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

Civil Engineering

MANUU POLYTECHNIC
DIPLOMA IN
(CIVIL ENGINEERING)
SCHEME OF INSTRUCTION, EXAMINATION & EVALUATION (CBCS)

Sno.	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
		Semester I							
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	DPCE101EST	Engineering Mechanics	3	-	-	3	30	70	100
8	DPCS101PCP	Computer Fundamentals Lab	-	1	2	2	25	25	50
9	DPCE101PCT	Surveying –I	3	-	-	3	30	70	100
10	DPCE101PCP	Surveying Lab – I	-	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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Sno.	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
		Semester II							
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	DPCE201PCT	Surveying II	3	-	-	3	30	70	100
8	DPCE201PCP	Surveying Lab–II	-	1	2	2	25	25	50
9	DPCE202PCT	Strength of Materials- I	3	-	-	3	30	70	100
10	DPCE202PCP	Strength of Material 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 Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	DPCC301BST	Engineering Mathematics - III	3	-	-	3	30	70	100
2	DPCE301PCT	Design of RCC Elements - I	3	-	-	3	30	70	100
3	DPCE302PCT	Strength of Materials-II	3	-	-	3	30	70	100
4	DPCE303PCT	Construction Materials & Practice	3	-	-	3	30	70	100
5	DPCE304PCT	Fluid Mechanics - I	3	-	-	3	30	70	100
6	DPCE304PCP	Fluid mechanics Lab - I	-	1	2	2	25	25	50
7	DPCE301PCP	Civil Engineering Drawing Lab - I	-	1	2	2	25	25	50
8	DPCE302PCP	Material Testing Lab - I	-	1	2	2	25	25	50
9	DPCE303PCP	Auto Cad Lab - I	-	1	2	2	25	25	50
10	DPCC301SEP	Basic Communication & Presentation Skills Lab	-	1	2	2	25	25	50
Total Credits (Semester III)			30		25	275	475	750	

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Sno.	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
Semester IV									
1	DPCE401PCT	Fluid Mechanics - II	3	-	-	3	30	70	100
2	DPCE402PCT	Design of RCC Elements - II	3	-	-	3	30	70	100
3	DPCE403PCT	Quantity Survey - I	3	-	-	3	30	70	100
4	DPCE404PCT	Irrigation Engineering	3	-	-	3	30	70	100
5	DPCE405PCT	Water Supply and Sanitation Engineering	3	-	-	3	30	70	100
6	DPCE401PCP	Fluid Mechanics Lab - II	-	1	2	2	25	25	50
7	DPCE402PCP	Civil Engineering Drawing Lab - II	-	1	2	2	25	25	50
8	DPCE403PCP	Material Testing Lab - II	-	1	2	2	25	25	50
9	DPCE404PCP	Auto Cad Lab-1I	-	1	2	2	25	25	50
10	DPCC401SEP	Communication and Interactive Skills Lab	-	1	2	2	25	25	50
Total Credits (Semester IV)				30		25	255	495	750

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Sno.	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
Semester V								
1	DPCE501PCT	Design of Steel Structures	3	-	-	3	30	70	100
2	DPCE502PCT	Transportation Engineering	3	-	-	3	30	70	100
3	DPCE503PCT	Construction Quality and Management	3	-	-	3	30	70	100
4	DPCE504PCT	Quantity Survey - II	3	-	-	3	30	70	100
5	DPCE501PCP	Environmental Engineering Lab	-	1	2	2	25	25	50
6	DPCE502PCP	Material Testing Lab - III	-	1	2	2	25	25	50
7	DPCE503PCP	Advanced Surveying Lab	-	1	2	2	25	25	50
8	DPCE504PCP	S.E Drawing Lab	-	1	2	2	25	25	50
9	DPCC501SEP	Employability Skills Lab	-	1	2	2	25	25	50
10		**Electives**							
	DPCE501PET	Concrete Technology	3	-	-	3	30	70	100
	DPCE502PET	Geo-Technical Engineering							
	DPCE503PET	Engineering Hydrology							
	**Total Credits (Semester V)**	**30**			**25**	**280**	**520**	**800**

SCHEME OF INSTRUCTIONS & EXAMINATION
MANUU POLYTECHNIC
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Semester VI									
Sno.	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	DPCE601PCP	Industrial Skills Training-Project Work	-	-	-	8	300	300	600
Total Credits (Semester VI)						8	300	300	600

Total Credits: **140**

Total SGPA Marks: **4500**

Course Code	Course Title	Semester
DPCC101HST	**ENGLISH-I**	1

Scheme of Instruction	Scheme of Examination

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

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 :** 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
DPCC103BST	**ENGINEERING MATHEMATICS-I**	1

Scheme of Instruction	**Scheme of Examination**

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

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

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.

Unit	Course Content	Instruction Hours
I	**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. **PARTIAL FRACTION:** Introduction Rational Fraction and Some Fundamental Rules To Resolve a Proper Fraction **f(x)/g(x)** into Partial Fraction. **BINOMIAL THEOREM**: - Binomial Theorem Statement (without proof) Properties of Binomial Theorem and its Applications. **FUNCTIONS AND RELATIONS –:** Types of Functions, Inverse Functions, Domain, Range, and Inverse of real valued function.	15
II	**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 Crammer's rule.	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   **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: Theory   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	**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. **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.	15
II	**Kinematics** Introduction, Write the equation of motion in a straight line, Explain the	15

	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, **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. **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	
III	**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 **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	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	**Scheme of Examination**
Total Duration : 45Hrs	Maximum Score : 50
Periods / Week: 1+2-T+P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation : 25
Instruction Mode: Demonstration + Practical	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	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	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	**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: Theory	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 it's 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	**SOME BASIC CONCEPTS OF CHEMISTRY**: **A-** **General Introduction:** Importance and Scope of Chemistry. **B-** **Atomic structure;-**Fundamental particles of an atom-Bohr's atomic theory and its limitations-Quantum numbers. **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. **D-** **Modern Periodic Table and Periodic Law.**	15

	E- Chemical bonding:- Ionic, Covalent, Coordinate covalent bond with examples. **F- Organic Chemistry-** General Introduction and Classification of Organic Compounds. **G- Hydrocarbons:** Classification of Hydrocarbons, Homologues series. a) Alkanes – Ethane b) Alkenes – Ethene c) Alkynes – Ethyne and Benzene. **H- Types of Functional groups** with examples.**- Isomerism;** Structural Isomers. **I- Types of Organic reactions:** a) Addition Reactions b) Substitution Reactions.	

