

MAULANA AZAD NATIONAL URDU UNIVERSITY

(A Central University established by an Act of Parliament in 1998)

Accredited 'A' Grade by NAAC

Gachibowli, Hyderabad - 500 032, T.S.

Polytechnic Syllabus-2018(CBCS Pattern)



Diploma in Electronics & Communication Engineering

MANUU POLYTECHNIC
DIPLOMA IN
(ELECTRONICS AND COMMUNICATION ENGINEERING)
SCHEME OF INSTRUCTION, EXAMINATION & EVALUATION

Semester I									
Sno.	Course Code	Course Name	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	DPCC101HST	English-I	2	-	-	2	15	35	50
2	DPCC103BST	Engineering Mathematics – I	3	-	-	3	30	70	100
3	DPCC101BST	Engineering Physics-I	3	-	-	3	30	70	100
4	DPCC101BSP	Engineering Physics Lab-I	-	1	2	2	25	25	50
5	DPCC102BST	Engineering Chemistry	3	-	-	3	30	70	100
6	DPCC102BSP	Engineering Chemistry Lab	-	1	2	2	25	25	50
7	DPEL101EST	Basic Electrical Engineering	3	-	-	3	30	70	100
8	DPEL101ESP	Basic Electrical Engineering Lab	-	1	2	2	25	25	50
9	DPCS101PCT	Computer Fundamentals	3	-	-	3	30	70	100
10	DPCS101PCP	Computer Fundamentals Lab	-	1	2	2	25	25	50
11	DPCE101ESP	Engineering Graphics Lab-I	1	-	2	2	25	25	50
Total Credits (Semester I)			35			27	290	510	800

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Semester II									
Sno.	Course Code	Course Name	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	DPCC201HST	English-II	2	-	-	2	15	35	50
2	DPCC203BST	Engineering Mathematics – II	3	-	-	3	30	70	100
3	DPCC201BST	Engineering Physics-II	3	-	-	3	30	70	100
4	DPCC201BSP	Engineering Physics Lab-II	-	1	2	2	25	25	50
5	DPCC202BST	Engineering Chemistry & Environmental Science	3	-	-	3	30	70	100
6	DPCC202BSP	Engineering Chemistry & Environmental Science Lab	-	1	2	2	25	25	50
7	DPEL201PCT	Basic Electronics	3	-	-	3	30	70	100
8	DPEL201PCP	Basic Electronics Lab	-	1	2	2	25	25	50
9	DPCS201PCT	Programming in C	3	-	-	3	30	70	100
10	DPCS201PCP	Programming in C Lab	-	1	2	2	25	25	50
11	DPCE201ESP	Engineering Graphics Lab-II	1	-	2	2	25	25	50
Total Credits (Semester II)			35			27	290	510	800

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Semester III									
Sno.	Course Code	Course Name	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	DPCC301BST	Engineering Mathematics – III	3	-	-	3	30	70	100
2	DPEL301PCT	Analog Electronics	3	-	-	3	30	70	100
3	DPEL301PCP	Analog Electronics lab	-	1	2	2	25	25	50
4	DPEL302PCT	Digital Electronics	3	-	-	3	30	70	100
5	DPEL302PCP	Digital Electronics Lab	-	1	2	2	25	25	50
6	DPEL303PCT	Communication Systems I	3	-	-	3	30	70	100
7	DPEL303PCP	Communication Systems I Lab	-	1	2	2	25	25	50
8	DPEL3034PCT	Network Theory	3	-	-	3	30	70	100
9	DPEL304PCP	Network Theory lab	-	1	2	2	25	25	50
10	DPCE301SEP	Basic Communication & Presentation Skills Lab	-	1	2	2	25	25	50
Total Credits (Semester III)			30			25	275	475	750

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Semester IV									
Sno.	Course Code	Course Name	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	DPEL401PCT	Linear Integrated Circuits	3	-	-	3	30	70	100
2	DPEL401PCP	Linear Integrated Circuits Lab	-	1	2	2	25	25	50
3	DPEL402PCT	Communication Systems II	3	-	-	3	30	70	100
4	DPEL402PCP	Communication Systems II Lab	-	1	2	2	25	25	50
5	DPEL403PCT	Microprocessor	3	-	-	3	30	70	100
6	DPEL403PCP	Microprocessor Lab	-	1	2	2	25	25	50
7	DPEL404PCT	Industrial Electronics	3	-	-	3	30	70	100
8	DPEL404PCP	Industrial Electronics Lab	-	1	2	2	25	25	50
9	DPEL405PCT	Electronic Measuring Instruments	3	-	-	3	30	70	100
10	DPCC401SEP	Communication and Interactive Skills Lab	-	1	2	2	25	25	50
Total Credits (Semester IV)			30			25	275	475	750

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Semester V									
Sno.	Course Code	Course Name	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	DPCC501PET	Industrial Management and Entrepreneurship	3	-	-	3	30	70	100
2	DPEL501PCT	Microcontrollers	3	-	-	3	30	70	100
3	DPEL501PCP	Microcontrollers lab	-	1	2	2	25	25	50
4	DPEL502PCT	Advanced Communication System	3	-	-	3	30	70	100
5	DPEL502PCP	HDL Lab	-	1	2	2	25	25	50
6	DPIT501SET	Internet of Things	3	-	-	3	30	70	100
7	DPIT501SEP	Internet of Things Lab	-	1	2	2	25	25	50
8	DPIT502PCP	Hardware Devices and Networking Lab	-	1	2	2	25	25	50
9	DPCC501SEP	Employability Skills lab	-	1	2	2	25	25	50
	Electives								
10	DPEL501PET	1. Data Communication and Computer Networks	3	-	-	3	30	70	100
	DPEL502PET	2 VLSI Technology							
	DPEL503PET	3. Biomedical instrumentation							
Total Credits (Semester V)			30		25	275	475	750	

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Semester VI								
Sno.	Course Code	Course Name Subject	L	T	P	Credits	Assessments Marks	
1	DPEL601PCP	Industrial Training	-	-	-	11	First Assessment	250
							Second Assessment	250
							Final Assessment	100
Total Credits (Semester VI)						11	600	

*** 6 Hours of Training load per Teacher –Trainee batch per week**

Total Credits : 140

Total Marks: 4450

Course Code	Course Title	Semester
DPCC101HST	ENGLISH-I	1

Scheme of Instruction

Total Duration : 30 Hrs

Periods / Week: 2-L/T

Credits: 2

Instruction Mode: Lecture + Tutorial

Course Objectives:**The course enables the students to:**

- Understand the need to learn English
- Listen for general comprehension
- Read and comprehend English
- Learn various grammatical structures
- Learn to excel in various forms of written communication

Course Outcomes:**At the end of the course the students are able to:**

- Use classroom expressions meaningfully
- Listen and understand general specific information
- Identify main ideas, specific ideas by reading.
- Use basic sentence structures in spoken and written forms
- Generate ideas for writing a paragraph

Scheme of Examination

Maximum Score : 50

Internal Evaluation : 15

End/ External Evaluation : 35

Exam Duration : 2 Hours

Unit	Course Content	Instruction Hours
I	Listening & Speaking : Need for English, Expressing Feelings, Making requests, Expressing Obligations.	10
II	Reading: Adventures of Toto, Tiller turns Engineer- An Innovation.	10
III	Grammar and Writing: Describing words, Tenses, Basic Sentence Structures, Voice, Questioning, Paragraph writing, letter writing.	10
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal weightage of marks.		
Text Books and References:		
1	Essential English Grammar (Intermediate level)- Raymond Murphy	
2	Learn English (A Fun Book of Functional Language, Grammar and Vocabulary)- Santanu Sinha Chaudhuri	
3	Grammar builder (Entire Series)- Oxford University Press	
4	Word Power made Easy- Norman Lewis	

Course Code	Course Title	Semester
DPC103BST	ENGINEERING MATHEMATICS-I	1

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3 L

Credits: 3

Instruction Mode: Theory

Course Objectives:

- To introduce the concept of sequences and series.
- To introduce matrices and illustrate application of matrices for solving linear equations.
- To introduce the basic concepts of trigonometry and trigonometric ratios

Course Outcomes:

the course, the student will be able to

- Solve simple problems on sequences and series.
- Solve the linear simultaneous equations in three variables using matrix methods.
- Solve problems from trigonometric ratios and appreciate applications of trigonometry.

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation:70

Exam Duration : 3 Hours

Unit	Course Content	Instruction Hours
I	<p>SEQUENCE AND SERIES :- Arithmetic Mean, Arithmetic Progression (A.P.), Geometric Progression (G.P), Hyperbolic Progression (H.P), Sum of infinite G.P. Recurring decimals as infinite G.P problems on A.P., G.P. and H.P.</p> <p>PARTIAL FRACTION: Introduction Rational Fraction and Some Fundamental Rules To Resolve a Proper Fraction $f(x)/g(x)$ into Partial Fraction.</p> <p>BINOMIAL THEOREM: - Binomial Theorem Statement (without proof) Properties of Binomial Theorem and its Applications.</p> <p>FUNCTIONS AND RELATIONS –: Types of Functions, Inverse Functions, Domain, Range, and Inverse of real valued function.</p>	15
II	<p>MATRICES Types of Matrices, Additions & Subtraction of matrices, Multiplication of matrices, example and problem. Rank of a matrix, Determinant and Adjoint of a matrix, Inverse of a matrix and related problems. Linear equation of a 3 variables, solution by Cramer's rule.</p>	15

III	TRIGONOMETRY Trigonometrical ratios of the sum and difference of two angles. Trigonometrical ratios of multiple and submultiples. Trigonometrical equations. Transformation of products and sums.	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal weightage of marks.		
Text Books and References:		
1	Text book of Engineering Mathematics-I by G.Srinagesh, and others –FALCON Publishers	
2	Text book of Engineering Mathematics –I by Radiant Publishers	
3	Text book of intermediate Mathematics – I & II by Telugu Academy.	
4	Text book of Engineering Mathematics-I by Dr.J.Sairam and others – UNITECH SERIES.	

Course Code	Course Title	Semester
DPCC101BST	ENGINEERING PHYSICS-I	1

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3 L

Credits: 3

Instruction Mode: Theory

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation:70

Exam Duration : 3 Hours

Course Objectives:

The objective of the course is to develop basic understanding of the concepts of physics among students, which are fundamental to many advance courses which students will learn as part of their technical training.

Course Outcomes:

- Understand the importance of Units, Dimensions and Vectors
 - Acquire Basic ideas of Kinematics and Dynamics.
 - Understand the elastic property and the types of modules of elasticity.
 - Explain the surface tension of liquids and viscosity of fluids.
- Gain knowledge about heat and thermodynamics

Unit	Course Content	Instruction Hours
I	<p>Units and Dimensions Physics – scope and nature– physics in relation to technology, Define the terms (a) Physical quantity (b) Fundamental physical quantity (c) Derived physical quantities with examples, Define units, Fundamental units, Derived Unites. State S.I. Units of various physical quantities with symbols, Rules for writing SI units. Dimensions of physical quantity, dimensional formulae and Dimensional Equations, Statement of principle of Homogeneity of Dimensions, State the applications of Dimensional Analysis, problems solving.</p> <p>Elements of vectors Explain the concept of vectors Define scalar and vector quantities with examples, Representation of vectors, classification of vectors,(Unit vectors, Null Vectors, Equal Vectors, Negative vectors, Like vectors, Position vectors) Determine the resolution of vectors by component method ,State triangle law of addition of vectors, State parallelogram law of addition of vectors, Derive an expression for magnitude and direction of resultant of two vectors using parallelogram law, State and explain polygon law of addition of vectors, Define dot product and cross product of two vectors with examples and mention their properties and the related numerical problems solving.</p>	15
II	<p>Kinematics Introduction, Write the equation of motion in a straight line, Explain the</p>	15

	<p>acceleration due to gravity on the surface of the Earth, Derive expressions for vertical motion, (a) Maximum Height (b) Time of Ascent (c) Time of Descent (d) Time of flight, Derive an expression for height of a tower when a body projected vertically upwards from the top of a tower, Explain projectile motion with examples, Explain horizontal projection and Derive expression for the path of a projectile for horizontal projection, Explain oblique projection, derive an expression for the path of an oblique projectile,</p> <p>Dynamics Define the terms work, power, energy and State their SI units, Define potential Energy and Kinetic Energy give examples and derive their expression. State and explain the law of conservation of Energy, verify in the case of freely falling body. Define simple harmonic motion and give examples, State the conditions of S.H.M, Define simple pendulum and second's pendulum, derive an expression for time period of simple pendulum.</p> <p>Properties of matter: Define Surface Tension and states examples, Define Angle of contact Define Capillarity and states examples, Experimental determination of surface tension based on capillarity tube method. Explain the concept of viscosity and state the Examples. Problem solving</p>	
III	<p>Heat: Introduction, Introduction to a Thermal expansion of solid (Linear, areal, cubical expansions and their coefficients definition and formula), Explain three modes of transmission of heat, Conduction, Convection and Radiation, Explain absolute scale of temperature. Write relation between Celsius, Fahrenheit and Kelvin scales, State Boyle's law and Charles laws, Derive ideal gas equation and Define gas constant and Universal gas constant, Calculate external work done by a gas, Explain Isothermal process and Adiabatic process, Problem solving</p> <p>Thermodynamics: Introduction, Heat and Temperature, Internal Energy, State laws of thermodynamics, Define specific heats, molar specific heats of a gas, Work done by ideal gas during expansion and derive relation $C_p - C_v = R$ & Problem solving</p>	15
Examination and Evaluation Pattern:		
As per the CBCS Rules and Regulations of Examination Branch of MANUU.		
Each Unit will carry equal weightage of marks.		
Text Books and References:		
1	Concepts of Physics by HC VERMA, Surya Publication. Ghaziabad, India	
2	Physics – Resnick and Halliday – Wisley Toppan publishers – England	
3	Physics – Intermediate –I– Telugu Academy, Telangana, India	
4	Intermediate physics – Volume I & II Engineering Physics by SB SING	

Course Code	Course Title	Semester
DPCC101BSP	ENGINEERING PHYSICS LAB-I	1

Scheme of Instruction

Total Duration : 45Hrs

Periods / Week: 1+2-T+P

Credits: 2

Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50

Internal Evaluation : 25

End/ External Evaluation : 25

Exam Duration : 3 Hours

Course Objectives:

On completion of the practical of the subject the student should be able to develop the following skills:

- Handling the apparatus with precautions
- Develop skill of observing and taking reading
- Improve analytical skills by calculation.
- Improve his systematic approach and research attitude .

Course Outcomes:

- Provide familiarity with apparatus and enable them to handle the instruments and apparatus with purpose.
- Demonstrate the principles covered in your study material in physics.
- Learn how to do science experiments.
- Develop an attitude of perfection in practical tasks.

