours and type of course (Lecture, Tutorial, Practical, Seminar, Project etc)	L-T-P = 3-0-0; Credits: 3 Contact hours: 45hrs
Course assessment methods (both continuous and semester end assessment)	<p>Progressive Assessment (PA): It is a part of continuous evaluation and is conducted through class test, assignments and class performance with 40%, 40 % and 20 % Weightage respectively.</p> <p>It helps the student to keep in pace with academic activities and know and improve his/her performance on continuous basis during the semester period.</p> <p>End Term (ET) evaluation: End term evaluation is done at the end of semester to assess to student's level of understanding of the subject matter and is conducted centrally during the specific period by APSCTE. Both theory and practical exams are held as a part of ET evaluation and are reflected in marks statement along</p>

	with PA.
Course Outcomes	CO1:Understand Properties of gas & vapour, Phase diagram, dryness fraction, and different properties of steam.
	CO2:Apply the basic knowledge of steam properties in developing Steam Boiler and reciprocating engine.
	CO3:Understand the working, types, compounding and applications of Steam Turbine.
	CO4:Understand the basic difference, necessity, classification & applications of Condenser.
	CO5:Understanding the working principle, types and applications of Internal Combustion Engine.

Topics covered		
Unit-I	<p>Difference between gas and vapour</p> <p>Phase diagram for formation of steam from ice</p> <p>Definition of saturated temperature and pressure, sensible heat, total heat, dryness fraction, entropy of vapour.</p> <p>Types of steam e.g., wet, dry saturated steam, superheated steam, and degree of superheat</p> <p>Dryness fraction of steam by separating &amp; throttling calorimeters.</p> <p>Non-flow process of vapour and their representation on P-V, T-S and H-S diagrams</p> <p>Flow process of vapours.</p>	7
Unit-II	<p>Functions and working principles of boilers</p> <p>Construction, mountings accessories, pressure parts and pipe fittings of modern type of boilers</p> <p>Quality of boiler fuel</p> <p>Burning equipment and ash handling mechanism</p> <p>Chimney draught and state its measurements</p> <p>Process of feed water treatment</p>	6

Unit-III	<p>Working principle of steam engine and its field of use</p> <p>Rankine cycle</p> <p>Types of engines</p> <p>List the components of engine &amp; state their functions</p> <p>Speed governing system of steam engine</p> <p>Describe the indicator diagram</p> <p>Definition of (a) mean effective pressure (b) indicated horse power (c) brake horse power (d) Thermal efficiency (e) mechanical efficiency</p>	6
Unit-IV	<p>Function and working principle of steam turbine</p> <p>Difference between steam engine and steam turbine</p> <p>Functions of (a) nozzles (b) blades (c) casing (d) wheels (e) rotors (f) diaphragm and glands</p> <p>Impulse and reaction, simple and compound, single and multistage turbine</p> <p>Compounded impulse turbine e.g., (a) pressure compounded (b) velocity compounded (c) pressure velocity compounded</p> <p>Pressure and velocity diagram of all above turbines</p> <p>Losses of turbine</p> <p>Velocity diagram of single stage impulse turbine</p> <p>Work done, output and efficiency</p> <p>Speed governing system of the turbine</p>	8
Unit-V	<p>Function and classification of surface and jet condensers and air pumps</p> <p>Effect of vacuum in condenser</p> <p>Vacuum efficiency and condenser efficiency</p> <p>Amount of cooling water required and the mixture of vapour &amp; air</p> <p>Source of air in condensers</p>	6
Unit-VI	<p>Difference between internal and external combustion engine</p> <p>Classification of IC engine</p> <p>Working principles of two stroke cycle and four stroke cycle of petrol and diesel engine</p> <p>Definition of (a) cycle of operation of four stroke otto (b) diesel and dual combustion cycle (c) cycle efficiency (d) comparison between otto and diesel cycle (e) two stroke otto (f) diesel cycles (g) scavenging</p> <p>Petrol engines, engine parts cylinder, piston, piston ring, connecting rod, crank and crank case, cam and crank-shaft</p> <p>Diesel engine and its parts. Description of (a) fuel injection system (b) cooling system (c) exhaust system (d) governing system (e) lubricating system both for CI and SI engine</p>	10
	Class Test	2

Text/reference books

<b>Sr. No.</b>	<b>Author (s)</b>	<b>Title of the book</b>
1	Er.B.S.Ubhi	Thermodynamics, Vol-II
2	TP Mukherjee, M Dutta & Co.	Heat Engine
3	PL Ballaney; Khanna Publishers	Thermal Engineering
4	BK Sarkar, Tata Mc Graw Hill Publishing Company	Thermal Engineering

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**G-207 FUNDAMENTAL OF ELECTRICAL & ELECTRONICS ENGINEERING**

Department	Electrical and Electronics Engineering
Course name	Fundamentals of Electrical & Electronics Engineering
Course coordinator	Shanti Taring
Designation as a required or elective course	compulsory course
Pre-requisites	Physics I and Physics II, Engineering Mathematics I and Engineering Mathematics II
Contact hours	Contact hours: 70; 5credits(L-T-P): 3-0-2
Course assessment methods(both continuous and semester end assessment)	i) assignment/class test: It is part of the continuous evaluation that keep the students in touch with the topics covered ii) End semester exam: It evaluates the students level of understanding of the subject matter and reflect