II	**SOLUTIONS AND ACIDS AND BASES**
	A- Solutions-
	    1. General Introduction of solutions: Classification of Solutions-Aqueous and non- aqueous solution.
	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.
	C- Acid and Bases:
	    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	**ELECTROCHEMISTRY AND CORROSION**
	A- ELECTROCHEMISTRY
	    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

Secondary batteries, lead acid storage battery **Fuel cells:** Definition, Hydrogen-oxygen fuel cell.

B- Corrosion:

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.

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
DPCC102BSP	**Engineering Chemistry Lab**	1

Scheme of Instruction

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

	solution. 4. Estimation of hydrochloric acid using standard sodium hydroxide solution. 5. Estimation of sulphuric acid using standard sodium hydroxide solution.	
II	**Redox reactions:** 1. Estimation of Mohr's salt solution using standard potassium permanganate solution. 2. Estimation of oxalate solution using standard potassium permanganate solution. **Demonstration experiments:** **3.** Determination of melting point of some solids (Urea, Salicylic acid). 4. Determination of boiling point of some solvents (Acetone, Amylalcohol, Benzene). 5. Experiment to show that both air and water required for rusting of iron. 6. Electrolysis of aq.NaCl solution. 7. Reverse Osmosis.	22

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
DPCE101EST	**Engineering Mechanics**	I

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: Theory	Exam Duration : 3 Hours

Course objectives:
- To bridge the gap between physical theory and its application to technology.
- To impart basic knowledge of Engineering Mechanics where in Laws of Physics are applied to Solve the Engineering problems
- Understand the vectorial and scalar representation of forces and moments
- Describe static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions
- Analyse the properties of surfaces, solids in relation to moment of inertia and Comprehend the effect of Friction

Course Outcomes:
 On completion of the course, the students will be able to:
- Apply knowledge of mathematics, science, and engineering
- Design and conduct experiments, as well as to analyze and interpret data
- Design a system, component, or process to meet desired needs of multi-disciplinary teams
- Identify, formulate, and solve engineering problems
- Use the techniques, skills, and modern engineering tools necessary for engineering practice.

Unit	Course Content	Instruction Hours
I	**Forces & Moments** Introduction to Mechanics, Concepts of Force, Moment, Resultant, Equilibrium of forces; equilibrant and Moment of a couple, Distinguish between Scalar and Vector quantities, Co-planar and non-co-planar forces, parallel and non-parallel forces, like and unlike parallel forces, Compute the resultant of a system of coplanar parallel forces, Compute the resultant of two co-planar forces acting at a point by law of parallelogram and law of Triangle of forces, Principle of transmissibility of force, Lami's theorem. Properties of a couple, Moment of a couple, Condition of equilibrium of rigid body subjected to a number of co-planar forces. Types of beams with different support conditions and support reactions for point loads and uniformly distributed load.	15
II	**Centroid and Moment of Inertia** Introduction to Centroids, Centroids of simple regular plane figures, Centroids of T, L, I, Channel section, Z section, Unsymmetrical I section	15

	and Built-up sections. Moment of Inertia: Introduction to Moment of Inertia, Perpendicular and parallel axes theorems, Moment of Inertia of standard sections like rectangle, triangle, circle and hollow circular sections , Moment of Inertia T, L, I, Channel section, and Z sections using parallel axis theorem .	
III	**Moment of Inertia for Built-up Sections** Moment of Inertia and radius of gyration of built-up sections. Polar Moment of Inertia of solid and hollow circular sections using perpendicular axis theorem. **FRICTION** Introduction - Theory of Friction - Angle of friction - Laws of Friction - Static and Dynamic Frictions- Wedge Friction, Screw-jack and Differential Screw-jack	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	Engineering Mechanics – R.S.KURMI
2	Engineering Mechanics – P.K. Abdul Latheef
3	Engineering Mechanics Statics – Dayaratnam.
4	Engineering Mechanics N. Srinivasulu.
5	Engineering Mechanics – A.Kamala & A.V.R.J.Sharma

Course Code	Course Title	Semester
DPCS101PCP	**Computer Fundamentals Lab**	1

Scheme of Instruction   **Scheme of Examination**

Total Duration : 45 Hrs   Maximum Score : 50
Periods / Week: 1+2-L+P   Internal Evaluation : 25
Credits: 2   End/ External Evaluation : 25
Instruction Mode: Practical   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 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.

Unit	Course Content	Instruction Hours
I	**DOS**: Practice on Internal and External commands, Create and use Batch Files; know the usage of WYSIWY Editor. **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. **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.	22

II	**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, **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. **MS Power Point:** Create a power point presentation for a simple technical topic using MS-PowerPoint. **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. **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.	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
2	Computer Science Theory and Application

Course Code	Course Title	Semester
DPCE101PCT	**Surveying - I**	I

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:

- Have the ability to apply knowledge of mathematics, science, and engineering to understand the measurement techniques and equipment used in land surveying.
- Have the ability to use techniques, skills, and modern engineering tools necessary for engineering practice.
- To impart knowledge and skills of basics of surveying and purpose of surveying.
- Knowledge of chain surveying, Understand the principles and functions of Chain Surveying
- To know the Principles of Compass Surveying and methods involved

Course Outcomes:

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

- Appreciate the need for accurate and thorough note taking in field work to serve as a legal record.
- Gain a basic understanding of the principles and operation of chain surveying
- Learn the basics of the principles and operation of compass surveying
- Improve ability to function as a member of a survey party in completing the assigned field work.
- Appreciate the need for licensed surveyors to establish positioning information for property and structures