Cycle	Course Content	Instruction Hours
I	<ol style="list-style-type: none"> 1. Determine the volume of sphere, using Vernier calipers 2. Determine the volume of, cylinder using Vernier calipers 3. Determine the radius of wire using Screw gauge 4. Determine the thickness of glass plate using Screw gauge 5. Verify Parallelogram law of forces 6. Verify Triangle law of forces 	22
II	<ol style="list-style-type: none"> 1. Determine the acceleration due to gravity at place using Simple pendulum 2. Draw the graph of length of pendulum against square of the time period. Use the graph to find the length of the second's pendulum. 3. Verify Boyle's law using Quill tube 4. Determine the Surface tension of water by capillary rise method 5. Determine the Viscosity of water using aspirator bottle. 	23

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.

Each Unit will carry equal weightage of marks.

Text Books and References:

1	Concepts of Physics by HC VERMA, Surya Publication. Ghaziabad, India
2	Physics – Resnick and Halliday – Wisley Toppan publishers – England
3	Physics – Intermediate –I– Telugu Academy, Telangana, India
4	Intermediate physics – Volume I & II Engineering Physics by SB SING
5.	MANUU Laboratory Manual in Engineering Physics

Course Code	Course Title	Semester
DPCC102BST	ENGINEERING CHEMISTRY	I

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3 L

Credits: 3

Instruction Mode: Theory

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation:70

Exam Duration : 3 Hours

Course Objectives:

The objective of this course is to make the students understand and master basic concepts in Chemistry. The syllabus provides logical sequencing of the 'Units' of the subject matter with proper placement of concepts for better understanding with ultimate goal of providing firm foundation for further learning of Chemistry at tertiary level more effectively. We expect that at the end of Semester-I the student will

- Understand the importance of basic chemistry and its applications in daily life.
- Acquire Basic ideas of Atomic structure, Modern Periodic Table and Chemical bonding.
- Understand the organic chemistry and its applications in Engineering.
- Explain Solutions, Acid and Bases.
- Gain knowledge about Electrochemistry, Corrosion, metallurgy and its applications.

Course Outcomes:

- The student should be able to describe several fundamental concepts of chemistry and its applications in various aspects of life.
- The student should be able to understand and apply various theories of Acid and Bases in different chemical reactions.
- The student should be able to prepare for further learning of chemistry at tertiary level and prepare for competitive examinations like ECET etc.

Unit	Course Content	Instruction Hours
I	<p>SOME BASIC CONCEPTS OF CHEMISTRY:</p> <p>A- General Introduction: Importance and Scope of Chemistry.</p> <p>B- Atomic structure;-Fundamental particles of an atom-Bohr's atomic theory and its limitations-Quantum numbers.</p> <p>C- Principles of Electronic configuration;-1.Aufbau's principle, Hand's rule and Pauli's exclusion principle with examples. Electronic configuration of elements (1 to 30).Orbital and the shapes of s, p and d Orbitals.</p> <p>D- Modern Periodic Table and Periodic Law.</p>	15

	<p>E- Chemical bonding:- Ionic, Covalent, Coordinate covalent bond with examples.</p> <p>F- Organic Chemistry- General Introduction and Classification of Organic Compounds.</p> <p>G- Hydrocarbons: Classification of Hydrocarbons, Homologues series. a) Alkanes – Ethane b) Alkenes – Ethene c) Alkynes – Ethyne and Benzene.</p> <p>H- Types of Functional groups with examples.- Isomerism; Structural Isomers.</p> <p>I- Types of Organic reactions: a) Addition Reactions b) Substitution Reactions.</p>	
II	<p>SOLUTIONS AND ACIDS AND BASES</p> <p>A- Solutions-</p> <ol style="list-style-type: none"> 1. General Introduction of solutions: Classification of Solutions-Aqueous and non- aqueous solution. <p>B- Concentration terms Molarity, Normality and problems. Parts per million, Components of solution, Types of solution on the basis of physical state of solute and solvent. Boiling point, Melting point and Freezing point.</p> <p>C- Acid and Bases:</p> <ol style="list-style-type: none"> 1. General Introduction of Acids and Bases 2. Theories of acids and bases and limitations. 3. Arrhenius concept , Bronsted-Lowry concept & Lewis Theory. 4. Ionic product of water (K_w). pH and related numerical problems. 5. Buffer solutions. 	15
III	<p>ELECTROCHEMISTRY AND CORROSION</p> <p>A- ELECTROCHEMISTRY</p> <ol style="list-style-type: none"> 1. Introduction of Electrochemistry. 2. Conductors and insulators, Electrolytes and non-electrolytes. 3. Arrhenius theory of electrolytic dissociation. 4. Electrolytic cells &Electrolysis: Electrolysis of fused NaCl Industrial Electrolytic process-Chloralkali process (aqueous NaCl). 5. Faraday's laws of electrolysis and numerical problems. 6. Construction of Galvanic cell, standard electrode potential, electrochemical series. emf of the cell & numerical problems. 7. Electrochemical energy storage: Batteries-Primary and 	15

	<p>Secondary batteries, lead acid storage battery Fuel cells: Definition, Hydrogen-oxygen fuel cell.</p> <p>B- Corrosion:</p> <ol style="list-style-type: none"> 1. General Introduction of Corrosion: Definition, Factors affecting corrosion. 2. Electrochemical theory of corrosion. 3. Types of cells-stress cells, concentration cells and composition cells. 4. Electrochemical corrosion of iron & mechanism of rusting of iron. 5. Control of corrosion: Cathodic protection-sacrificial anode & impressed current (voltage) method, coating methods. 	
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal weightage of marks.</p>		
<p>Text Books and References:</p>		
1	<p>Intermediate chemistry Vol 1&2 Telugu Acedemy</p>	
2	<p>Intermediate Chemistry NCERT for Class XI and XII.</p>	
3	<p>Organic Chemistry R. T. Morrison and R. N. Boyd</p>	
4	<p>Engineering Chemistry Jain & Jain</p>	
5	<p>Engineering Chemistry O.P. Agarwal, Hi-Tech.</p>	
6	<p>Engineering Chemistry Sharma</p>	

Course Code	Course Title	Semester
DPCC102BSP	Engineering Chemistry Lab	1

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 1+2-T+P

Credits: 2

Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50

Internal Evaluation : 25

End/ External Evaluation : 25

Exam Duration : 3 Hours

Course Objectives:

The objective of this course is to provide intensive practical training to the students in basic chemistry lab and make them understand and master practical skills in the chemistry laboratory, such as handling chemicals, glassware, instrumentation, setting chemistry experiments and important safety rules for carrying out experiments in the chemistry laboratory. We expect that at the end of Semester-I the student will

- Acquire the training for volumetric measurements (using pipettes, measuring jars, volumetric flask and burettes) and making dilutions, etc.
- Practice making standard solutions with pre weighted salts and to make desired dilutions using appropriate techniques.
- Conduct titrations adopting standard procedures and using standard solution for estimation of given Acids or Bases.

Course Outcomes:

- The student should be able to carry out volumetric analysis for the preparation and analyses of given chemical samples and keep a complete and accurate record of experimental methods and data.
- The student should be able to do qualitative and quantitative analysis of lab samples for the determine concentration, molarities and saturation of given sample.

Cycle	Course Content	Instruction Hours
I	1. Preparation of standard sodium carbonate solution. Neutralization reactions: 2. Estimation of hydrochloric acid using standard sodium carbonate solution. 3. Estimation of sulphuric acid using standard sodium carbonate	23

	<p>solution.</p> <p>4. Estimation of hydrochloric acid using standard sodium hydroxide solution.</p> <p>5. Estimation of sulphuric acid using standard sodium hydroxide solution.</p>	
II	<p>Redox reactions:</p> <p>1. Estimation of Mohr's salt solution using standard potassium permanganate solution.</p> <p>2. Estimation of oxalate solution using standard potassium permanganate solution.</p> <p>Demonstration experiments:</p> <p>3. Determination of melting point of some solids (Urea, Salicylic acid).</p> <p>4. Determination of boiling point of some solvents (Acetone, Amyl alcohol, Benzene).</p> <p>5. Experiment to show that both air and water required for rusting of iron.</p> <p>6. Electrolysis of aq. NaCl solution.</p> <p>7. Reverse Osmosis.</p>	22
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal weightage of marks.</p>		
<p>Text Books and References:</p>		
1	Intermediate chemistry Vol 1&2 Telugu Acedemy	
2	Intermediate Chemistry NCERT for Class XI and XII.	
3	Organic Chemistry R. T. Morrison and R. N. Boyd	
4	Engineering Chemistry Jain & Jain	
5	Engineering Chemistry O.P. Agarwal, Hi-Tech.	
6	Engineering Chemistry Sharma	

Course Code	Course Title	Semester
DPEL101EST	BASIC ELECTRICAL ENGINEERING	1

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3 L

Credits: 3

Instruction Mode: Theory

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- To impart the basic knowledge on fundamentals of electrical system, components and circuits
- To explain the working principle, construction, applications of DC machines and motors.
- To impart the basic knowledge about the Electric and Magnetic circuits.
- To understand the Constructional details of Transformer.

Course Outcomes:

- Ability to understand different electrical components and circuits.
- Ability to understand the Constructional details, principle of operation, Performance, of DC Machines.
- Ability to understand Constructional details, principle of operation of Transformers.

Unit	Course Content	Instruction Hours
I	Introduction to Electrical Circuits: An Electrical system, Voltage, Current, Power & Energy, Components: Active & Passive, Ohms Law, Kirchhoff's laws, Series circuits, Parallel Circuits(Using Resistors only), Faradays Law of Electromagnetic Induction, Lenz's law.	15
II	Different types of switches, Connectors, Relays and DC Generators: Different types of switches and connectors used in circuits, their specifications, constructional details and ratings, Fuses, Types of relays- Relay contacts, constructional features of relays. D.C. GENERATOR: Basic principles, brief description of different parts and working, different types, E.M.F equation.	15

III	<p>DC MOTORS & TRANSFORMERS</p> <p>D.C. MOTORS: Basic principles of motor, significance of back E.M.F, Voltage Equation of motor, Types of motor. TRANSFORMERS: WORKING principle of transformer, Construction, EMF equation, losses in transformer and efficiency</p>	15
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal weightage of marks.</p>		
<p>Text Books and References:</p>		
1	S. K. Bhattacharya “Electrical Machines”– Tata McGraw Hill Publications	
2	M. V. Deshpande Electrical machines “– Wheeler Publication.	
3	J. B. Gupta Theory and Performance of Electrical Machine “	
4	K. Mungnesh Kumar D. C. Machines and Transformers “– Vikas Publication	
5	B. L. Thereja A Text Book of Electrical Technology” – S. Chand publication	
6	P.C.Bs by Boshart TMH	

Course Code	Course Title	Semester
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DPEL101ESP**Basic Electrical Engineering Lab**

1

Scheme of Instruction

Total Duration :45 Hrs

Periods / Week: 1+2-T+P

Credits: 2

Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50

Internal Evaluation : 25

End/ External Evaluation : 25

Exam Duration : 3 Hours

Course Objective:

- To impart the students with the basic knowledge on Electrical Components, wirings and circuit measurements.
- To expose the students to the operation of D.C. machines and transformers and give them experimental skill.

Course Outcome:

Ability to model and analyze electrical apparatus and their application to power system

Cycle	Course Content	Instruction Hours
I	1. Residential House Wiring Using switches, Fuse, Indicator, Lamp and Energy Meter 2. Measurements of Electrical Quantities – Voltage, Current, Power 3. Measurement of Energy Using Single Phase / Three Phase energy Meter 4. Load Characteristics of Shunt Generator 5. Performance Characteristics of a Compound motor	22
II	1. Performance Characteristics of a Shunt motor 2. Performance Characteristics of a Series motor 3. Speed Control of DC motor 4. OC and SC test on Single phase Transformer 5. Load test on Single phase Transformer	23

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.

Each Unit will carry equal weightage of marks.**Text Books and References:**

1	S. K. Bhattacharya “Electrical Machines”– Tata McGraw Hill Publications
2	M. V. Deshpande Electrical machines “– Wheeler Publication.
3	J. B. Gupta Theory and Performance of Electrical Machine “
4	K. Mungnesh Kumar D. C. Machines and Transformers “– Vikas Publication
5	B. L. Thereja A Text Book of Electrical Technology” – S. Chand publication

Course Code	Course Title	Semester
DPCS101PCT	Computer Fundamentals	1

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 3 L
 Credits: 3
 Instruction Mode: Theory

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- Understand the fundamentals of Computer
- Demonstrate the features of Windows Operating System
- Discuss the features of various Computer Network and Internet.
- Understand Programming Methodology through Algorithms and Flow Charts.

Course Outcomes:

- Students will understand the usage of computers and various operating systems.
- Students will be able to understand and create Word, Excel and Power point files
- Students will be able to write an algorithm and construct flowcharts.
- Students will be able to compare algorithm and flow chart.

Unit	Course Content	Instruction Hours
I	Introduction to Computers: Definition, Different types of computers, Need of computer, Applications of computers in various fields. Organization of a Digital Computer: Block diagram of a digital computer, functional parameters of CPU. Concept of a byte and word. Functional blocks of a CPU: ALU, Control Unit and Memory Unit, various types of memory: RAM ROM, Hard disk and Purpose of cache memory. Basics of GPU: Definition and Block Diagram Number Systems: Binary Number system, Decimal, Binary, hexadecimal and octal codes, Conversion from one number system to another number system,	15
II	Basics of Operating Systems & Internet Define Operating system; describe the need for an operating system. List and discuss the various operating systems used presently. DOS Prompt,	15

	Types of commands, Internal & External Commands. Fundamentals of Internet Basics of a computer network, describe the concept of local area network, wide area network, and metropolitan area network. Compare Internet & Intranet, Basics of E-mail, the purpose of Web browsers; describe the purpose of World Wide Web, FTP, telnet and E-mail, Structure of Universal Resource Locator, describe DNS, functions of an Internet service provider, role of a modem in accessing the Internet, Describe address format and IP address, MAC address, describe DNS and search engines. Know about Social Network sites. Understand Internet Security.	
III	Concept of Programming methodology Steps involved in solving a problem- Concept of Structured program – Flow chart-Algorithm. State the different steps involved in problem solving. State the steps involved in algorithm development. Differentiate algorithm and flowchart. Develop algorithms for simple problems. Draw the symbols used in flowcharts. Draw flowcharts for simple problems. Discuss various programming paradigms.	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal weightage of marks.		
Text Books and References:		
1	Information Technology -Curtin	
2	Computer Science Theory and Application- E. Balaguru Swamy, B. Sushila	
3	Introduction to Programming with Raptor by Dr Wayne Brown	

Course Code	Course Title	Semester
DPCS101PCP	Computer Fundamentals Lab	1

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 1+2-T+P

Credits: 2

Instruction Mode: Tutorial + Practical

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- Understand the fundamentals of Computer
- Features of Windows Operating System
- Installation of Hardware and Software.
- Understand Microsoft Packages.