	on their individual grades
Course outcomes	<p>1: Explain concept of D.C circuits.</p> <p>2 .Explain concept of A.C circuits.</p> <p>3: Understand magnetic circuits and explain concepts of Electromagnetism and Electromagnetic Induction.</p> <p>4: Describe semiconductor physics and diode circuits.</p> <p>5: Able to explain various transistor circuits and its application.</p> <p>6. Can explain FET &amp; MOSFET, feedback amplifier and oscillator.</p>
Topics covered	
Unit 1	D.C circuits
Unit 2	A.C circuits
Unit 3	Electro Magnetism & Magnetic Circuits
Unit 4	Semiconductor
Unit 5	Diode and Circuits
Unit 6	Transistor and Circuits
Unit 7	Feedback & oscillator
Text books and /or reference materials	<ol style="list-style-type: none"> <li>1. Practical electricity by P.Nigel cook</li> <li>2. Electrical technology by B.L.Theraja and A.K. Theraja</li> <li>3. Electrical Technology by J.B. Gupta</li> <li>4. Basic Electrical Engineering by A.Chakrabarti</li> <li>5. Principle of Electronics by V.K.Mehta</li> <li>6. Electronics Fundamentals and Applications by</li> </ol>

	<p>D.Chottopadhyay and Rakshit.</p> <p>7. Electronics devices by G.K.Mithal</p> <p>8. Electronics devices and circuits theory by Robert Boyelstad</p> <p>9. Basic electronics by S.K.Mandal</p>
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2<sup>nd</sup> year

EEE-404 ELECTRICAL POWER SYSTEM-I

Department	Electrical and Electronics Engineering
Course name	Electrical Power Systems-I
Course coordinator	Shanti Taring
Designation as a required or elective course	Required/compulsory course
Pre-requisites	-
Contact hours	Contact hours: 45; 5credits(L-T-P): 3-0-0
Course assessment methods(both continuos and semester end assessment)	<p>i) assignment/class test: It is part of the continuous evaluation that keep the students in touch with the topics covered</p> <p>ii) End semester exam: It evaluates the students level of understanding of the subject matter and reflect on their individual grades</p>

Course outcomes	<p>1: Able to explain basic working principle of various conventional power generating plants,</p> <p>2: Apply concepts of economics of power generation and solve problems based on it.</p> <p>3: understand basics of power installation and industrial drives.</p> <p>4: Describe necessity of earthing and neutral earthing.</p> <p>5.Explain inspection and maintenance of substation equipments and transformer oil testing.</p>
Topics covered	
Unit 1	Generation of Electrical power: Thermal power generation, Hydro Electric power Generation, Atomic Power Generation, Diesel Generating Plants, Gas Turbine
Unit 2	Economic and Tariff of Power System
Unit 3	Power installation and Drives
Unit 4	Sub Station, Earthing, Neutral Earthing, Oil Testing
Text books and /or reference materials	<ol style="list-style-type: none"> <li>1. Power plant Engineering by Nagpath&amp;kothari</li> <li>2. Testing commissioning operation and maintenance of electrical equipments by S.Rao</li> <li>3. Electrical design estimating and costing by S.K. Bhattacharya and K.B. Raina</li> <li>4. Generation of electrical energy by B.R. Gupta</li> <li>5. A course in electrical power</li> </ol>

	by M.L. Soni, P.V. Gupta, U.S. Bhatnagar 6. Power System by V.K.Mehta 7. Electrical power by A. Chakrabarti 8. A Course in electrical power system by J.B. Gupta
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2<sup>nd</sup> year

EEE-405 ELECTRICAL DRAWING & ESTIMATION

Department	Electrical and Electronics Engineering
Course name	Electrical Drawing & Estimation
Course coordinator	Shanti Taring
Designation as a required or elective course	Required/compulsory course
Pre-requisites	-
Contact hours	Contact hours: 60, 3 Credits(L-T-P): 0-2-2
Course assessment methods(both continuous and semester end assessment)	i) assignment/class test: It is part of the continuous evaluation that keep the students in touch with the topics covered ii) field visit: an opportunity to learn by visiting sites iii) market survey iv) End semester exam: It evaluates the students level of understanding of the subject matter and reflect on their individual grade.

Course outcomes	<p>1: Identify various electrical symbols and diagrams of electrical instruments, and accessories.</p> <p>2: Draw basic transmission and distribution line diagram and their components.</p> <p>3: Draw substation layout.</p> <p>4: Carryout simple domestic wiring.</p> <p>5: Understand elements of estimation and costing.</p> <p>6: Carry out tests for faults in electrical devices.</p>
Topics covered	
Unit 1	Drawing of Joints and Electrical Accessories
Unit 2	Drawing of Electrical Instruments
Unit 3	Drawing on Electrical Machine
Unit 4	Transmission & Distribution Line diagram
Unit 5	Plants and Substation layout diagram
Unit 6	Elements of Estimation and Costing
Unit 7	Domestic and Industrial Wiring
Unit 8	Estimation and Costing of Electrical products and services
Text books and /or reference materials	<ol style="list-style-type: none"> <li>1. Electrical design estimating and costing by S.K. Bhattacharya and K.B. Raina</li> <li>2. House wiring by Arora, B.D., R.B. Publication</li> <li>3. Electrical costing and</li> </ol>

	<p>estimating by Bajpai, M.N., Saroj publication.</p> <ol style="list-style-type: none"><li>4. A workbook of engineering drawing by somiaya publication.</li><li>5. Electrical appliances by R.B. Publication</li><li>6. Electrical appliances and devices by K.B. Bhatia</li><li>7. Engineering drawing by S.K. Bhattacharya</li></ol>
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