Unit	Course Content	Instruction Hours
I	**Introduction to Surveying and Chain Survey** Concept and Objective of Surveying, Classification of Surveying in detail, Principles of surveying, Linear and angular measurements, Instruments used, Units of Measurements. **Chain Surveying** Principle of Chain Survey Terms used in Chain Survey -Survey stations, Base line, check line, Offset. Equipment used in chain Surveying and their functions Errors in Chain Surveying – problems. **Operations in Chain Surveying** Different operations in Chain Surveying- Direct ranging and Indirect ranging, Chaining on sloping ground, Setting out right angles with open cross staff and tape, Recording field notes – field book- Conventional signs. Obstacles in chaining-methods to overcome obstacles – Problems, Calculations of area – different methods –Average Ordinate, Trapezoidal and Simpson's rules - Problems. Uses and working of minor instruments Abney level (Clinometers), Planimeter, Electronic Planimeter, Pentagraph, Ghat Racer, Sex Tant, Plane Table.	15

II	**Compass Surveying** Purpose and principle of Compass Survey- Description of prismatic compass. Concept of Meridian, types - designation of bearings: Whole Circle bearing, Quadrantal bearing – conversion - problems. Bearings and Angles - problems. Conversions of magnetic bearings to true bearings- problems, Traversing, Types.Local attraction- detection and correction – problems - declination- Calculation of included angles - Problems. Plotting of Closed traverse-closing error and adjustments by Bowditch method. Errors in Compass Surveying-Personal, Instrumental and Natural.	15
III	**Levelling:** Definitions of important terms in levelling. Types of Bench Mark. Component parts of Levelling Instrument, Temporary adjustments of Dumpy Level, Types of levelling staffs, description of levelling staff, Classification of Levelling, Methods of levelling and Description of each method. **Levelling Operations and Errors:** Hand Signals during levelling, Level book, Method of Booking the Staff Reading. Determination of reduced levels by height of Instrument and rise and fall Methods, Comparison - Problems. Errors in levelling, Personal, Instrumental and Natural. Precautions in levelling. Errors due to curvature, refraction and combined correction Problems. Determination of Collimation Error, Problems on Missing Data, Method of Plotting Profile Levelling. **Contouring:** Object of Contouring, Contouring – Characteristics Methods of contouring: Block contouring, radial contouring, Interpolation of contours-tracing contour gradient, uses of Contour maps, alignment of roads, railway and canal on contour maps. Determination of Capacity of Reservoir using Contour Maps.	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 Surveying	by	C.Venkatramaiah (Universities Press)
2	Surveying – 1	by	S.Mahboob Basha (Falcon Publishers)
3	Surveying and Levelling	by	R. Agor (Khanna Publications)
4	Surveying –I	by	H.Krishna Sarma, (Radiant Publishers)
5	Surveying and levelling Vol–1	by	Kulkarni and Kanetkar Pune (NCBA Publisher), New Delhi, 1985
6	Surveying and Levelling	by	N N Basak Tata McGraw Hill

Course Code	Course Title	Semester
DPCE101PCP	**Surveying Lab - I**	I

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45Hrs Periods / Week: 1+2-T+P Credits: 2 Instruction Mode: Demonstration + Practical	Maximum Score : 50 Internal Evaluation : 25 End/ External Evaluation : 25 Exam Duration : 3 Hours

Course Objectives:

- To Perform Chain Surveying
- To Perform Chain Traverse
- To Perform Compass Surveying
- To Perform Compass surveying Traversing

Course Outcomes:

- Will develop the ability of thorough note taking in field work to serve as a legal record.
- Gain a basic understanding of the principles and operation of chain surveying
- Will develop the basic understanding of the principles and operation of compass survey
- Improve ability to function as a member of a survey party in completing the assigned field work.

Cycle	Course Content	Instruction Hours
I	**Chain and Compass Surveying** 1. Practicing of unfolding and folding of a chain 2. Direct and Indirect Ranging and its recording 3. Measurement of a area using chain triangulation and cross staff methods 4. Chain triangulation around the building covering with recording offsets for other details 5. Observation of Bearings and Included Angles Using Prismatic Compass 6. Traversing with prismatic compass and chain – Open and closed traverse and recording. *Note :- Plotting is essential where ever required*	23
II	**Levelling**	22

| | 1. Taking levels of two points with Simple Levelling and Differential Levelling method.
2. Fly Levelling and shifting of Elevation of Bench Mark
3. Levelling involving inverted staff reading.
4. Reciprocal levelling.
5. Profile Levelling and Taking levels of Longitudinal Section and Cross Sections of a Road/ Canal.
6. Contouring by Radial/Block Levelling Method
Note :- Plotting is essential where ever required | |

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 Surveying	by	C.Venkatramaiah (Universities Press)
2	Surveying – 1	by	S.Mahboob Basha (Falcon Publishers)
3	Surveying and Levelling	by	R. Agor (Khanna Publications)
4	Surveying –I	by	H.Krishna Sarma, (Radiant Publishers)
5	Surveying and levelling Vol–1	by	Kulkarni and Kanetkar Pune (NCBA Publisher), New Delhi, 1985
6	Surveying and Levelling	by	N N Basak Tata McGraw Hill

Course Code	Course Title	Semester
DPCE101ESP	**Engineering Graphics Lab - I**	1

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1+2-T+P	Internal Evaluation : 25
Credits:2	End/ External Evaluation : 25
Instruction Mode: Theory + Practical	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	**Scheme of Examination**

Total Duration : 30 Hrs	Maximum Score : 50
Periods / Week: 2-L	Internal Evaluation : 15
Credits: 2	End/ External Evaluation : 35
Instruction Mode: Lecture	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	**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: Theory	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 Pllai**.**
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	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: Theory	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	**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. **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.	15
II	**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	15

	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. **MAGNETISM** 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.	
III	**MODERN PHYSICS** 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	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 & 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	**Scheme of Examination**

Total Duration : 45 Hrs   Maximum Score : 50
Periods / Week: 1+2-T+P   Internal Evaluation : 25
Credits: 2   End/ External Evaluation : 25
Instruction Mode: Demonstration + Practical   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	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	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:

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

	6. Elastomers: Butyl rubber, Buna-s, Neoprene rubber and their uses. **b. CHEMICALS IN DAILY LIFE** 1. Chemicals in Medicines: Analgesics, Disinfectants, Antibiotics, Antacids. 2. Chemicals in Food: Preservatives, Artificial Sweetening Agents, Elementary idea of Antioxidants. 3. Cleansing agents: Soaps and Detergents, Cleansing Action of soap.	
II	**METALLURGY AND THE CHEMICAL RESOURSES OF ENERGY** **a. METALLURGY:** 1. General Introduction of Metallurgy: Characteristics of metals and distinction between metals and non metals. 2. Terms and terminologies-mineral, ore, gangue, flux, slag. 3. Types of furnaces: Blast furnace, Reveberatory furnace and Muffle furnace. 4. Concentration of ore: Methods of concentration of ore-froth flotation process. 5. Methods of extraction of crude metal: Roasting, calcination, smelting. 6. Alloys: composition and uses of Brass, German silver and Nichrome. **b. FUELS** 1. General Introduction of fuels 2. Definition and classification of fuels. Characteristics of good fuel. 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	15
III	**ENVIRONMENTAL STUDIES AND WATER TECHNOLOGY** **a. ENVIRONMENTAL STUDIES** 1. General introduction to environmental studies. 2. Environment, scope and importance of environmental studies 3. Important terms and terminology in Environmental Chemistry – renewable and non renewable energy sources. 4. Concept of ecosystem, producers, consumers and decomposers 5. Biodiversity, definition and threats to Biodiversity. 6. Air pollution – Causes and Effects; acid rain; green house effect and global warming; Ozone depletion. Control measures of air pollution 7. Water pollution –Causes and effects. Control measures of water pollution. **b. WATER TECHNOLOGY** 1. General Introduction to Water Technology. 2. Sources of Water; Soft and Hard Water; Causes of Hardness of water. 3. Types of hardness. Disadvantages of Hard Water. Degrees of hardness. Numerical problems related to degree of hardness. 4. Softening of Water-Permutit process and ion exchange process. 5. Drinking water & its qualities. Municipal treatment of water for drinking purpose. Osmosis, Reverse Osmosi. Advantages of Reverse osmosis and its applications.	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	Scheme of Examination
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1+2-T+P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation : 25
Instruction Mode: Practical	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	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	**Demonstration Experiments:** **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
DPCE201PCT	**Surveying - II**	II
Scheme of Instruction		**Scheme of Examination**

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

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

Course objectives:
- To understand the importance of surveying in the field of civil engineering
- To understand the basics of levelling and operations involved
- To know the basics of levelling and theodolite survey in elevation and angular measurements
- To understand the basics and operations in contouring

Course outcomes:
On completion of the course, the students will be able to:
- Gain the ability to measure differences in elevation, draw and utilize contour plots, and calculate volumes for earthwork.
- Carry out preliminary surveying in the field of civil engineering applications such as structural, highway engineering and geotechnical engineering
- Plan a survey for applications such as road alignment and height of the building
- Undertake measurement and plotting in civil engineering
- Use techniques, skills, and modern engineering tools necessary for engineering practice

Unit	Course Content	Instruction Hours
I	**Theodolite Surveying**: Principles of theodolite surveying, Component parts, technical terms, detailed study of a transit. Temporary adjustments of Theodolite, Measurement of horizontal angles by repetition and reiteration method, Measurement of vertical angles. Determination of magnetic bearings- deflection angles- directs Angles- Prolonging a straight line. Errors in theodolite surveying, Traversing with theodolite by included angle, Method, deflection angle method, bearing method. Checks for closed and open traverse. Traverse computations, Latitude, departure, closing error, balancing a closed traverse by Bowditch rule and transit rule, problems on omitted Measurements, calculation of area of closed traverse.	15
II	**Trigonometric levelling:**	15

	Principle and necessity of Trigonometric levelling, Elevations and Distance of objects whose base is accessible and base is inaccessible with instruments station in same vertical plane and different vertical planes, Distance between two inaccessible points. **Tachometry:** Principles of tachometry, determination of Tachometric constants -Stadia Tachometry with staff held vertical and line of collimation horizontal or inclined -elevations and distances of staff stations – problems. Tangential Tachometry- Finding elevations- Problems. **Curves:** Simple circular curve- elements of simple curve – types of curves, Preparation of curve table and setting out curves by chain and Tape Method, Setting out of Curve by single and double Theodolite methods – problems.		
III	**Advanced Surveying:** Principle and uses of EDM, Electronic theodolite and distomat. Principles and Uses of Total station Global positioning system (G.P.S)-Fundamentals, Application. Geographical-Information-System(GIS)- definition-components- Spatial and Attribute data - use and application of GIS in Civil Engineering. Introduction to Photogrammetric Surveying - types - basic principles, Remote Sensing-definition-Electro Magnetic Radiation-Platforms and Sensors.	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 Surveying by C.Venkatramaiah (Universities Press)
2	Surveying and Levelling by R. Agor (Khanna Publications)
3	Surveying –I by H.Krishna Sarma, (Radiant Publishers)
4	Surveying and levelling Vol–1 by Kulkarni and Kanetkar Pune (NCBA Publisher), New Delhi, 1985
5	Surveying and Levelling by N N Basak Tata McGraw Hill
6	Surveying – 1 by Nagaraj and Hussain (S. Chand, limited 2000)

Course Code	Course Title	Semester
DPCE201PCP	**Surveying Lab - II**	II
Scheme of Instruction		**Scheme of Examination**

Total Duration :45 Hrs   Maximum Score : 50
Periods / Week: 1+2-T+P   Internal Evaluation : 25
Credits: 2   End/ External Evaluation : 25
Instruction Mode: Practical   Exam Duration : 3 Hours

Course objectives:
- To understand the basics of levelling and operations involved
- To Perform Theodolite survey

Course outcomes:
- Gain the ability to measure differences in elevation, draw and utilize contour plots, and calculate volumes for earthwork.
- Use the theodolite along with chain/tape, compass on the field
- Apply field procedures in basic types of surveys, as part of a surveying team
- Employ drawing techniques in the development of a topographic map.