Course Outcomes:

- Students will understand the usage of computers and windows operating systems.
- It gives an opportunity to students to continue their zeal in research in computer field.

Scheme of Examination

Maximum Score : 50

Internal Evaluation : 25

End/ External Evaluation : 25

Exam Duration : 3 Hours

Unit	Course Content	Instruction Hours
I	<p>DOS: Practice on Internal and External commands, Create and use Batch Files; know the usage of WYSIWY Editor.</p> <p>Windows: Start the windows Operating system, Start a program using the program option of the start menu, Open multiple windows and switch between windows, know how to locate a file using the search option of the Start menu, Open notepad, paint and WordPad programs, Practice locating Files stored on the hard disk drive, Know the various options in “My Computer “icon.</p> <p>Install and Uninstall the software and hardware: Install Windows Operating System, Install and Uninstall software using control panel, Install and Uninstall a new hardware using control panel, Install a modem using control panel, Install a printer using control panel, Usage of system tools, Find out drive space, Carryout Disk Defragmentation, Change resolution, Colour, appearance, screen server options of Display.</p>	22

II	<p>MS Word: Create a formatted word document using MS-Word, Print the Word document using page setup and Print facilities, Create mailing letters for a given information using MS-Word,</p> <p>MS Excel: Create a soft copy of the any statistical data using MS-Excel, Generate Appropriate Chart for the statistical data using MS-Excel, Generate the soft copy of a worksheet using formula facility of MS-Excel, Create a soft copy of a simple database using Excel. Run sort and filter facilities for the database, Understand Excel Marcos, Draw different chats.</p> <p>MS Power Point: Create a power point presentation for a simple technical topic using MS-PowerPoint.</p> <p>CD/ DVD Writing: Create a backup CD for a data using NERO or similar CD writing software, Create an user account on the Internet and e-mail and sending a document to from a given e-mail address.</p> <p>Basics of Internet: Create an Email Id, Send and receive Emails, send an attachment in e-Mail, Using different search engines for finding required sites to collect information on engineering related topics including down loading the contents.</p> <p>Draw Flow Charts using Raptor Software.</p>	23
Examination and Evaluation Pattern:		
As per the CBCS Rules and Regulations of Examination Branch of MANUU.		
Each Unit will carry equal weightage of marks.		
Text Books and References:		
1	Information Technology -Curtin	
2	Computer Science Theory and Application- E. Balaguru Swamy, B. Sushila	
3	Introduction to Programming with Raptor by Dr Wayne Brown	

Course Code DPCE101ESP	Course Title ENGINEERING GRAPHICS LAB- I	Semester 1
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Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 1+2-T+P
 Credits:2
 Instruction Mode: Lecture + Practical

Scheme of Examination

Maximum Score : 50
 Internal Evaluation : 25
 End/ External Evaluation : 25
 Exam Duration : 3 Hours

Course Objectives:

- Free hand sketching to aid in the visualization process and to effectively communicates ideas graphically.
- Learn to sketch and take field dimensions and transform it into graphic drawings
- Learn basic engineering drawing formats
- Prepare the student for future Engineering positions

Course Outcomes :

At the end of the course, the students will be able to

1. Perform basic sketching techniques
2. Produce engineered drawings
3. Convert sketches to engineered drawings
4. Illustrate simple clear and illustrative drawings as per existing standards/conventions.

Cycle	Course Content	Instruction Hours
I	1. Importance of Engineering Drawing, Scope and objectives.	30
	2. Engineering Drawing Instruments introduction and its using methods.	
	3. Basic concept of bordering and title box for different type of sheets.	
	4. Freehand lettering.	
	5. Freehand Numbering	
	6. Dimension practice	
II	1. Division of a line	30
	2. Construction of tangent lines and arcs.	

	3. Construction of polygon	
	4. Different types of Conical Curves.	
	5. Different types of special curves	
	6. Exercise.	
Examination and Evaluation Pattern:		
As per the CBCS Rules and Regulations of Examination Branch of MANUU.		
Each Unit will carry equal weightage of marks.		
Text Books and References:		
1	First Year Engineering Drawing – B.R. Gupta.	
2	Engineering Drawing by N.D.Bhatt.	
3	“A First Year Engineering Drawing” A.C. Parkinson (Metric Edition).	
4	T.S.M. & S.S.M on “Technical Drawing” prepared by T.T.T.I., Madras.	
5	SP-46-1998 – Bureau of Indian Standards.	
6	Introduction to Engineering Drawing R.C.Mouli , V.Rama Rao, M. Venkateswarlu	

Course Code	Course Title	Semester
DPCC201HST	ENGLISH-II	2

Scheme of Instruction

Total Duration : 30 Hrs
 Periods / Week: 2-L
 Credits: 2
 Instruction Mode: Lecture

Scheme of Examination

Maximum Score : 50
 Internal Evaluation : 15
 End/ External Evaluation : 35
 Exam Duration : 2 Hours

Course Objectives

The course enables the students to:

- Understand the need to learn English
- Listen for general comprehension
- Read and comprehend English
- Learn various grammatical structures
- Learn to excel in various forms of written communication

Course Outcomes

At the end of the course the students are able to:

- Use classroom expressions meaningfully
- Listen and understand general specific information
- Identify main ideas, specific ideas by reading.
- Use basic sentence structures in spoken and written forms
- Generate ideas for writing a paragraph

Unit	Course Content	Instruction Hours
I	Listening & Speaking Fixing and cancelling appointments, Extending and accepting invitations, Giving Instructions, Asking for and giving directions	10
II	Reading An Environmental challenge, Waiting for Mr Clean	10
III	Grammar and Writing The Here and Now!, Basic Sentence Structures, Voice, Reported speech, Error analysis, Data Interpretation, Writing a covering letter & Resume	10

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.

Each Unit will carry equal weightage of marks.

Text Books and References:

1	Essential English Grammar (Intermediate level) - Raymond Murphy
2	Learn English (A Fun Book of Functional Language, Grammar and Vocabulary) -Santanu Sinha Chaudhuri
3	Grammar builder (Entire Series) - Oxford University Press
4	Word Power made Easy - Norman Lewis

Course Code	Course Title	Semester
DPCC203BST	Engineering Mathematics-II	2

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 3-L
 Credits: 3
 Instruction Mode: Theory

Scheme of Examination

Maximum Score : 100
 Internal Evaluation : 30
 End/ External Evaluation : 70
 Exam Duration : 3 Hours

Course Objectives:

- To introduce the concept of differentiation and its applications
- To introduce the concept of integration and its rules
- To evaluate the integrals of rational algebraic functions
- To introduce the concept of linear differential equations and their solution

Course Outcomes:

At the end of the course, the students will be able to

- Solve problems on derivative of various functions.
- Apply different rules and methods of integration while solving problems.
- Evaluate the integrals of rational algebraic functions and area problems.
- Find the solution of linear differential equations.

Unit	Course Content	Instruction Hours
I	DIFFERENTIAL CALCULUS AND ITS APPLICATIONS Basic Concept of theory of limit in order to clarify the concept of continuity which would lay the foundation for study of differentially and differentiation of a function. First principle of Differentiation, Fundamental Rule for Differentiations, which allows us to find the Derivatives of a function directly without using definitions, Chain Rule.	15
II	INTEGRAL CALCULUS, INTEGRATIONS Indefinite Integral (Inverse process of Differentiations) Fundamental Integrations, Formulas and Standard Rules of integration, Method of integration, Integrations by Substitute method, Integration by Parts.	15
III	DIFFERENTIAL EQUATIONS Definitions of differential equations, Order and Degree of Differential Equations and Related problems, Solution of differential equations, Differential equations of first degree and first order and its problems, Variables Separable Forms. Homogeneous differential equations, Reducible to homogeneous form, Linear differential equations and equations of reducible to linear form and related problems. Particular integrals for the functions $\sin ax$, $\cos ax$. Exact Differential Equations and Equations of Reducible to Exact Form and Problems. BASICS OF PARTIAL DERIVATIVES - First Order and second order partial derivatives.	15

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.

Each Unit will carry equal weightage of marks.

Text Books and References:

1	Text book of Engineering Mathematics –I &II by G.Srinagesh, and others –FALCON Publishers
2	Text book of intermediate Mathematics I & II by Telugu Academy.
3	Differential Calculus by Manicavachagom Pillai.
4	Differential Calculus and Integral Calculus by N.P. BALI
5	Integral Calculus by S.Chand.
6	Text book of Engineering Mathematics – I&II by Radiant

Course Code	Course Title	Semester
DPCC201BST	Engineering Physics-II	2

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3-L

Credits: 3

Instruction Mode: Theory

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation : 70

Exam Duration : 3 Hours

Course Objectives:

The objective of the course is to develop basic understanding of the concepts of physics among students, which are fundamental to many advance courses which students will learn as part of their technical training. We expect that at the end of Semester-II the student will

Course Outcomes:

- Understand the importance of sound and its applications
- Acquire Basic ideas of optics and its related phenomenon.
- Understand the concepts of electricity and magnetism.
- Explain the phenomena of fiber optics, superconductivity and photoelectric effect.

Unit	Course Content	Instruction Hours
I	<p>SOUND Introduction to properties of sound, Distinguish between musical sound and noise, speed of sound in solids, Liquids and Gases, Newton's Formula Laplace's correction for velocity of sound in gasses, Explain the phenomenon of beats, state the applications of beats, Explain Doppler effect, Derive formula for apparent frequency – (i) Source in Motion and observer at rest (ii) Observer in motion and source at rest, Applications of Doppler effect, Absorption of sound waves, Absorption coefficient of a substance, Explain Reverberation and Reverberation time, Write Sabine's formula Explain echoes and also state its applications. Solve the related problems.</p> <p>LIGHT Introduction to properties of light, Reflection, refraction, refractive index, Snell's law, critical angle, total internal reflection, What is optical fibre and explain the working and construction of optical fiber, write its applications. Explain refraction of light from convex lens, problems Solving.</p>	15
II	<p>ELECTRICITY Introduction to Electricity, Electric Field and Potential, Explain Alternating current and Direct Current, Ohm's law and write the formula, Definitions of Resistance, specific resistance, conductance and their units,. Statements of Kirchhoff's laws and explanation, Describe</p>	15

	<p>Wheatstone bridge with legible sketch Derive an expression for balancing condition of Wheatstone bridge, Describe Meter bridge Experiment for determination of specific resistance with neat circuit diagram, problems Solving.</p> <p>MAGNETISM</p> <p>Introduction to magnetism, pole strength, Coulomb's inverse square law of magnetism, Definition of magnetic field, Magnetic moment, magnetic lines of force and write the properties of magnetic lines of force, Magnetic induction field strength-units, Uniform and Non- Uniform Magnetic fields, Moment of couple on a bar magnet placed in a uniform magnetic field, Derivation for Magnetic induction field strength at a point on the axial line and at a point on the equatorial line & problems Solving.</p>	
III	<p>MODERN PHYSICS</p> <p>Introduction to crystals, Explain energy bands in solids, Explain conductors, insulators and Semiconductors based on band theory, Explain intrinsic semiconductors, doping of semiconductor, and extrinsic semiconductors, Explain p-type and n-type semiconductor, Explain p-n junction diode, forward and reverse bias. Application of semiconductors. Explain Photo-electric effect & Einstein's photoelectric equation, State laws of photoelectric effect, Working of photoelectric cell, Applications of photoelectric effect, Definition of super conductor and superconductivity Examples of superconducting materials, Properties of Superconductors Applications of superconductors & problems solving</p>	15
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal weightage of marks.</p>		
<p>Text Books and References:</p>		
1	Concepts of Physics by HC VERMA, Surya Publication. Ghaziabad, India	
2	Physics – Resnick and Halliday – Wisley Toppan publishers – England	
3	Physics – Intermediate –I & II year – Telugu Academy, Telangana, India	
4	Intermediate physics – Volume I & II Engineering Physics by SB SING	
5	P.K Palaniswamy: A text book of Engineering Physics.	
6	C.Kittel(Wiley Eastern): Introduction to Solid State Physics.	

Course Code	Course Title	Semester
DPCC201BSP	Engineering Physics Lab-II	2

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 1+2-T+P

Credits: 2

Instruction Mode: Tutorial + Practical

Course Objectives:

On completion of the practical of the subject the student should be able to develop the following skills:

- Handling the apparatus with precautions
- Develop skill of observing and taking reading
- Improve analytical skills by calculation.
- Improve his systematic approach and research attitude.

Course Outcomes:

- Provide familiarity with apparatus and enable them to handle the instruments and apparatus with purpose.
- Demonstrate the principles covered in your study material in physics.
- Learn how to do science experiments.
- Develop an attitude of perfection in practical tasks.

Scheme of Examination

Maximum Score : 50

Internal Evaluation : 25

End/ External Evaluation : 25

Exam Duration : 3 Hours

Cycle	Course Content	Instruction Hours
I	1. Determine the Velocity of sound in air using resonance column Apparatus at room temperature and at 0° C. 2. Determine the Focal Length and focal power of convex lenses Separately 3. Determined the combined Focal Length and focal power of convex lenses 4. Determine the Refractive index of Solid Using Travelling microscope.	22
II	1. Determine the resistance and specific resistance of the wire using Meter Bridge 2. Verify the resistance of the given wires using Meter Bridge in series and parallel combinations 3. Draw the lines of force of combined magnetic field due to bar magnet in earth's magnetic field by locating the null points when North pole of the bar magnet pointing towards Geographical North of the Earth. 4. Draw the lines of force of combined magnetic field due to bar magnet in earth's magnetic field by locating the null points when North pole of the bar magnet pointing towards Geographical North of the Earth 5. Draw the voltage-current characteristic of P-n diode.	23

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.

Each Unit will carry equal weightage of marks.

Text Books and References:

1	Concepts of Physics by HC VERMA, Surya Publication. Ghaziabad, India
2	Physics – Resnick and Halliday – Wisley Toppan publishers – England
3	Physics – Intermediate –I– Telugu Academy, Telangana, India
4	Intermediate physics – Volume I & II Engineering Physics by SB SING
5.	MANUU Laboratory Manual in Engineering Physics

Course Code	Course Title	Semester
DPCC202BST	Engineering Chemistry & Environmental Science	2

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3-L

Credits: 3

Instruction Mode: Lecture

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation : 70

Exam Duration : 3 Hours

Course Objectives:

The objective of the course is to provide basic information and understating of most important chemical issues of our daily life like fuels for safe and green energy, Polymers and various environmental challenges like Air/Water and Soil pollution. We expect that at the end of Semester-II the student will

- Understand the importance Polymers and its applications in our daily life.
- Acquire Basic ideas of water technology
- Understand the characteristics of good fuels.
- Gain knowledge about environmental chemistry and various factors related.

Course Outcomes:

- The student should be able to describe several fundamental concepts about Polymers, Plastic and its advantages and disadvantages over traditional materials.
- The student should be able to explain the scope and importance of environmental studies and can help solve environmental challenges like, global warming and pollution.
- The student should be able to recognize the essential qualities of drinking water and methods of softening of hard water.

Unit	Course Content	Instruction Hours
I	<p>POLYMERS AND ADVERSE EFFECTS OF COMMONLY USED CHEMICALS</p> <p>a. POLYMERS</p> <p>1. General Introduction and Classification of Polymers.</p> <p>2. Polymerization-Types of polymerization: addition, condensation and copolymerization with examples.</p> <p>3. Plastics: Types of plastics, Advantages of plastics over traditional materials and Disadvantages of using plastics.</p> <p>4. Preparation and uses of the following plastics: 1. Polytehene 2. PVC 3. Teflon 4. Polystyrene 5. Urea formaldehyde 6. Bakelite.</p> <p>5. Natural rubber: processing from latex –Vulcanization of rubber.</p>	15

	<p>6. Elastomers: Butyl rubber, Buna-s, Neoprene rubber and their uses.</p> <p>b. CHEMICALS IN DAILY LIFE</p> <p>1. Chemicals in Medicines: Analgesics, Disinfectants, Antibiotics, Antacids.</p> <p>2. Chemicals in Food: Preservatives, Artificial Sweetening Agents, Elementary idea of Antioxidants.</p> <p>3. Cleansing agents: Soaps and Detergents, Cleansing Action of soap.</p>	
II	<p>METALLURGY AND THE CHEMICAL RESOURCES OF ENERGY</p> <p>a. METALLURGY:</p> <p>1. General Introduction of Metallurgy: Characteristics of metals and distinction between metals and non metals.</p> <p>2. Terms and terminologies-mineral, ore, gangue, flux, slag.</p> <p>3. Types of furnaces: Blast furnace, Reverberatory furnace and Muffle furnace.</p> <p>4. Concentration of ore: Methods of concentration of ore-froth flotation process.</p> <p>5. Methods of extraction of crude metal: Roasting, calcination, smelting.</p> <p>6. Alloys: composition and uses of Brass, German silver and Nichrome.</p> <p>b. FUELS</p> <p>1. General Introduction of fuels</p> <p>2. Definition and classification of fuels. Characteristics of good fuel.</p> <p>3. Composition and uses of gaseous fuels: a) water gas, b) producer gas, c) natural gas, d) coal gas, e) Bio gas and f) acetylene</p>	15
III	<p>ENVIRONMENTAL STUDIES AND WATER TECHNOLOGY</p> <p>a. ENVIRONMENTAL STUDIES</p> <p>1. General introduction to environmental studies.</p> <p>2. Environment, scope and importance of environmental studies</p> <p>3. Important terms and terminology in Environmental Chemistry – renewable and non renewable energy sources.</p> <p>4. Concept of ecosystem, producers, consumers and decomposers</p> <p>5. Biodiversity, definition and threats to Biodiversity.</p> <p>6. Air pollution – Causes and Effects; acid rain; green house effect and global warming; Ozone depletion. Control measures of air pollution</p> <p>7. Water pollution –Causes and effects. Control measures of water pollution.</p> <p>b. WATER TECHNOLOGY</p> <p>1. General Introduction to Water Technology.</p> <p>2. Sources of Water; Soft and Hard Water; Causes of Hardness of water.</p> <p>3. Types of hardness. Disadvantages of Hard Water. Degrees of hardness. Numerical problems related to degree of hardness.</p> <p>4. Softening of Water-Permutit process and ion exchange process.</p> <p>5. Drinking water & its qualities. Municipal treatment of water for drinking purpose. Osmosis, Reverse Osmosi. Advantages of Reverse osmosis and its applications.</p>	15

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.

Each Unit will carry equal weightage of marks.

Text Books and References:

1	Intermediate chemistry Vol 1&2 Telugu Acedemy
2	Intermediate Chemistry NCERT for Class XI and XII.
3	Organic Chemistry R. T. Morrison and R. N. Boyd
4	Engineering Chemistry Jain & Jain
5	Engineering Chemistry O.P. Agarwal, Hi-Tech.

Course Code	Course Title	Semester
DPCC202BSP	Engineering Chemistry & Environmental Science Lab	2

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 1+2-T+P
 Credits: 2
 Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50
 Internal Evaluation : 25
 End/ External Evaluation : 25
 Exam Duration : 3 Hours

Course Objectives:

The objective of the course is to encouraging students to apply those pre-learned practical skills in the chemistry laboratory (Sem-I) to investigate the various environmental issues in real-life situations. We expect that at the end of Semester-II the student will

- Conduct titrations adopting standard procedures to determine the alkalinity/Acidity, total hardness and chloride present in the given samples of water.
- Conduct the test using titrometric / electrometric method to determine Dissolved Oxygen (D.O) in given water samples and conduct the test on given samples of water / solutions to determine their pH using standard pH meter.

Course Outcomes:

- The student should be able to determine the Alkalinity/Acidity, Total hardness and chloride present in the given samples of water.
- The student should be able to determine Dissolved Oxygen (D.O) using chemical methods and determine the pH of given sample using standard pH meter.
- The student should be able to analyze the Air/Water pollution level using various chemical techniques and instruments.

Project

Scientific investigations involving laboratory testing and collecting information from other sources.

Suggested project

- Testing the hardness, presence of iron, fluoride, chloride etc. depending upon the regional variation in drinking water and the study of causes of presences of these ions above permissible limit (if any).

Cycle	Course Content	Instruction Hours
I	<ol style="list-style-type: none"> 1. Determination of Total Hardness of Water Sample. 2. Determination of Acidity of Water Sample. 3. Determination of Alkalinity of Water Sample. 4. Estimation of Chloride present in Water Sample. 5. Estimation of Dissolved Oxygen in Water Sample. 	22
II	<p>Demonstration Experiments:</p> <ol style="list-style-type: none"> 1. Determination of pH of Water using pH meter. 2. Determination of Turbidity of Water Sample. 3. Estimation of Total Solids Present in Water Sample. 4. Determination of Conductivity of Water. 5. Removal of hardness of water by using Chromatographic method. 6. Determination of high volume Air Sample 7. Synthesis of Rubber (a simple polymer). 	23

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.

Each Unit will carry equal weightage of marks.

Text Books and References:

1	Intermediate chemistry Vol 1&2 Telugu Acedemy
2	Intermediate Chemistry NCERT for Class XI and XII.
3	Organic Chemistry R. T. Morrison and R. N. Boyd
4	Engineering Chemistry Jain & Jain
5	Engineering Chemistry O.P. Agarwal, Hi-Tech.
6	Engineering Chemistry Sharma

Course Code	Course Title	Semester
DPEL201PCT	BASIC ELECTRONICS	2

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 3-L
 Credits: 2
 Instruction Mode: Lecture

Scheme of Examination

Maximum Score : 100
 Internal Evaluation : 30
 End/ External Evaluation : 70
 Exam Duration : 3 Hours

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- A fundamental understanding of the use of meters and test equipment used to measure electrical quantities.
- A fundamental understanding of voltage, current resistance and power in dc circuits and network analysis using Ohms Law,
- Study the working principle of PN junction diode and transistor
- Understand the working principle of different types of rectifiers
- Understand the different transistor configurations and Analyze them

Course Outcomes:

- Determine the behavior of simple passive electrical circuits with independent voltage and current sources.
- Understand the working of Transistors, Semiconductor diodes and their applications.

Unit	Course Content	Instruction Hours
I	Fundamentals of electrostatics, resistors and their uses: Definition of charge, electric potential, electric field, voltage, current. Coulombs law Classification of resistors, colour code, Specifications, preferred values of resistors, properties and uses of Carbon and wire wound resistors and their characteristics. Potentiometer, Effect of temperature on resistance. Thermistors, sensistors. Capacitors and Inductors used in electronic circuits and their applications: Classification, specifications of capacitors, colour code, dielectric constant, dielectric strength, properties and applications of paper, mica, ceramic polyester, polystyrene, glass and electrolytic capacitors. Variable capacitors and applications, capacitor connected in series and parallel. Energy stored in capacitors. Self Inductance, mutual inductance, coefficient of coupling. Classification of inductors, specifications, different core materials. Inductors in series and	15

	parallel.	
II	<p>Semiconductor Materials and Devices: Electrical properties, energy level diagrams of conductor, semi conductor and Insulator. Formation of P-Type and N-Type materials and their properties. Drift and diffusion current, formation and behaviour of PN junction diode, Zener diode and its characteristics.</p> <p>Rectifiers: Half wave rectifier, Full wave rectifier, (Bridge & centre tapped) and their characteristics</p> <p>Filters: Types of filters, operation, their characteristics and comparison, limitations & advantages of filters</p>	15
III	<p>Transistor: Formation and properties of PNP and NPN Transistor, Transistor configurations, input and output characteristics. α, β, and γ factors. Comparison of CB, CE, and CC configurations. Transistor as an amplifier, FET, MOSFET.</p>	15

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.

Each Unit will carry equal weightage of marks.

Text Books and References:

- | | |
|----|---|
| 1. | Basic Electronics, Grob Bernard, Fourth Edition, McGraw Hills |
| 2. | Electronic components by Dr.K.Padmanabham. |
| 3. | Electrical Technology Vol 1 &2 by B.L. Theraja |

Course Code	Course Title	Semester
DPEL201PCP	BASIC ELECTRONICS LAB	2

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 1+2-T+P
 Credits: 3
 Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50
 Internal Evaluation : 25
 End/ External Evaluation : 25
 Exam Duration : 3 Hours

Course Objectives:

- To become familiar with fundamental electronic circuits.
- To learn to use common electronic instrumentation.
- To become familiar with soldering and testing.
- To be able to design electronic circuits to perform realistic tasks.

Course Outcomes:

- The ability to apply theoretical knowledge to design and conduct experiments using designed circuits
- The students will have the ability to identify, formulate, and solve problems related to PCB design and generate manufacturing files
- The students will have the ability to identify, formulate, and solve problems associated with assembly and testing of electronic circuits

Unit	Course Content	Instruction Hours
I	Soldering Practice (Assembling and De-assembling of components on PCB) Test and measure the value of capacitor using R.L.C. meter, ohmmeter / multimeter and compare with the marked / colour code value. Measurement of resistance, AC/DC voltages and current using analogue and digital multi meters. Study of AF / RF signal generators and C.R.O. Study of various regulated power supplies.	23
II	Testing of transformer Voltage & resistance measurement. Characteristics of semiconductor diodes (Si, Ge). Characteristics of Zener diode. Characteristics of Bipolar -junction transistor in CE mode (Input & Output). Characteristics of Bipolar -junction transistor in CB mode (Input & Output).	22

Course Code	Course Title	Semester
DPCS201PCT	Programming in C	2

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 3-L
 Credits: 3
 Instruction Mode: Lecture

Scheme of Examination

Maximum Score : 100
 Internal Evaluation : 30
 End/ External Evaluation : 70
 Exam Duration : 3 Hours

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- Understand the Sequential structure, selective structure, repetitive structure.
- Know about Arrays, Strings and Functions
- Basics of Pointer, Structures and Unions.
- Understand the File processing techniques and Pre-processor directives.

Course Outcomes:

- Students will understand the Basics of c programming language.
- Choose the loops and decision statements to solve problems
- Understand pointers, structures and unions
- Implement file operations in c language.
- It gives an opportunity to students to continue their zeal in research in computer field.

Unit	Course Content	Instruction Hours
I	<p>Programming constructs</p> <p>Sequential structure: Various types of data, Arithmetic operators, Assignment statement , Assignment operators , printf, scanf, Type conversion techniques ,Macro define</p> <p>Selective Structure: Relational operators - Logical operators - Logical expressions - Conditional operator – bit wise operators -Conditional statements - Multi way condition statement - Switch statement</p> <p>Repetitive structures: Iterative loops, Nesting, break, continue statements null statement, comma operator.</p>	15
II	<p>Arrays, Strings and Functions</p> <p>Array - Array declaration - Access to array elements - Initialization of Array elements and - Arrays as arguments</p>	15

	<p>String – Declaration of Strings – various String Functions.</p> <p>Function- Return statement – Function prototypes - local and external variables – Automatic and static variables, Recursion.</p>	
III	<p>Pointers</p> <p>Pointer - Address and de-referencing operators - Declaration, Assignment and Initialization of a pointer - Pointer Arithmetic - Pointer comparison, conversion parameter passing by reference – Relation between arrays and pointer – String manipulation using pointer - Pointer arrays - Pointer to function- Dynamic memory management functions.</p> <p>Structures and Unions</p> <p>Structures initialization, access concept - Size of a structure - Pointers to structure – Relationship between structure and function - Structures function arguments and function values - Relation between structure and arrays –Structure containing pointers –self Referential structure – Unions</p> <p>File processing and Pre processor directives- File processing facility - Pre processor directives.</p>	15
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal weightage of marks.</p>		
<p>Text Books and References:</p>		
1	Information Technology - Curtin.	
2	Computer Science Theory and Application - E. Balaguruswamy, B. Sushila	
3	Programming in ANSI C - Balagurusamy - TMH	
4	Programming in C - K.R. Venugopal and H.S. Vimala	
5	Programming With 'C' - Ghosh (PHI)	

Course Code	Course Title	Semester
DPCS201PCP	Programming in C Lab	2

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 1+2-T+P
 Credits: 2
 Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50
 Internal Evaluation : 25
 End/ External Evaluation : 25
 Exam Duration : 3 Hours

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- To make the student to learn a programming language.
- To practice various c programs to solve the problems.
- To introduce the concept of arrays, functions, pointers, structure, unions and files.

Course Outcomes:

On completion of the course, the students will be able to:

- Students will able to write different c programs to solve different problems.

Unit	Course Content	Instruction Hours
I	1. A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence. 2. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user. 3. Write a C program to find the roots of a quadratic equation. 4. Write C programs that use both recursive and non-recursive functions i) To find the factorial of a given integer. ii) To find the GCD (greatest common divisor) of two given integers. 5. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement) 6. Write a C program to find both the largest and smallest number in a list of integers.	22
II	1. Write a C program to find the sum of individual digits of a positive integer.	23

	<ol style="list-style-type: none"> 2. Write a C program that uses functions to perform the following: <ol style="list-style-type: none"> a. Addition of Two Matrices b. Multiplication of Two Matrices 3. Write a C program on Parameter Passing Techniques 4. Write a C program on operations on Pointers. 5. Write a C program to determine if the given string is a palindrome or not 6. Write a C program which copies one file to another. 	
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal weightage of marks.</p>		
<p>Text Books and References:</p>		
1	C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications	
2	Programming in C Second Edition by Reema Tharej	
3	Let us C Solutions by Yashavant P. Kanetkar	

Course Code	Course Title	Semester
DPCE201ESP	ENGINEERING GRAPHICS LAB- II	2

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 1+2-L+P

Credits: 3

Instruction Mode: Lecture + Practical

Scheme of Examination

Maximum Score : 50

Internal Evaluation : 25

End/ External Evaluation : 25

Exam Duration : 3 Hours

Course Objectives:

- General projection theory, with emphasis on orthographic projection to represent in two-dimensional views (principal, auxiliary, sections).
- Dimension and annotate two-dimensional engineering drawings.
- The application of industry standards and best practices applied in engineering graphics.
- Theoretical concepts delivered in this course which would help the students to understand the design considerations and tolerances to be used in the design and manufacture of engineering components.