Cycle	Course Content	Instruction Hours
I	**Theodolite surveying and Tacheometry** 1. Measurement of horizontal angles by reiteration method 2. Measurement of horizontal angles by repetition method. 3. Measurement of vertical angles. 4. Determination of constants of Tacheometry. 5. Determination of horizontal distance and Elevation by Stadia Tacheometry 6. Determination of horizontal distance and elevation by Tangential Tacheometry.	23
II	**Trigonometric Levelling and Curves** 1. Determination of Elevation of an Object whose base is accessible 2. Determination of Elevation of an Object whose base is inaccessible and instruments are in same vertical plane or Different vertical plane. 3. Determination of distance between two inaccessible points. 4. Setting of Curve by offset from Long Chord 5. Setting of Curve by one theodolite method 6. Setting of Curve by two theodolite method	22
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	Surveying and levelling Vol–1 by Kulkarni and Kanetkar Pune (NCBA Publisher), New Delhi, 1985	

Course Code	Course Title	Semester
DPCE202PCT	**Strength of Materials - I**	II

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: Theory	Exam Duration : 3 Hours

Course objectives:
- To learn about the concept of stress, strain, strain energy and deformation of solid and state of stress
- To learn the bending moment, shear force and the corresponding stress distribution for different types of beams
- To learn the analysis of plane truss

Course Outcomes:
On completion of the course, the students will be able to:
- Develop skill of determining the strength parameters of the materials under various aspects
- Develop skills to determine shear force, bending moment, bending and shear stress distribution across various cross sections
- Apply various methods of analysis of plane truss

Unit	Course Content	Instruction Hours
I	**Simple stresses & strains** Elasticity and Plasticity- Types of stresses and strains- Hooke's law-stress strain diagram for mild steel-working stress-Factor of safety-lateral strain, Poisson's ratio and volumetric strain-elastic moduli and their relationship-change in length of bars of varying sections. **Strain Energy** Resilience- gradual, sudden and impact loading -simple applications **Analysis of Trusses** Determination of forces in members of pin jointed plane trusses-cantilever and simply supported trusses by method of joints, method of sections and Graphical method.	15
II	**Shear force and Bending moment** Definition of beam-Types of beams-Concept of Shear force and Bending moment-Shear force and Bending moment diagrams for cantilever, simply supported and overhang beams when subjected to concentrated loads,	15

	U.D.L and their combination of loads-Point of contra flexure-Relation between rate of loading, shear force and bending moment at a section of beam.	
III	**Bending Stresses** Theory of simple bending-assumptions-derivation of bending equation - neutral axis-section modulus of rectangular, square, circular sections (Solid and hollow)- calculation of maximum bending stress in beams of rectangular, square, circular, I and T sections-design of simple beam sections. **Shearing Stress** Derivation of Shear Stress equation-shear stress distribution across various beam sections like rectangular, square, circular, triangular, I and T sections	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	Strength of Materials by R.K.Rajput,S.Chand & Co.New Delhi
2	Strength of Materials by R.K. Bansal, Laxmi Publications Pvt.Ltd,New Delhi.
3	Strength of Materials by Schaum"s outline series-Mc Grawhill international editions
4	Strength of Materials by S.Ramakrishna and R.Narayan-Dhanpat Rai Publications.
5	Strength of Materials by Bhavikatti.

Course Code	Course Title	Semester
DPCE202PCP	**Strength of Materials Lab**	II

Scheme of Instruction	Scheme of Examination
Total Duration :45 Hrs	Maximum Score : 50
Periods / Week: 1+2-T+P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation:25
Instruction Mode: Demonstartion + Practical	Exam Duration : 3 Hours

Course Objectives:

- To find the Young Modulus, hardness and tensile strength of given specimens
- To find the compressive strength of concrete cubes and bricks
- To find the shear strength of given steel specimen
- To find the Flexure strength

Course Outcomes :

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

- Evaluate Young Modulus, , hardness and tensile strength of given specimens
- Find the compressive strength of concrete cubes and bricks
- Evaluate Shear Strength & Flexural strength of given specimens

Cycle	Course Content	Instruction Hours
I	1) Tension test on mild steel rod 2) Compressive Strength of Brick 3) Compressive Strength of Cement 4) Compressive Strength of Concrete 5) Strength of given steel specimen in single shear 6) Strength of given steel specimen in double shear	22
II	1) Flexure Test 2) Brinell/Rockwel-hardness test on Steel Specimen 3) Brinell/Rockwel-hardness test on Brass Specimen 4) Izod/Charpy tests on mild steel/brass. 5) Deflection Test on simply supported beam (Steel beam or Wooden beam) 6) Deflection Test on cantilever beam (Steel beam or Wooden beam)	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	Concrete Technology by M.S.Shetty. – S.Chand & Co.	
2	Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi	
3	Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition	

Course Code	Course Title	Semester
DPCE201ESP	**Engineering Graphics Lab - II**	2

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1+2-T+P	Internal Evaluation : 25
Credits: 3	End/ External Evaluation : 25
Instruction Mode: Practical	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 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.	23
II	1. Auxiliary view 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.	22
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	**ENGENIERING MATHEMATICS-III**	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: Theory   Exam Duration : 3 Hours

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

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	Instruction Hours
I	**PROBABILITY:** Random Experiments and Events, Classical Definition of probability, and Addition Multiplication Theorem of Probability. Independent and Dependent Events Conditional Probability, Baye'sTheorem with some Example.	15
II	**MEASURES OF DISPERSION:** 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	**ANALYTICAL GEOMETRY** 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	Course Title	Semester
DPCE301PCT	**Design of RCC Elements - 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: Theory	Exam Duration : 3 Hours

Course objectives:
- To study the stress-strain behaviour of steel and concrete
- To understand the concept of working stress and limit state methods
- To gain the knowledge of limit state design for flexure, shear, torsion, bond and anchorage for single, doubly and T-Beams
- To understand **the concept of design of lintel**

Course Outcomes:
   On completion of the course, the students will be able to:
- Apply the fundamental concepts of working stress method and limit state method
- Develop skill of using IS-Code of practice
- Develop skill of designing the beams and lintels
- Develop skill of visualising the detailing of RCC beams and lintel

Unit	Course Content	Instruction Hours
I	<u>**Introduction to Reinforced Cement Concrete and its Design**</u> • RCC as a material: Its Constituents, Various grades of concrete, Recommendations of IS-456-2000 in detail. • Working stress method of design (Overview only) • Limit State Design and its philosophy : concepts of limit state design-characteristic loads- characteristic strength – partial load and partial safety factors- representative stress- strain curves for deformed and mild steel bars and Concrete - assumptions in limit state design- stress block parameters- Limiting Percentage of Steel, Limiting moment of resistance	15
II	<u>**Analysis and Design of Singly & Doubly Reinforced Beams**</u> • Singly Reinforced Beam: Definition, Necessity, Moment of Resistance, Design for Flexure and Design of Shear Reinforcement and all necessary checks (Bond) • Doubly Reinforced Beam: Definition, Necessity, Advantages, Moment of Resistance, Design for Flexure and all necessary checks.	15
III	<u>**T- Beams, Lintels and Sunshades**</u> • T Beams: Definition, Necessity and Design • Lintels: Definition, Necessity and Design • Sunshades: Definition, Necessity and Design	15
Note	**All Designs as per IS:456-2000**	

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	Reinforced concrete design by N.Krishna Raju and R.N.Pravesh, New age International publishers, New delhi
2	Fundamentals of reinforced concrete by N.C. Sinha and S.K.Roy, S.Chand publishers
3	Limit state design by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi publishers pvt.Ltd, New Delhi
4	Reinforced concrete structural elements behaviour and design by P. Puroshotam, Tata Mc Grawhill.
5	Reinforced Cement Concrete by Dheerendra Babu, Falcon Publishers

Course Code	Course Title	Semester
DPCE302PCT	**Strength of Materials - II**	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: Theory	Exam Duration : 3 Hours

Course Objectives:

- To study the different methods of finding deflection of beams
- To study the different methods to find the load carrying capacity of columns and struts with different end conditions
- Analyze structural members subjected to tension, compression, torsion and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials.
- To analyse the stress distribution in thin and thick cylinders

Course Outcomes:

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

- Develop skill of determining deflection of the beams for various loading conditions

- Develop skill of visualizing the behaviour of columns and struts for combined bending and axial loading

- Develop awareness about power transmission through shafts

- Develop skill of visualizing different stresses developed in thin and thick cylinders

Unit	Course Content	Instruction Hours
I	**Deflection of beams** Bending into circular arc-concept of slope, deflection and radius of curvature- Differential equation for the elastic line of beams- Double integration method and Macaulay's method- Computation of slope and deflection for simple cases of cantilever and simply supported beams for concentrated and uniformly distributed load and their combination.	15
II	**Columns, Struts and Torsion in Shafts** **Columns and Struts:** Types of columns-Short, intermediate and long columns- Axially loaded compression members-crushing load- Euler's theory for long columns – assumptions- derivation of Euler's formula for various end conditions-Slenderness ratio- Euler's critical stress-limitation of Euler's theory-	15

	Rankines formula for intermediate column- determination of safe and ultimate Rankine load. **Torsion** Torsion of circular shaft: Concept of pure torsion -assumptions and derivation of torsion equation-Torsional moment of resistance, Polar section modulus-Power transmission by shafts.	
III	<u>**Direct & Bending Stress, Cylinders**</u> **Direct & Bending Stress** Stresses under the combined action of direct loading and bending moment, core of section-determination of stresses in case of a retaining walls and dams-stresses due to direct loading and bending moment about both the axes. **Thin & Thick cylinders** Thin Seamless cylindrical shells- derivation of longitudinal and circumferential stresses-Hoop, longitudinal and volumetric strains- changes in diameter and volume of thin cylinders. Introduction to Lames theory for thick cylinders.	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	Strength of Materials by R.K. Bansal,Laxmi Publications Pvt.Ltd,New Delhi
2	Strength of Materials by S.Ramamrutham & R.Narayan-Dhanpat Rai Publications.
3	Strength of Materials by A.R.Basu,Dhanpat Rai & Co,Nai Sarah,New Delhi.
4	Strength of Materials by R.K.Rajput,S.Chand & Co.New Delhi

Course Code	Course Title	Semester
DPCE303PCT	**Construction Materials & Practice**	3

Scheme of Instruction	**Scheme of Examination**

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

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

Course objectives:
- To obtain the understanding of Building Stones
- To learn the importance and properties of Sand and Cement
- To obtain the concepts of Mortar and Concrete
- To know the classification of buildings and types of foundation
- To build an awareness about the type of masonry, floors, and roofs
- To know about materials that is used for protection and functional purpose.

Course Outcomes:

On completion of the course, the students will be able to:
- Demonstrate the different properties required for building stones and the process by which the stones are dressed suitably for usage in construction
- Understand the types, composition and application of different types of sand apart from the manufacture process and usage of cement.
- Understand the Concepts of mortar, concrete and their composition apart from the usage in different kind of construction works
- Understand the role and responsibility of a project manager
- Understand safety practices in construction industry
- Identify the equipment used in construction

Unit	Course Content	Instruction Hours
I	**Stones, Bricks, Sand and Cement** **Stones** Classification of stones. Characteristics of good building stone. Types of stones used in construction, Granite, marble, Cuddapah slabs, Shahabad stones etc.. Dressing of stones **Bricks** Characteristics of good bricks. Standard Size and tests for bricks - explain water absorption and compressive strength tests. Uses of refractory bricks, fly ash bricks, precast Solid Concrete Blocks, Hollow concrete blocks, High quality building blocks. **Sand** Types of Sand and their characteristics, functions of good building sand.	15

	Bulking of Sand. Substitute materials for sand and manufacturing sand – Robo sand etc **Cement** Cement as a Binding Material and its Chemical Composition. Manufacture of cement (Overview only). States the classification of cements and their uses. State the standard tests for cement and explain tests for consistency and setting time of cement. State grades of cement and their compressive strengths. State the importance of Portland Puzzolona cement (Blended cement) and their application		
II	**Mortars & Concrete and Classification of Buildings** Classification of mortars. Different proportion of mortars for various works. Method of preparation of cement mortar. Ingredients of plain and reinforced concrete. Usual proportions of plain and reinforced concrete for different types of works. Importance of Hydration of cement, water cement ratio, workability. Use of Admixtures. **Classification of Buildings** Component parts of a building -Their function. Classification of building according to National building code Site investigations for foundation as per N.B.C	15	
III	**Masonry, Doors, Windows, Roofs and Floors** Classification of stone masonry-Ashlar, Random rubble masonry, Coursed Rubble Masonry. General principles to be observed while constructing stone masonry-Brick Masonry-Bonds in brick masonry (English bond only)-General principles to be observed in construction of brick masonry. Scaffolding and Shuttering for Beams, Columns and Slabs **Doors, Windows , Roofs and Flooring** Common types of Doors and Windows Roofs and its Classification Floor - Requirements of a good floor, Methods of constructing flooring-cement concrete flooring, stone, Tiled flooring, and Marble flooring.	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	Construction materials by N.Sreenivasulu
2	Building Construction by Sushil Kumar
3	Building Construction by S.C.Rangawala
4	Building Materials & Construction by Bindra & Arora.