Course Outcomes :

At the end of the course, the students will be able to

- Increase ability to communicate technical aspects of drawing with people.
- Draw orthographic projections and sections.
- Learn to take data and transform it into graphic drawings
- Draw the two dimensional drawings.
- Learn basic engineering formats.

Cycle	Course Content	Instruction Hours
I	1. Projection of points	23
	2. Projection of lines	
	3. Projection of solids	
	4. Basic concept of Orthographic Projection. For prisms & pyramids.	
	5. Construction of Sectional Views.	
	6. Construction of true shape.	
II	1. Auxiliary view	22
	2. Pictorial drawings	
	3. Drawing of Isometric View.	
	4. Identify the correct pictorial views from a set of Orthographic drawings.	
	5. Development of surfaces	
	6. Prepare development of simple Engineering objects.	
Text Books and References:		
1	First Year Engineering Drawing – B.R. Gupta.	
2	Engineering Drawing by N.D.Bhatt.	

Course Code	Course Title	Semester
DPCC301BST	ENGINEERING MATHEMATICS-III	3

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3 L

Credits: 3

Instruction Mode: Theory

Course Objectives:**To Introduce:**

- The concept of measures of dispersions.
- The concept of probability and events.
- The concept of random experiment and Baye's theorem.
- Properties of straight lines, circles and conic sections

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation:70

Exam Duration : 3 Hours

Course Outcomes:

At the end of the course, the student will be able to

- Solve some related problems on basic probability.
- Solve simple related problems to random experiments and events.
- To proof the basic theorem of probability and related problems.
- Solve simple problems related to straight lines, circles, ellipse, parabola and hyperbola.

Unit	Course Content	Instructi on Hours
I	<u>PROBABILITY:</u> Random Experiments and Events, Classical Definition of probability, and Addition Multiplication Theorem of Probability. Independent and Dependent Events Conditional Probability, Baye's Theorem with some Example.	15
II	<u>MEASURES OF DISPERSION:</u> Range, Mean Deviation, Variance and Standard Deviation of Ungrouped / Grouped data. Coefficients of Variation and Analysis of Frequency Distribution with Equal Mean but Different Variance.	15
III	<u>ANALYTICAL GEOMETRY</u> Straight Line-Different form of a straight lines, distance of a point from a straight line, acute angle between two lines, intersection of two nonparallel lines and distance between two parallel lines. Circles-Equation of a circle given centre and radius, given ends of diameter-General equation finding centre and radius, given end of the diameter-General equation finding the Centre and Radius. Standard forms of equations of Parabola, Ellipse and Hyperbola-Simple properties.	15

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.
Each Unit will carry equal Weightage of marks.

Text Books and References:

1	Probability and Statistics by DR. T.K.V IYENGAR, DR. B.K. KRISHNA GANDHI, S.RANGANATHAN, M.V.S.S.N PRASAD
2	A Text book of intermediate Mathematics –II by Telugu Academy
3	Senior Secondary School Mathematics For 11 & 12 by R.S Aggarwal
4	Probability and Statistics by S. Chand & Text book of Engineering Mathematics –I by Radiant Publishers

Course Code DPEL301PCT	Course Title ANALOG ELECTRONICS	Semester 3
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Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 3 L
 Credits: 3
 Instruction Mode: Lecture

Course Objectives:**Scheme of Examination**

Maximum Score : 100
 Internal Evaluation : 30
 End/ External Evaluation : 70
 Exam Duration : 3 Hours

On completion of the study of the subject the student should be able to comprehend the following:

- Familiarize with the significance of regulators in power supply and to analyse various regulated circuits.
- To understand the concept, analysis and frequency response of multistage amplifiers, Darlington pair.
- To understand the concept of biasing and theory of stabilization in amplifiers and amplifier topologies
- Understand switching application of Transistor and importance of feedback.

Course Outcomes:

- Ability to explain the basic circuits like Transistor as an amplifier, graphical analysis, small signal equivalent circuit models.
- Ability to analyse BJT circuits i.e., Modes of operation, Transistor as a switch, biasing the BJT.
- Ability to define and analyse the four basic amplifiers models (voltage, current, transconductance and transresistance)

Unit	Course Content	Instruction Hours
I	Regulators and Biasing of BJT : Introduction to regulators, voltage regulation factor, Basic Zener diode voltage regulator with concept of load regulation & line regulation. Basic block diagram of dc power supply. Transistorized series & shunt regulators, Regulator IC's – 78xx, 79xx, 723 as fixed, variable & dual regulator. UJT and UJT Relaxation Oscillator. Need of biasing , concept of dc load line , selection of operating point (Q point) , need of stabilization of Q point (thermal run away concept). Types of biasing circuits -Fixed bias, Collector to Base bias and Voltage divider bias. Introduction to two port networks, Hybrid model for CE.	15
II	Small signal amplifiers -Concept of amplification, Classification of amplifiers, Small signal amplifier using BJT, AC Load Line, Small signal analysis of single stage CE Amplifier with importance of emitter	15

	bypass capacitor and coupling capacitors. Multi stage amplifiers- RC and Transformer coupled amplifiers, Darlington pair.	
III	Feedback and Power Amplifiers: Negative Feedback - Block diagram of negative feedback amplifier, characteristics of feedback amplifiers. Block diagrams of voltage series, current series, current shunt and voltage Shunt feedback amplifiers. Gain of negative feedback amplifiers. Effect of negative feedback on gain, bandwidth, input and output impedances. Power Amplifiers: Need for Power Amplifier- Performance measures of power amplifier, Classification of power amplifiers based on conduction, (Class A, B, AB, C). Operation of Class A, Class B, Class AB & Class c amplifiers with waveforms. Transistor Push-pull amplifier, distortions in power amplifiers- Choice of Class A, Class B, Class AB and Class C Amplifiers. Application of power amplifiers.	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	Electronic Devices and Circuits: Jacob Millman, Christos C. Halkias McGrawHill	
2	S Salivahanan, N Suresh Kumar, A Vallavaraj, "Electronic devices and circuits", Tata McGrawHill	
3	Sundaram Natarajan, 'Microelectronics Analysis and Design' Tata McGrawHill	
4	Adel S. Sedra and Kennrth C. Smith, ' Microelectronic Circuits' Fifth Edition Oxford University Press	
5	Sanjeev Gupta, "Electronics devices and circuits", Dhanpath Rai publications,	

Course Code DPEL302PCT	Course Title Digital Electronics	Semester 3
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Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3-L

Credits: 3

Instruction Mode: Lecture

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation : 70

Exam Duration : 3 Hours

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- Compile the different building blocks in digital electronics using logic gates and implement simple logic function using basic and universal gates.
- Understand different number system and their conversions, logic families and their comparison.
- Understand the use of voltage levels to represent digital quantities and describe various parameters of pulse waveform.
- Understanding the basics of memory devices & their types.

Course Outcomes:

- Understand and examine the structure of various number systems and its application in digital design.
- Ability to apply the laws of Boolean algebra to simplify circuits and Boolean algebra expressions.
- Ability to understand, analyse and design various combinational and sequential circuits.
- Ability to use the methods of systematic reduction of Boolean algebra expressions including Karnaugh maps.
- Ability to understand the basic electronics of logic circuits and be able to understand basics of integrated circuits (ICs).

Unit	Course Content	Instruction Hours
I	<p>Part I: NUMBER SYSTEM AND BOOLEAN ALGEBRA Binary, Octal, Decimal, Hexadecimal - Conversion from one to another. Binary codes: BCD, Gray, Excess-3, Alpha numeric Codes. Boolean Algebra: Postulates & De-Morgan's theorems.</p> <p>Part II: LOGIC GATES & DIGITAL LOGIC FAMILIES: GATES: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR. Realization of basic gates using universal gates. Concept of negative and positive logic. Simplification of expression using Boolean techniques, Boolean expression for outputs (SOP and POS), K-Map (Upto 4 variables), Don't care conditions, construction of logic circuits using Boolean expressions, Digital logic families-CMOS & TTL, characteristics and comparison.</p>	15

II	UNIT II: COMBINATIONAL CIRCUITS: Binary arithmetic (Addition & subtraction), subtraction using 1's and 2's complement, Signed binary numbers. Half Adder and Full Adder, 4-bit Parallel adder, Serial Adder, Comparison of Parallel & Serial Adder, Half Subtractor & Full Subtractor, Encoder & Decoder (upto 3-bit binary inputs/outputs), Multiplexer (upto 8x1), Demultiplexer (upto 1x8).	15
III	UNIT III: SEQUENTIAL CIRCUITS & MEMORY DEVICES: FLIP-FLOPS: SR, JK, T, D, JK- MS JK FF, Triggering of FF: edge & level triggering. Counters: Synchronous & Asynchronous (ripple) counter, Ripple Mod-4, Mod-8 and Decade Counter, 4-bit synchronous counter, Ring counter, difference between Asynchronous and Synchronous counters. Registers: 4-bit shift register- SISO, SIPO, PISO, PIPO. Memory: Terminologies of a memory, RAM, ROM, PROM, EPROM, EEPROM & Flash memory.	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	John F.Wakerly, "Digital Design", Fourth Edition, Pearson/PHI, 2008	
2	John.M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006.	
3	Charles H.Roth. "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013	
4	Donald P.Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006.	

Course Code	Course Title	Semester
DPEL303PCT	COMMUNICATION SYSTEMS – I	3
Scheme of Instruction	Scheme of Examination	
Total Duration : 45 Hrs	Maximum Score : 100	
Periods / Week: 3-L	Internal Evaluation : 30	
Credits: 3	End/ External Evaluation : 70	
Instruction Mode: Lecture	Exam Duration : 3 Hours	

Course Objectives:

- To familiarize the students with modulation techniques
- To impart knowledge of AM, DSB-SC and SSB.
- To familiarize with different transmitters and receivers and compare their performance according to the transmission bandwidth, transmitted power and system complexity.
- To familiarize with the transmission lines and radio wave communication.

Course Outcomes:

On completion of the study of the subject, the student shall be able to:

- Understand the basic signals and their frequency spectra
- Analyse basic analogue transmitters and receivers
- Describe amplitude and frequency modulation and demodulation techniques
- Describe the techniques of communication using transmission lines and radio waves.

Unit	Course Content	Instruction Hours
I	1. Introduction to communication systems & Modulation techniques. Elements of communication system, Frequency spectrum, Need for modulation, types of modulation, Noise, Signal to noise ratio, noise figure and noise temperature. Time domain equation of AM wave, Modulation index, effects of over modulation, bandwidth, power and voltage calculations of AM signal, Suppressed carrier and single sideband techniques, angle modulation- its types, Definition of PM. FM -Time domain equation of FM wave, Modulation index, bandwidth, side bands, power of side bands, frequency deviation, pre-emphasis, de-emphasis, merits and demerits of FM over AM.	15
II	2. Transmitters and Receivers. Specifications of transmitters, low level modulation, high level modulation, heterodyne type transmitters, FM transmitter, Armstrong method of FM generation, sensitivity, selectivity, fidelity of receiver, TRF receiver, super heterodyne AM receiver, selection of IF, AVC, IMRR, FM	15

	receiver, FM detector (Foster Seeley), Noise limiter circuit, comparison of AM & FM receivers.	
III	3. Transmission Lines and Wave Propagation. Electrical equivalent of transmission lines, characteristic impedance, reflection coefficient, SWR, transmission line losses, Electromagnetic waves, wave polarization and its types, reflection, refraction, diffraction, ground wave propagation, space wave propagation (LOS), sky wave propagation, ionosphere layers, critical frequency, MUF, virtual height.	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	Electronic Communication Systems by George Kennedy, Bernard Davis and SRM Prasanna, McGraw Hill Education.	
2	Principles of Communicaiton Engineering, Umesh Sinha. Satya Prakashan New Delhi.	
3	Communication Systems: Analog and Digital by R P Singh & S D Sapre, Second Edition Tata McGraw-Hill Publishing Company Limited	
4	Analog Communication Systems – Principles and Practices by KC Raveendra Nathan University Press (India) Pvt Ltd. Hyderabad	
5	Electronics Communication Systems by Roy Blake, Second Edition, Delmar/Thomson Learning.	

Course Code	Course Title	Semester
DPEL304PCT	NETWORK THEORY	3
Scheme of Instruction		Scheme of Examination
Total Duration : 45 Hrs		Maximum Score : 100
Periods / Week: 3-L		Internal Evaluation : 30
Credits: 3		End/ External Evaluation : 70
Instruction Mode: Lecture		Exam Duration : 3 Hours

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- To introduce the fundamental concepts of electrical circuits
- To impart knowledge on network theorems
- To inculcate the basics of RC Integrator and Differentiators

Course Outcomes:

- An ability to understand the series and parallel Responses of RLC circuits
- Ability to understand and analyze the electrical circuits and Network theorems
- An ability to analyze and understand the Star-Delta conversions

Unit	Course Content	Instruction Hours
I	<p>Behaviour of Passive Components and Resonance Active elements, passive elements, comparison of active and passive Elements, comparison of DC and AC, average value, effective (R.M.S) values, phase and phase difference, ohm's law, KCL, KVL, related problems.</p> <p>Voltage current characteristic of R,L,C , series RC, RL,LC, RLC circuits, parallel RC, RL, LC, RLC circuits, related problems.</p> <p>Resonance in AC circuits, series resonance and parallel resonance circuits, resonance curves (F vs I,Z), bandwidth, Q-factor. Comparison of series and parallel resonance, applications of series and parallel resonance. related problems.</p>	15
II	<p>Mesh and Node Analysis Mesh current analysis, driving point impedance, transfer impedance, related problems. Node voltage analysis, driving point admittance, transfer admittance, related problems. Star to delta & delta to star conversions, related problems.</p>	15
III	<p>Networks Theorems Thevenin's theorem, Norton's theorem, Superposition theorem , Maximum power transfer theorem, Reciprocity theorem, problems on above theorems.</p> <p>Linear Wave Shaping Linear wave shaping, low pass R.C. circuit, high pass R.C. circuit, passive differentiating and integrating circuits.</p>	15

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.
Each Unit will carry equal Weightage of marks.