Course Code	Course Title	Semester
DPCE304PCT	**Fluid Mechanics - I**	3

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation : 30
Credits: 3	End/ External Evaluation:70
Instruction Mode: Theory	Exam Duration : 3 Hours

Course Objectives:

- To teach students about the basic principles of fluid mechanics.
- To teach students with some specific knowledge regarding fluid-flow phenomena observed in civil engineering systems, such as flow in a pipe, open channel flow, etc.
- To provide students with principle and analysis related to fluid kinematics and fluid dynamics.

Course Outcomes:
On completion of the course, the students will be able to
- Recognize the type of fluid flow that is occurring in a particular physical system.
- Develop the skill to choose the appropriate fluid mechanical principles needed to analyze fluid-flow situations.
- Recognize the particular flow regime that is present in a typical engineering system.
- Develop skills to analyze laminar and turbulent flow situations with appropriate fluid properties.
- Develop analytical capability to solve problems of Hydraulics

Unit	Course Content	Instruction Hours
I	**INTRODUCTION:** Properties of fluids, specific weight, mass density, specific gravity, viscosity. Newton's law of viscosity, surface tension and capillarity, Compressibility and Bulk Modulus, Vapour pressure and cavitation. Types of fluids, ideal and real fluids, Thermodynamic Properties, perfect gas equation. **Fluids statics:** Pressure and its measurement, Pascal's law, Atmospheric pressure, gauge pressure absolute pressure and vacuum pressure. Measurement of fluid pressure at a point using piezometer and manometers and pressure gauges,	15
II	**Fluid Kinematics:** Methods of describing fluid motion, Velocity and acceleration – Types of fluid flow – steady and unsteady – uniform and non-uniform – rotational and irrotational flows, Laminar and turbulent flows rate of flow, continuity equation and its applications.	15

	Hydrostatic forces on surfaces: Total pressure and centre of pressure. Fluid pressure on plane inclined and curved surfaces. Buoyancy, Centre of buoyancy, meta-centric height. Conditions of equilibrium of floating and submerged bodies.	
III	**Dynamics of Fluid Flow:** Control volume and fluid flow, Euler equation, Bernoulli theorem, practical application of Bernoulli's equation, Venturimeter, orifice meter, pitot tube. Momentum equation and its applications **Orifices and mouthpieces:** Classification of orifices, flow through an orifice, Hydraulic coefficients, Flow through large orifice, fully submerged orifice, partially submerged orifice, time of emptying a tank through an orifice, classification of mouthpieces. Flow through internal, external, convergent and divergent mouthpieces.	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	S. Nagarathnam, "Fluid Mechanics", Khanna Publishers, New Delhi.
2	Dr R.K. Bansal, " Fluid Mechanics and Hydraulic Machines", Lakshmi Publications, New Delhi
3	Hydraulics & Fluid Mechanics Machines By DrP.N Modi & Dr S.N .Seth.

Course Code	Course Title	Semester
DPCE304PCP	**Fluid Mechanics Lab I**	3

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

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

Course Objectives:

- To enable students to understand properties of fluid and fluid characteristics.
- To train students about flow measurements using various devices at constant and variable head conditions.

Course Outcomes:

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

- Develop skills to analyze various flow problems and fluid characteristics.
- Develop skills to measure discharge rate by using orifices, mouthpieces, notches, orifice meter and venturimeter.

Cycle	Course Content	Instruction Hours
I	1. Verification of Bernoulli's Theorem. 2. Determination of Hydraulic coefficients C_C, C_V and C_d. 3. Determination Coefficient of Discharge of Venturimeter. 4. Determination Coefficient of Discharge of Orificemeter. 5. Determination of Viscosity of Liquids.	22
II	1. Determination Coefficient of Discharge of the Orifice for Unsteadyflow(Free Vortex). 2. Determination Coefficient of Discharge of a Mouthpiece by Constant head method. 3. Determination Coefficient of Discharge of a Mouthpiece by Falling head method 4. Determination Coefficient of Discharge of Given Shape of V-Notch. 5. Determination Coefficient of Discharge of Given Shape of Rectangular- Notch.	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. Nagarathnam, "Fluid Mechanics", Khanna Publishers, New Delhi.
2	Dr R.K. Bansal, " Fluid Mechanics and Hydraulic Machines", Lakshmi Publications, New Delhi
3	Hydraulics & Fluid Mechanics Machines By DrP.N Modi & Dr S.N .Seth.

Course Code	Course Title	Semester
DPCE301PCP	**Civil Engineering Drawing Lab I**	3

Scheme of Instruction	**Scheme of Examination**

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

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

Course Objectives:

1. To understand the principles of planning and bylaws
2. To draw plan, elevation and section of load bearing and framed structures
3. To draw plan, elevation and section of public and industrial structures
4. To prepare a detailed working drawing for doors, windows, etc.

Course Outcomes :

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

1. Appreciate types of Drawings and their importance.

2. Use building drawing Symbols, Conventions and Abbreviations

3. Apply various types of scales as per needs.

4. Apply the Bye laws and Principles of Planning for residential and other public buildings.

5. Develop concept plan of buildings

6. Prepare detail drawings for single and two storied residential building and public building.

7. Draw details of parts of buildings

Cycle	Course Content	Instruction Hours
I	1. Conventional signs for Construction materials, sanitary fixtures and electrical fixtures.	22
	2. Plan of one brick wall, showing Odd and even courses in English bond and Cross section of a load bearing wall, showing all the components, below and above the ground level.	
	3. Plan & Cross section of a Fully panelled door, Fully panelled window & glazed window	
	4. Single storied two bedroom load bearing residential building	
	5. Single storied framed structure two bedroom residential building	
	6. Two-storied residential building (framed structure type)	
II	1. Dog legged stair case.	23
	2. Elevation of King post and Queen post trusses with the given data	

	3. Draw line diagrams only showing the functional requirements of
	      a) Rural hospital for 10 beds capacity,
	      b) Hostel for 50 students
	      c) Primary school for 250 to 300 students
	      d) Apartments - Plan of one floor with 6 to 10 units
	         @90 – 150 Sq.m/unit	

	4. Working drawing for the purpose of marking the width of foundation for the given plan	
	5. The working drawings for electrical layout, plumbing for a given residential building (two bedroom building – Ground floor only)	
	6. Lift shaft for multi storied building.	