Text Books and References:

1	Circuit Theory – by Joseph Edminister, Tata Mc. Graw Hill co.,
2	Networks, lines & field – by Ryder, PHI
3	Networks & Lines by Umesh Sinha, Satyaprakash
4	Engineering Circuit analysis by W H Hayt & J E Kemerly
5	Network analysis by M.E. Van Valkenberg.
6	Circuits and Networks Sudhakar & Shyam Mohan
7	Network Analysis and Synthesis by U A Bakshi, Technical Publication
8	Network Theory-Joseph Adminster-Schaum Series
9	Networks and Systems by D Roy Choudhury, Wiely
10	Foundations of Electronic circuits and Devices by Meade Thomson Delmar

Course Code
DPCC301SEP

Course Title
BASIC COMMUNICATION &
PRESENTATION SKILLS LAB

Semester
3

Scheme of Instruction

Total Duration : 45 Hrs
Periods / Week: 1T+2P
Credits: 2
Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50
Internal Evaluation : 25
End/ External Evaluation:25
Exam Duration : 3 Hours

Course Objectives:

The course enables the students to:

- Listen and understand English
- Describe objects and report incidents
- Make short oral presentations

Course Outcomes:

At the end of the course the students are able to:

- Use English for short conversations
- Introduce themselves
- Talk about objects, incidents etc.

Cycle	Course Content	Instruction Hours
I	1. Listening – I 2. Introducing oneself 3. Describing objects	22
II	1. Reporting past incidents 2. Just a minute 3. Making presentations	23

Examination and Evaluation Pattern:
As per the CBCS Rules and Regulations of Examination Branch of MANUU.
Each Unit will carry equal Weightage of marks.

Course Code: DPEL401PCT	Course Title: LINEAR INTEGRATED CIRCUITS	Semester 4
Scheme of Instruction	Scheme of Examination	
Total Duration : 45 Hrs	Maximum Score : 100	
Periods / Week: 3-L	Internal Evaluation : 30	
Credits: 3	End/ External Evaluation : 70	
Instruction Mode: Lecture	Exam Duration : 3 Hours	

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- To Impart the knowledge of operational amplifiers and their applications, which is the backbone for the basics of Linear integrated circuits.
- To understand the basic principles and operation of oscillators, sweep circuits, PLL , converters, multi-vibrators and timers.

Course Outcomes:

- Ability to understand the characteristics and applications of operational amplifiers.
- Ability to explain the fundamentals involving PLL, converters, multi-vibrators and timers.

Unit	Course Content	Instruction Hours
I	<p>BASICS OF OPERATIONAL AMPLIFIERS & ITS APPLICATIONS: The ideal OP-amp, general operational amplifier stages, internal circuit diagrams of IC 741, DC and AC performance characteristics. Block diagram of an operational amplifier, BJT differential amplifier and brief introduction on current mirrors.</p> <p>Applications: shift circuits, voltage follower, V to I converters, I to V converters, adder, subtractor, integrator, differentiator, comparator, Schmitt trigger, clipper, clamper, low-pass, high-pass and band-pass filters.</p>	15
II	<p>OSCILLATORS, SWEEP CIRCUITS AND WAVE SHAPING: Introduction to positive feedback amplifiers, gain of positive feedback amplifiers- Effect of Positive feedback on gain, bandwidth, input and output impedances. Requisites of an oscillator. Classification of oscillators. RC phase shift oscillator, Wein bridge oscillator, Hartley, Colpitts, Crystal oscillator, Boot-strap circuit, Miller sweep circuit, Current sweep circuit. Schmitt trigger, clippers and clampers - their applications, Operation of the basic PLL, closed loop analysis, Monolithic PLL IC 565.</p>	15

III	CONVERTERS, MULTIVIBRATORS AND TIMERS: Analog and digital data conversions, D/A converter – weighted resistor type, R-2R ladder type, A/D converters – Flash type, Successive approximation type, Multivibrators – Astable, Monostable, Bistable, Timer IC 555(PWM.PPM).	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	D. Roy Choudhry , Shail Jain, “ Linear Integrated Circuits”, New Age Intl. Pvt. Ltd., 2000.	
2	Ramakant A. Gayakwad, “OP-Amp and Linear ICs” 4th Edition, Prentice Hall, Pearson Education, 2001.	

Course Code	Course Title	Semester
DPEL402PCT	COMMUNICATION SYSTEMS – II	IV
Scheme of Instruction	Scheme of Examination	
Total Duration : 45 Hrs	Maximum Score : 100	
Periods / Week: 3-L	Internal Evaluation : 30	
Credits: 3	End/ External Evaluation : 70	
Instruction Mode: Lecture	Exam Duration : 3 Hours	

Course Objectives:

- To understand the building blocks of digital communication system
- To understand and analyse the signal flow in a digital communication system.
- To comprehend various digital modulation techniques
- To understand various multiplexing and multiple access techniques
- To understand the method of transmission and reception of signals using antennas

Course Outcomes:

On completion of the course, the student will be able to

- Differentiate between different modulation techniques and compare analog and digital communication systems
- Explain the concept of modem and different multiplexing and multiple access schemes
- Comprehend various antennas, their characteristics and uses.

Unit	Course Content	Instruction Hours
I	Digital Communication and Digital Modulation. Introduction to digital communication, Sampling theorem, pulse modulation, pulse code modulation, delta modulation, , vocoders and data compression, Data coding, asynchronous transmission, synchronous transmission, digital modulation, Amplitude shift keying(ASK), frequency shift keying (FSK), phase shift keying (PSK), quadrature amplitude modulation (QAM).	15
II	Multiplexing and multiple access techniques. Concept of modem, digital subscriber lines, ADSL, multiplexing and multiple access, FDM and TDM, FDMA and TDMA, spread-spectrum, code-division multiple access (CDMA), ISDN, Internet Telephony.	15
III	Antennas. Isotropic, half wave dipole antennas, antenna characteristics –	15

	radiation resistance, efficiency, gain, directivity, beam width, front to back ratio, impedance, polarisation. Effect of ground on antennas monopole, folded dipole, non resonant antennas, Antenna arrays – broadside, end fire, Parabolic reflectors, Dish antennas, VSAT and Cellular antennas.	
Examination and Evaluation Pattern:		
As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	Electronic Communication Systems by George Kennedy, Bernard Davis and SRM Prasanna, McGraw Hill Education.	
2	Electronic communication systems by Roy Blake, Thomson Delmar	
3	Antenna Systems by K. D. Prasad.	
4	4. Electronic Communication Systems A Complete Course –4 th Edi by William Schweber, Prentice Hall.	
5	Communication Systems: Analog and Digital by R P Singh & S D Sapre, Second Edition Tata McGraw-Hill Publishing Company Limited	

Course Code	Course Title	Semester
DPEL403PCT	MICROPROCESSORS	4
Scheme of Instruction	Scheme of Examination	
Total Duration :45 Hrs	Maximum Score : 100	
Periods / Week: 3-L	Internal Evaluation : 30	
Credits: 2	End/ External Evaluation : 70	
Instruction Mode: Lecture	Exam Duration : 3 Hours	
Course Objectives:		

On completion of the study of the subject the student should be able to comprehend the following:

- To impart the Basic Concept 8086 Microprocessor
- Study the Architecture of 8086 Microprocessor
- Understand the implementation of integer and floating point operations using binary arithmetic
- Identify/explain the operation of the components of a typical microprocessor: the role of the ALU, registers, stack and the use of interrupts
- Appreciate the link between the compiler, linker, assembler, emulator and debugger, and understand their roles in the development of software for microprocessor systems,

Course Outcomes:

- Ability to understand the architecture of 8086 Microprocessor
- The student will be able to analyse, specify, design, write and test assembly language programs of moderate complexity.
- The student will be able to identify a detailed s/w & h/w structure of the Microprocessor.
- Identify various addressing modes.

Unit	Course Content	Instruction Hours
I	1. Introduction to Computer Organization Basic digital computer- Organization-Accumulator based CPU- Micro and Macro Operations- Stored program concept –Fixed and Floating point representation- Memory hierarchy – Cache memory – Associative memory – Virtual memory – Memory interleaving.	15
II	2. Architecture of 8086 Concepts of Parallel processing - memory segmentation- Features of 8086 – internal architecture of 8086 – Pin diagram of 8086 - minimum	15

	and maximum modes with memory read and write timing diagrams, calculation of physical address – flag register – basic 8086 system timing diagrams – interrupts.	
III	3. Programming and Instruction set of 8086 Instruction format - Addressing modes - Instruction set – data transfer – Arithmetic and logical – branching – loop control– processor control instructions .instruction format ,addressing modes of 8086.Assembler directives –program development tools –sample programs	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	Ray and BulChandi, “ Advanced Micro Processors”, Tata McGraw-Hill.	
2	.Kenneth J Ayala, “ The 8086 Micro Processors Architecture, Programming and Applications”, Thomson Publishers	
3	Microcomputer Systems: The 8086/8088 Family: Architecture, Programming and Design, 2nd ed., Liu & Gibson	
4	Doughlas.V.Hall, “ Microprocessor and Interfacing : Programming and Hardware”, 2nd edition, McGraw Hill, 1991	

Course Code	Course Title	Semester
DPEL403PCP	MICROPROCESSOR LAB	4

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 1+2 –T+ P
 Credits: 2
 Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50
 Internal Evaluation : 25
 End/ External Evaluation : 25
 Exam Duration : 3 Hours

Objectives:

- To impart the knowledge of 8086 microprocessor programming using MASM

Outcomes:

- Able to apply the fundamentals of assembly level programming of microprocessors
- Able to apply the principles of Assembly Language Programming logical development of programs on the 8086.
- Will have the basic idea about the data transfer schemes

Cycle	Course Content	Instruction Hours
I	1. Familiarization of Assembler-MASM. 2. Program to perform 16-bit addition. 3. Program to perform 16-bit subtraction 4. Program to perform 16-bit multiplication. 5. Program to perform 16-bit division	22
II	1. Program to find biggest number in the given array 2. Program to arrange data in ascending order 3. Program to find LCM for the given data. 4. Program to convert binary code to gray code 5. Program to find factorial of 8-bit data	23

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.
 Each Unit will carry equal Weightage of marks.

Text Books and References:

1	Ray and BulChandi, “ Advanced Micro Processors”, Tata McGraw-Hill.
2	.Kenneth J Ayala, “ The 8086 Micro Processors Architecture, Programming and Applications”, Thomson Publishers

Course Code	Course Title	Semester
DPEL404PCT	INDUSTRIAL ELECTRONICS	4
Scheme of Instruction	Scheme of Examination	
Total Duration :45 Hrs	Maximum Score : 100	
Periods / Week: 3-L	Internal Evaluation : 30	
Credits: 2	End/ External Evaluation : 70	
Instruction Mode: Lecture	Exam Duration : 3 Hours	

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- To introduce students the basic theory of power semiconductor devices.
- To understand and acquire knowledge about various power electronics equipments
- To understand the various control techniques of motors.

Course Outcomes:

- Ability to understand basic operation of various power semiconductor devices and passive components.
- Ability to analyze various single phase and three phase power converter circuits ,Choppers, .Ac regulators
- Ability to understand the Inverters and Cyclo converters circuits.
- An ability to understand various control methods of AC and DC motors.

Unit	Course Content	Instruction Hours
I	1. POWER DEVICES: Principle of operation of power BJT and IGBT with output characteristics. Switching characteristics of power diodes, power transistors; power MOSFET, IGBT, SCR. Two transistor analogy for SCR, Ratings of SCR, Protection of power devices - overload protection, fuse protection, circuit breakers, transient protection, Switched Mode power supply(SMPS).	15
II	2. Converters , AC Regulators & Choppers Classification of converters, single phase half wave fully controlled converter, free wheeling diode, single phase fully controlled converter, three phase half wave, three phase full wave controlled converter, battery charger, single phase ac regulator, choppers- modes, operation - Applications.	15

III	<p>3. Cycloconverters , Inverter, speed control of motors : Principle of operation of single phase bridge type cyclo converters. Classification of inverters: series inverter- parallel inverter- single-phase bridge inverter using MOSFET- voltage source inverter- PWM inverter- single, multiple and Sinusoidal .</p> <p>DC motor control: Introduction, Factors effecting speed of DC motors. Speed control of DC shunt motor by using single phase converters and choppers.</p> <p>AC motors control: Introduction, factors effecting speed of AC motors, Speed control of induction motor by using AC voltage controllers and inverters.</p>	15
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.</p>		
<p>Text Books and References:</p>		
1	Power Electronics, P.C. SEN, TMH	
2	Industrial Electronics & Control, S. K. Bhattacharya (TTTI), TMH	
3	Power Electronics, Singh & Kanchandani, TMH	
4	Power Electronics & Control, S.K. Dutta, PHI	
5	Industrial Electronics, S.N. Biswas, Dhanpat Rai	

Course Code	Course Title	Semester
DPEL404PCP	INDUSTRIAL ELECTRONICS LAB	4

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 1+2 –T+ P
 Credits: 2
 Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50
 Internal Evaluation : 25
 End/ External Evaluation : 25
 Exam Duration : 3 Hours

COURSE OBJECTIVES:

- To impart the basic practical knowledge of power semiconductor devices, power electronics equipments
- To impart the knowledge about various controlling techniques of power semiconductor devices and motors.

COURSE OUTCOMES:

- Understand basic operation of various power semiconductor devices.
- Analyze characteristics of power semiconductor devices
- Ability to understand Inverters and servomotor system

Cycle	Course Content	Instruction Hours
I	1. SCR Characteristics. 2. Diac Characteristics. 3. Triac Characteristics. 4. UJT relaxation oscillator.	22
II	1. Study of simple inverter circuit. 2. SCR circuit to drive small loads (DC and AC) 3. Triac power control circuit (AC load) 4. Study of a simple servomotor and system.	23

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.
 Each Unit will carry equal Weightage of marks.

Text Books and References:

1	Power Electronics, P.C. SEN, TMH
2	Industrial Electronics & Control, S. K. Bhattacharya (TTTI), TMH
3	Power Electronics, Singh & Kanchandani, TMH
4	Power Electronics & Control, S.K. Dutta, PHI

Course Code	Course Title	Semester
DPEL405PCT	ELECTRONIC MEASURING INSTRUMENTS	4

Scheme of Instruction

Total Duration :45 Hrs
 Periods / Week: 3-L
 Credits: 2
 Instruction Mode: Lecture

Course Objectives:

- To familiarize the students with the concepts of electronic measurements.
- To learn the use of different types of analog meters for measuring electrical quantities.
- To learn the principle, working and applications of CRO.
- To learn the principle of signal generators and transducers.

Course Outcomes:**On completion of the subject, the student will be able to**

- Use oscilloscope to determine frequency and phase of a sinusoidal signal.
- Identify electronics Instruments, their use, peculiar errors associated with the instruments and how to minimise such errors.
- Analyze the working of different Equipments used in Instrumentation.
- Analyze various measuring techniques for both electrical and nonelectrical quantities

Scheme of Examination

Maximum Score : 100
 Internal Evaluation : 30
 End/ External Evaluation : 70
 Exam Duration : 3 Hours

Unit	Course Contents	Instruction Hours
I	<p>1. MEASUREMENT FUNDAMENTALS: Accuracy, Precision, resolution, reliability, repeatability, validity, Errors and their analysis, Standards of measurement.</p> <p>PERMANENT MAGNET MOVING COIL METER: Theory of operation, working principle and construction of PMMC. Measurement of voltage, current and resistance, loading effect, extension of range and PMMC Multimeter.</p> <p>MEASUREMENT OF BASIC PARAMETERS: Advantages of electronic voltmeter over ordinary voltmeter. Digital Multi Meter: Working principle, types of DMM, Integration and successive approximation type, advantages over Conventional Multi Meter. Digital LCR Meter, Digital IC tester. Advantages of digital instruments over analog instruments.</p>	15
II	<p>OSCILLOSCOPES AND SIGNAL GENERATORS</p> <p>Block diagram of CRO, constructional features of CRT and principle of operation. Block schematic description Vertical Amplifier, Time Base Generator, Trace Synchronization, Triggering Modes, Front Panel Controls, Probe Characteristics. . Measurement Parameters amplitude,</p>	15

	frequency, time period of CRO. Features of dual trace oscilloscopes. Block schematic description of digital storage oscilloscope. Signal Generator- Sine wave generator. Frequency-synthesized signal generator, Sweep frequency generator, Pulse and square wave generators, Function Generators.	
III	<p>TRANSDUCERS AND BRIDGES Introduction, classification of transducers, strain gauge, variable resistance transducer, LVDT, Thermocouples, Special resistance thermometer, Transducer applications - accelerometers, Tacho generators, Servomotors. Piezoelectric transducers.</p> <p>BRIDGES Construction, Principle of working, Torque equation, Extension range. Wheatstone's Bridge – Measurement of Resistance using Wheatstone's Bridge. Maxwell's bridge – Measurement of inductance using Maxwell's bridge. Schering Bridge – Measurement of Capacitance using Schering Bridge. Q meter, Distortion Factor Meter.</p>	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	Electronic Measurement and Measurement Technique / Cooper / Prentice Hall of India	
2	Electronic Instrumentation / Kalsi / Tata McGraw-Hill	
3	A Course in Electrical and Electronic Measurement and Instrumentation / A.K. Sawhney / Dhanpat Rai & Sons	
4	Electronic Measurement and Instrumentation / Oliver Cage / McGraw Hill	

Course Code
DPCC401SEP

Course Title
**COMMUNICATION &
INTERACTIVE SKILLS LAB**

Semester
4

Scheme of Instruction

Total Duration : 45 Hrs
Periods / Week: 1T+2P
Credits: 2
Instruction Mode: Tutorial + Practical

Course Objectives

The course enables the students to:

- Describe events
- Make observations
- Participate in group discussions
- Practice mock interviews

Scheme of Examination

Maximum Score : 50
Internal Evaluation : 25
End/ External Evaluation:25
Exam Duration : 3 Hours

Course Outcomes

At the end of the course the students are able to:

- Speak about events
- Infer details from reading materials
- Learn ethics of group discussion and interview

Cycle	Course Content	Instruction Hours
I	1. Listening – II 2. Describing events 3. Speaking from observation/reading	22
II	1. Group discussions 2. Interview skills 3. Making presentations	23
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.</p>		

Course Code	Course Title	Semester
DPCC501PET	INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP	5

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 3-L
 Credits: 3
 Instruction Mode: Lecture

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- To provide the necessary knowledge, skills, values and attitudes to occupy positions of management and administration in business, industry, public system and the government.
- To impart the students latest and relevant knowledge from the field of management theory and practice.
- To provide opportunities to the students for developing necessary Production and Materials.
- To develop the right kind of values and ethics to function effectively as Managers/Administrators/entrepreneurs.

Scheme of Examination

Maximum Score : 100
 Internal Evaluation : 30
 End/ External Evaluation : 70
 Exam Duration : 3 Hours

Course Outcomes:

- Ability to explain and describe how industrial activities are led and organized.
- An ability to choose, interpret and using Quantitative Techniques as a basis for decision-making in different business cases.
- Ability to compile and interpret the annual reports of an industrial company at a basic level.

Unit	Course Content	Instruction Hours
I	<p>Introduction to Management Define industry, commerce (Trade) and business, Definition of Management, Need for management. Nature and Scope of Management, Definitions of Industrial Management, Importance of Management, Functions of management, Purpose of Planning, Steps in planning, Organizational Process, Functions of management, Motivation, Maslow's Need Hierarchy Theory, Communication, Decision Making, Levels of management, Management and administration, F. W. Taylor's Scientific Management Theory, Principles laid by Henry Fayol,</p> <p>Forms of Organization: Line/Staff and functional Organizations, Decentralization and Delegation</p> <p>Business Ownership: Proprietorship, Partnership, Joint Stock Company, Private limited company, Public Limited company, Co-operative society, Public Sector, Globalization,</p>	15

II	<p>Production, Material and Maintenance Management</p> <p>Production Management: Identify the factors of Plant Location, Objectives of plant Layout, Explain the types of plant Layouts, Relate the production department with other departments, Explain the stages of Production, planning and control, Demand forecasting using Moving average method, Dispatching, Break Even Analysis, Draw PERT/CPM networks, Identify the critical path</p> <p>Materials Management: Role and importance of materials management in industries, Functions of Materials Management, Explain ABC analysis, Define safety stock. Define reorder level, Derive an expression for economic ordering quantity, Functions of Stores Management, Types of store layouts, List out stores records, Bin card, Describe Cardex method, General purchasing procedures, List out purchase records, Applications of RFID in material management</p> <p>Maintenance Management: Definition, Importance, Objectives and Activities of maintenance management</p>	15
III	<p>Industrial Safety, Quality Control and Entrepreneurship Development</p> <p>Industrial Safety: Importance of safety at Work place. List out the Acts governing safety of employees in industry. Different hazards in the Industry. Causes of accidents. Direct and indirect cost of accidents.</p> <p>Quality Control: Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - Contributions of Deming, Juran and Crosby, Costs of quality, Quality Management Systems and ISO: Evolution of ISO standards, Beneficiaries of ISO 9000, Concepts of ISO 14000</p> <p>Entrepreneurship Development: Define the word entrepreneur. Explain the requirements of an entrepreneur. Determine the role of entrepreneurs in promoting Small Scale Industries. Describe the details of self-employment schemes. Characteristic of successful entrepreneurs Explain the method of site selection. List out the organisations that help an entrepreneur, Understand the concept of make in India, Zero defect</p>	15
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.</p>		

Text Books and References:

1	Industrial Engineering and Management -by O.P Khanna
2	Production Management- by Buffa
3	Engineering Economics and Management Science - by Banga & Sharma
4	Personnel Management by Flippo.
5	Production and Operations Management –S.N. Chary
6	Supply Chain Management –Sunil Chopra and Meindl, PHI publishers
7	Total Quality Management by Sidharth Bhatt

Course Code	Course Title	Semester
DPEL501PCT	MICROCONTROLLER	5

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3-L

Credits: 3

Instruction Mode: Lecture

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation : 70

Exam Duration : 3 Hours

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- To impart the Basic Concept of 8051 microcontroller
- Get familiarise with the architecture and the instruction set of an microcontroller , Assembly language programming will be studied as well as the design of various types of interfaces.
- To study the addressing modes of 8051.
- To introduce the need & use of Interrupt structure 8051.

Course Outcomes:

- Ability to understand the architecture of 8051 microcontroller
- Impart the knowledge about the instruction set of 8051 microcontroller
- Understand the basic idea about the data transfer schemes and its applications
- Develop skill in simple program writing for 8051 and applications.
- Interface a microcontroller system to user controls and other electronic systems.
- Describe the internal architecture of microcontroller systems, including counters, timers, ports, and memory

Unit	Course Content	Instruction Hours
I	Architecture of 8051: Block diagram of microcomputer, Block diagram of 8051, Pin out diagram of 8051, registers, timers, interrupts, fetch cycle, execution cycle, machine cycle, T-state .	15
II	Instruction set of 8051: Instruction set of 8051, instruction format, classification of instructions, addressing modes- Groups of instructions, data transfer, arithmetic, logical, branch ,Boolean instructions	15
III	Programming and Interfacing of 8051: Data transfer, single and multi byte addition and subtraction, subroutines, nesting, multiple ending and common ending, use of Input output and machine related statements, debugging, time delay	15

	program. Peripheral ICs: Know the function, features, pin details and interfacing of 8255, 8279, 8257, 8251, 8259.RS-232C	
Examination and Evaluation Pattern:		
As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	Mazidi, The 8051 Microcontroller And Embedded Systems ,2 nd Edition, Publisher Pearson Education India, 2007.	
2	Kenneth J. Ayala, The 8051 Microcontroller, Edition 3 , Publisher Cengage Learning, 2004	
3	A.V. Deshmukh, Microcontrollers [Theory and Applications], Tata Mcgraw Hill, 2006.	

Course Code
DPEL501PCP

Course Title
MICROCONTROLLER LAB

Semester
5

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 1T+2P

Credits: 2

Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50

Internal Evaluation : 25

End/ External Evaluation:25

Exam Duration : 3 Hours

Course Objectives:

- To impart the knowledge of 8051 microcontroller programming using Keil μ vision

Course Outcomes:

- Able to apply the fundamentals of assembly level programming of microprocessors
- Able to apply the principles of Assembly Language Programming logical development of programs on the 8051
- Will have the basic idea about the data transfer schemes

Cycle	Course Content	Instruction Hours
I	1. 8 – bit addition and subtraction 2. Multi byte addition 3. Block transfer of data. 4. Sum of given n numbers 5. Sum of first n natural numbers 6. Arithmetic programming	22
II	1. 8 bit x 8 bit multiplication using MUL instruction 2. Hex to BCD conversion and BCD to Hex conversion 3. Testing the interfacing of 8255, PPI 4. Testing the interfacing of 8279, keyboard & display interface. 5. Use of RS-232 in Interfacing.	23

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.

Each Unit will carry equal Weightage of marks.

Text Books and References:

1	Mazidi, The 8051 Microcontroller And Embedded Systems ,2 nd Edition, Publisher Pearson Education India, 2007.
2	Kenneth J. Ayala, The 8051 Microcontroller, Edition3 , Publisher Cengage Learning, 2004
3	A.V. Deshmukh, Microcontrollers [Theory and Applications], Tata Mcgraw Hill, 2006.

Course Code	Course Title	Semester
DPEL502PCT	ADVANCED COMMUNICATION SYSTEMS	5

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3-L

Credits: 3

Instruction Mode: Lecture

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation : 70

Exam Duration : 3 Hours

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- To equip the students with sound technical knowledge in microwave tubes.
- To study how Scattering parameters are defined and used to characterize devices and system behavior.
- To know the principle and operation of RADAR system
- To impart the knowledge of Mobile and Cellular Communication

Course Outcomes:

- Ability to understand the fundamentals of Microwave and RADAR communications.
- Ability to understand how transmission and waveguide structures are used.
- Gain knowledge and understanding of microwave Vacuum Tube.
- An ability to understand about the Mobile and Cellular communication system.

Unit	Course Content	Instruction Hours
I	1. Microwave & RADAR Communication Microwave frequency range –introduction to wave guides - dominant mode in Rectangular wave guide – phase velocity – Group velocity – Cut off wavelength – operation of Magic tee – working principle and applications of Magnetron, Klystron, TWT, Introduction to Radar system – Radar range equation - Pulsed Radars - Duplexer – Radar Indicators – Doppler effect - CW radar – MTI – radar Beacons.	15
II	2 Fibre Optic Communication Optical fibre – Total Internal Reflection (TIR), Numerical Aperture(NA), Modes and dispersion, losses in fibres, fibre optic cables – Splices, connectors, optical couplers, – optical emitters (LED & LASER diode) – optical detectors (PIN diode & APD) – basic fibre optic system – Repeaters and optical amplifiers – wavelength division multiplexing (WDM), Dense wavelength division multiplexing (DWDM) , Submarine cables– Fibre in local area network.	15

III	3. Mobile and Cellular Communication Intelligent network, Evolution of Mobile Radio Communication - Cellular concepts – Cellular systems operation – AMPS operation – Digital cellular mobile system – GSM standard and service aspects – GSM architecture – GSM function partitioning, GSM radio characteristics, security aspects, CDMA systems – power control & soft hand off in CDMA - EDGE technology – 3g and 4G wireless Standards WCDMA LTE, WiMax.	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	Electronic communication system by George Kennedy.	TMH
2	Electronic Communication Systems by Roy Blake	Thomson
3	Communication Electronics by Frenzel	TMH
4	Mobile and Personal communication system and services by Raj Pandya.	PHI
5	Microwave Engineering by Sanjeeva Gupta	
6	Wireless digital communication by Kamilo Fehr	
7	Communication systems by Shradar	
8	Modern Electronic Communication by Ashok Raj.	

Course Code
DPEL502PCP

Course Title
HARDWARE DESCRIPTIVE LANGUAGE LAB

Semester
5

Scheme of Instruction

Total Duration : 45 Hrs
Periods / Week: 1T+2P
Credits: 2
Instruction Mode: Tutorial + Practical

Objective:

- To impart knowledge about the latest software and implementation of Verilog HDL.

Outcomes:

- Ability to use latest tools and implement VLSI Circuit design

Scheme of Examination

Maximum Score : 50
Internal Evaluation : 25
End/ External Evaluation:25
Exam Duration : 3 Hours

Cycle	Course Content	Instruction Hours
I	<ol style="list-style-type: none"> Practice with MultiSIM simulation software for verilog HDL Implement Basic Logic Gates Implement i) Half adder and ii) Full Adder Implement i) Half Subtractor and ii) Full Subtractor Implement 4-bit Parallel Adder Implement 4:1 Multiplexers 	22
II	<ol style="list-style-type: none"> Implement 1:4 Demultiplexers Implement 3:8 Decoders Implement 8:3 Encoders Implement 4-bit Comparator Implement SR-Flip flop Implement) JK- Flip Flop 	23
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.</p>		
<p>Text Books and References:</p>		
1	Verilog Design-Digital Design & synthesis-Samir Palnitkar	

Course Code	Course Title	Semester
DPIT501SET	INTERNET OF THINGS	5

Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 3-L
 Credits: 3
 Instruction Mode: Lecture

Course Objectives:**Scheme of Examination**

Maximum Score : 100
 Internal Evaluation : 30
 End/ External Evaluation : 70
 Exam Duration : 3 Hours

On completion of the study of the subject the student should be able to comprehend the following:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

Course Outcomes:

- Students will understand the Concept of IoT.
- Students will be able to develop IoT Applications.

Unit	Course Content	Instruction Hours
I	Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.	15
II	IoT and M2M – Software defined networks, network function virtualization, Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib	15

III	IoT Physical Devices and Endpoints - Introduction to Raspberry PI- Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, and reading input from pins.	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madiseti, Universities Press, 2015, ISBN: 9788173719547	
2	Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759	

Course Code	Course Title	Semester
DPIT501SEP	INTERNET OF THINGS LAB	5

Scheme of Instruction

Total Duration : 45Hrs

Periods / Week: 1+2-T+P

Credits: 2

Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50

Internal Evaluation : 25

End/ External Evaluation : 25

Exam Duration : 3 Hours

Course Objective:

- To interact with various devices using IoT.
- Familiar with Arduino and Raspberry PI Boards

Course Outcome:

- Students will be able to use Arduino and Raspberry PI Boards.
- Students will be able to develop IoT Applications.

Cycle	Course Content	Instruction Hours
I	1) Working with temperature sensors using Arduino Board 2) Working with gas sensors 3) Working with Ultrasonic sensors 4) Smart dustbin 5) Controlling light with Wi-Fi	22
II	1) Working with touch sensor 2) Installing Operating System in Raspberry Pi 3) Working with Raspberry Pi 4) Working with GSM 5) Innovative Project	23
Examination and Evaluation Pattern:		
As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madiseti, Universities Press, 2015, ISBN: 9788173719547	
2	Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759	

Course Code	Course Title	Semester
DPIT502PCP	HARDWARE DEVICES & NETWORKING LAB	5

Scheme of Instruction

Total Duration : 45Hrs
 Periods / Week: 1+2-T+P
 Credits: 2
 Instruction Mode: Tutorial + Practical

Scheme of Examination

Maximum Score : 50
 Internal Evaluation : 25
 End/ External Evaluation : 25
 Exam Duration : 3 Hours

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- To understand the basic concept and working principles of Computers hardware
- To understand the different topologies,

Course Outcome:

- Ability to prepare and estimate approximate cost and materials required for a network
- Skill to prepare different wires and test LANs and trouble shoot networking devices and solve the problem.
- Ability to provide correct power backup to the computer hardware devices.

Unit	Course Content	Instruction Hours
I	1. Identify motherboard components, RAM identification, removal, installation. 2. CMOS setup, Print a summary of your system Hardware, Upgrading memory. 3. Hard drive, optical drive installation. 4. Trouble shooting keyboard, monitor, printer 5. Printer Problems: laser printer> a) Printer never leaves warm-up mode. b) Paper Jam message is displayed. c) Printed messages are distorted 6. Installation of operating system.	22

II	<ol style="list-style-type: none"> 1. Installation of Network card. 2. Preparing the UTP cable for cross and direct connections using crimping tool. 3. Installation of a switch, Router and connecting systems to a network switch. 4. Installation of a modem (internal, external or USB) and connecting to internet. 5. Using FTP for uploading and downloading files. 6. Installation and configuring the proxy server for internet access. 	23
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.</p>		
<p>Text Books and References:</p>		
1	Enhanced Guide to Managing And Maintaining Your PC --Jean Andrews (Thomson)	
2	Basics of Networking -- NIIT PHI publication	
3	PC Hardware A Beginners Guide -- Gilster (TMH)	
4	Trouble Shooting Your PC -- Stone & poor	

Course Code
DPCC501SEP

Course Title
EMPLOYABILITY SKILLS LAB

Semester
5

Scheme of Instruction

Total Duration : 45 Hrs
Periods / Week: 1T+2P
Credits: 2
Instruction Mode: Tutorial + Practical

Course Objectives

The course enables the students to:

- Develop and communicate more effectively
- Prepare themselves to face the future with enthusiasm and confidence
- Develop team management skills and leadership skills

Course Outcomes

At the end of the course the students are able to:

- Set their career goals
- Think critically and creatively
- Develop broad career plans
- Evaluate and match the job requirements and skills

Cycle	Course Content	Instruction Hours
I	1. Attitude 2. Adaptability 3. Goal setting, 4. Motivation 5. Time management	22
II	1. Critical thinking and creativity 2. Problem solving 3. Team work 4. Leadership 5. Stress management. 6. Written Communication	23

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.
Each Unit will carry equal Weightage of marks.

Course Code DPEL501PET	Course Title DATA COMMUNICATIONS AND COMPUTER NETWORKS	Semester 5
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Scheme of Instruction

Total Duration : 45 Hrs
 Periods / Week: 3-L
 Credits: 3
 Instruction Mode: Lecture

Scheme of Examination

Maximum Score : 100
 Internal Evaluation : 30
 End/ External Evaluation : 70
 Exam Duration : 3 Hours

Course Objectives:

- To introduce the concepts of data communication
- To familiarize with different network topologies and the OSI model
- To familiarize with various communication protocols

Course Outcomes:

On completion of the subject, the student will be able to :

- Identify different types of network topologies and their architecture
- Identify various protocols used in communication
- Understand the different web applications.

Unit	Course Content	Instruction Hours
I	<p>Basics of Data Communication & Networking Introduction – concepts of data communication – analog signal, analog transmission – digital signal, digital transmission – simplex, duplex, full duplex – transmission media – guided media – twisted pair, UTP, STP, Coaxial cable, optical fiber – comparison of transmission media characteristics – Shannon capacity- Network topologies – bus, star, ring – switching basics – circuit switching – packet switching – message switching – router – routing. – OSI Model – OSI functions – physical layer, data link layer, network layer, transport layer, session layer, presentation layer and application layer. Categories of computer network – LAN – Ethernet – introduction – properties – addresses – Ethernet frame 802.3 format – MAC — token ring –introduction – properties - operation. Concepts of WLAN -Bluetooth – overview – application.</p>	15
II	<p>Basics of WAN and WAN Protocols WAN – basics – architecture – transmission mechanism – addressing – packet forwarding – intranet – point-to-point and point to multi point networks. Internet – introduction – internetworking devices – repeaters – bridges – routers – gateways – brief history of internet – ARPA net – www – internal architecture of ISP – high level architecture of an ISP</p>	15

	Ways of accessing the internet – introduction –PSTN ISDN – background of ISDN– ISDN architecture -TCP/IP basics – Use of IP address – TCP/IP examples – IP datagrams –Communication using TCP/IP — routers - TCP basics – features of TCP – relation between TCP & IP – ports and sockets – Connection.	
III	Web Applications Domain name system (DNS) – DNS Name space – Electronic mail – Mail box – sending and receiving an email – email anatomy – POP – SMTP server – complete journey of an email message – browser based emails – file transfer using FTP — Data transfer connection – TELNET- Introduction and brief history of WWW – basics of WWW– remote login.	15
Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.		
Text Books and References:		
1	Data Communication and Networking by Godbole TMH	
2	Computer Networks by Andrew S. Tanenbaum 4th Ed. PHI.	
3	Data and Computer Communications: William Stallings 7 th edition. PHI.	
4	Data Communication and Networking: Behrouz Forouzan 3rd edition.TMH.	
5	Computer Communications and Network Technologies by Michael A.Gallo & William Hancock Thomson	

Course Code	Course Title	Semester
DPEL502PET	VLSI TECHNOLOGY	5

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3-L

Credits: 3

Instruction Mode: Lecture

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation : 70

Exam Duration : 3 Hours

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

- Understand basics of CMOS Technology
- Understand various IC fabrication processes
- Understand VLSI Design Flow.

Course Outcomes:

- Ability to distinguish all the steps in the preparation of an IC
- Ability to recognise different MOS families and their characteristics.
- Write simple programs using Verilog HDL.

Unit	Course Content	Instruction Hours
I	Introduction to MOS VLSI Technology Introduction to SSI, MSI, LSI & VLSI. Moore's Law, MOS Transistor (PMOS & NMOS), Depletion and Enhancement mode Transistors & their characteristics, CMOS & Bipolar Technology, comparison of CMOS & Bipolar Technology.	15
II	Design of VLSI System & Programming Design Rules-minimum width & spacing rules, length of Poly and metal lines, minimum enclosure & extension. Basic concepts of Verilog, VLSI Design Flow: Structural, Switch, Behavioural level modelling, RTL modelling. Sample program using Verilog HDL.	15
III	Fabrication Technology Wafer preparation (MGS-Metallurgical Grade Silicon, EGS-Electronic Grade Silicon, CZ Growth & Epitaxy). Material growth and deposition (Thermal Oxidation, CVD) Metal and contact deposition. Doping Process-Ion Implantation, Solid State Diffusion Photolithography & Etching: Wet and Dry etching. Device Fabrication-CMOS Fabrication (P-well & N-well process)	15

Examination and Evaluation Pattern:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.
Each Unit will carry equal Weightage of marks.

Text Books and References:

1	Essentials of VLSI circuits and systems – Kamran Eshraghian, Douglas and A. Pucknell, PHI, 2005 Edition.
2	Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997
3	Introduction to VLSI Circuits and Systems –John P.Uyemura,Wiley student Edition

Course Code	Course Title	Semester
DPEL503PET	BIO-MEDICAL INSTRUMENTATION	5

Scheme of Instruction

Total Duration : 45 Hrs

Periods / Week: 3-L

Credits: 3

Instruction Mode: Lecture

Scheme of Examination

Maximum Score : 100

Internal Evaluation : 30

End/ External Evaluation : 70

Exam Duration : 3 Hours

Course Objectives:

- To provide an acquaintance of the physiology of the heart, lung, blood circulation and circulation respiration. Biomedical applications of different transducers used.
- To introduce the student to the various sensing and measurement devices of electrical origin. To provide awareness of electrical safety of medical equipments
- To provide the latest ideas on devices of non-electrical devices.
- To bring out the important and modern methods of imaging techniques.
- To provide latest knowledge of medical assistance / techniques and therapeutic equipments

Course Outcomes:

- Ability to understand the physiology of various systems in human body.
- Will Understand application of electronics in Medical field.
- Will identify various sensing devices and their applications in medical field
- Ability to Understand working of bioelectronics systems such as EEG, ECG, MRI etc. and various imaging techniques.

Unit	Course Content	Instruction Hours
I	Introduction: Static and dynamic characteristics of medical instruments. Biosignals and characteristics. Bio amplifier, Problems encountered with measurements from human beings. Organisation of cell: Nernst equation for membrane Resting Potential Generation and Propagation of Action Potential. Bio Electrodes: Biopotential Electrodes-External electrodes, Internal Electrodes. Biochemical Electrodes.	15
II	Mechanical function: Electrical Conduction system of the heart. Cardiac cycle. Relation between electrical and mechanical activities of the heart. Cardiac Instrumentation: Blood pressure and Blood flow measurement. Specification of ECG machine. Einthoven triangle, Standard 12-lead configurations, Interpretation of ECG waveform with respect to electro mechanical activity of the heart.	15
III	Neuro-Muscular Instrumentation: Specification of EEG and EMG machines. Electrode placement for EEG and EMG recording. Interpretation of EEG and EMG.	15

	<p>Therapeutic equipment: Pacemaker, Defibrillator, Shortwave diathermy. Haemodialysis machine.</p> <p>Respiratory Instrumentation: Mechanism of respiration, Spirometry, Pneumotachograph Ventilators.</p>	
<p>Examination and Evaluation Pattern: As per the CBCS Rules and Regulations of Examination Branch of MANUU. Each Unit will carry equal Weightage of marks.</p>		
<p>Text Books and References:</p>		
1	Principles of Applied Biomedical Instrumentation – by L.A. Geddes and L.E. Baker, John Wiley and Sons.	
2	Biomedical Equipment Technology – Carr & Brown, Pearson	
3	M.Arumugam, ‘Bio-Medical Instrumentation’, Anuradha Agencies, 2003.	
4	Handbook Of Biomedical Instrumentation R S Khandpur Edition : 2014	
5	L.A. Geddes and L.E.Baker, ‘Principles of Applied Bio-Medical Instrumentation’, John Wiley & Sons, 1975.	
6	J.Webster, ‘Medical Instrumentation’, John Wiley & Sons, 1995.	
7	C.Rajaroo and S.K. Guha, ‘Principles of Medical Electronics and Bio-medical Instrumentation’, Universities press (India) Ltd, Orient Longman ltd, 2000.	

Course Code
DPEL601PCP

Course Title
Industrial Training

Semester
6

Credits: 11

Periods / Week: 6-T

1) Scheme of Evaluation

S.NO	Subject	Duration	Assessments	Max Marks	Remarks
1	Industrial Training	One Semester	1.First Assessment (during middle of semester)	250	To be done in the Industry
			2. Second Assessment (at the end of Semester)	250	To be done in the Industry
			3. Final Assessment. (Log Book and Seminar 50 marks Each)	100	To be done in the MANUU
<i>Total Marks</i>				600	

2) OBJECTIVES

On completion of a spell of practical training in a industry, the student will be able to

1. Know the organizational set up from top executive to workmen level
2. Know the aspects to be considered during preliminary projects in respect of Irrigation/Road/Rural water supply/Housing colony etc.,
3. Know the duties of different officers in the organization
4. Know about administrative sanction and technical sanction
5. Know various stages of construction
6. Knows inspection of form work, reinforcement grills etc.,

7. Know the methods of procurement of labour, material and equipment
8. Know tenders, contract and contract systems
9. Know the need & principles supervision of works
10. Know measurement book and muster roll.

3) Minimum Attendance: - The candidate shall put in a minimum of 90% attendance.

4) Minimum Passing Marks :- The minimum Pass marks for industrial training shall be 50% in all assessments.

5) ASSESSMENT SCHEME for First and Second Assessment

These assessments shall be done at industry by the trainers/examiners of industry.

S. No.	Name of the Parameter	Max. Marks Allotted for each Parameter
1.	Attendance and punctuality	25
2.	General conduct during the period	25
3.	Ability to communicate & human relations	25
4.	Familiarity with materials, tools & machinery	25
5.	Attitude towards job	25
6.	Manual skills	25
7.	Comprehension & Observation	25
8.	Supervising ability	25
9.	Safety and Environmental consciousness	25
10.	Maintenance of dairy	25
	Total:	250

6) ASSESSMENT SCHEME for Final Assessment

The final assessment shall be carried out in MANUU by a committee comprising of

- a) A representative of the Industry where the candidate is undergoing training
- b) Head of the Department.
- c) One Faculty of Department.

6.1) LOG Book

The trainees are required to maintain neatly a log book giving a brief account of activities performed and observations made on day to day basis at the industry. This is to be checked and counter signed by the supervising personal industry and visiting faculty if deputed by MANUU. At the end of training Log Book shall be evaluated for 50 Marks.

The format of Log Book shall be as follows:-

First Page :- It shall consists of following:-

Name of Candidate:-

Roll No of Candidate:-

Date of Joining the Training:-

Name of the Project:-

Name of the work assigned:-

Second Page onwards :-

S.No	Date	Day	Shift / Timing	Work done / Task/Activity	Signature of Trainer	Remarks

6.2) Seminar/Presentation

A seminar/ Viva-Voice/ Presentation shall be conducted as part of final assessments after the completion of training wherein every candidate will be given fixed time to demonstrate and explain the work experience gained in the training period.

Based on the demonstration viva voice for 50 marks will be conducted.

7) Record Book

Every trainee shall submit two copies of bounded training report of minimum 70 Pages, A4 sized and neatly typed. Detailed Record format shall be obtained from the department.

8) Other Rules

8.1) Student failing in training or falling short of attendance has to re-appear for the training when it is offered next. Candidates have to register for reappearing within 15 days of commencement of new semester. No separate notice will be given in this regard.