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
DPCE302PCP	**Material Testing Lab-I**	3

Scheme of Instruction	Scheme of Examination
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1T+2P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation:25
Instruction Mode: Demonstration and Practical	Exam Duration : 3 Hours

Course Objectives:

- To find the water absorption and efflorescence of bricks
- To find property and quality of cement by performing various test on it
- To study the gradation of fine aggregates
- To find the physical properties of given fine aggregate and cement samples

Course Outcomes :

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

- Evaluate the quality of bricks
- Evaluate the quality of cement
- Evaluate the quality of fine aggregates
- Perform Quality Assurance & Quality Control checks at sites

Cycle	Course Content	Instruction Hours

I	**Tests on Bricks**
	     1. Water absorption
	     2. Efflorescence.
	 Tests on Cement
	     3. Fineness test and Compressive Strength of Cement.
	     4. Normal consistency test
	     5. Initial setting time of cement.
	     6. Final setting time of cement.
	     7. Specific gravity of cement.
		22

II	**Tests on Fine Aggregates**
	     1. Bulking of Sand
	     2. Percentage of Voids
	     3. Sieve Analysis
	     4. Field method to Determine Silt Content
	     5. Specific gravity of Fine Aggregates
		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	Concrete Technology by M.S.Shetty. – S.Chand & Co.	
2	Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi	
3	Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition	

Course Code	Course Title	Semester
DPCE303PCP	**AutoCAD Lab - I**	3

Scheme of Instruction

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

Scheme of Examination

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

Course Objectives:
- To learn the fundamentals of Computer Aided Drafting
- Preparation of plan, elevation and sections of various types of buildings and using AutoCAD
- Improve imagination and creative skills in planning and detailing various types of buildings

Course Outcomes :

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

- Draw the plan, section and elevation of a building
- Create, analyze and produce 2D drawings of buildings in AUTO CAD environment
- Detailing building plans in CAD environment
- Apply Spreadsheet calculations to Civil Engineering

Cycle	Course Content	Instruction Hours
I	1. **Introduction to computer aided drafting (CAD)**, Computer graphics, Definition of CAD, Applications of CAD, Advantages of CAD, Introduction to Auto CAD as Drafting package Study of drawing editor screen, List out methods to access Auto CAD commands, Practice of setting up of drawing area using utility commands, & using setting commands, Practice of entity draw commands 2. Draw the given geometrical figures using draw commands; Dimension the figures using dimensioning commands, Practice of Modify commands. Practice of construct commands, Practice of edit commands, 3. Practice of view commands, Practice of Hatch commands, Practice of insert commands. 4. Construct a hexagon from the given data, Construct ellipse, parabola, hyperbola, cycloid, and helix 5. Draw conventional signs as per I.S. standards , symbols used in civil engineering drawing 6. Use of Layer, Lineweight, Line Properties	22
II	1. Draw the Plan and Section and Elevation of fully Panelled Door 2. Elevation of partly glazed and partly panelled window. 3. Draw the important building components like section of a load bearing wall foundation to parapet.	23

4. Prepare the king post & Queen post truss and label the various parts. 5. Develop Simple 2D Drawings with Dimensioning, Lettering 6. Develop Complex 2D Drawings with Dimensioning, Lettering	

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.	Ronald W., Leigh, AutoCAD: A Concise Guide to Commands and Features, Galgotia Publications, 2004.

Course Code	Course Title	Semester
DPCC301SEP	**Basic Communication & Presentation Skills Lab**	3

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1T+2P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation:25
Instruction Mode: Demonstration + Practical	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	Course Title	Semester
DPCE401PCT	**Fluid Mechanics - II**	4

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation : 30
Credits: 3	End/ External Evaluation:70
Instruction Mode: Theory	Exam Duration : 3 Hours

Course Objectives:

- To teach students about the basic principles of fluid mechanics.
- To teach students with some specific knowledge regarding fluid-flow phenomena observed in civil engineering systems, such as flow in a pipe, open channel flow, etc.
- To provide students with principle and analysis related to fluid kinematics and fluid dynamics.

Course Outcomes:

On completion of the course, the students will be able to:
- Develop the skill to choose the appropriate fluid mechanical principles needed to analyze fluid-flow situations.
- Recognize the particular flow regime that is present in a typical engineering system.
- Develop skills to analyze laminar and turbulent flow situations with appropriate fluid properties.
- Design a most economical section of an open channel.
- Differentiate various properties of flow before and after the shock.

Unit	Course Content	Instruction Hours
I	**Notches and Weirs** Classification of notches and weirs, discharge over a rectangular, triangular, Trapezoidal notch or weir, advantages of triangular notch or weir over rectangular notch or weir Discharge over a stepped notch, Cipolletti weir or notch, discharge over a broad-crested weir, narrow crested weir, ogee weir, submerged or drowned weir. Time required for emptying a tank with a rectangular notch or weir. Velocity of approach **Flow through Pipes** Laminar and turbulent flows, Loss of energy in pipes, Darcy formula for loss of head due to friction. Loss of energy due to friction. Major and Minor energy losses, Hydraulic gradient line and Total energy line.	15

II	**Flow through Open Channels** Flow through open channels-rectangular and trapezoidal-chezy's formula for discharge-Kutter's and Manning's equation for Chezy's constants-Most economical sections of – Normal and critical depths – Hydraulic jump and its application	15
III	**Hydraulic Machines:** Turbines, Classification, Pelton Turbine, Francis Turbine, Kaplan Turbine-. Use of Draft tube, Pumps-Types, Centrifugal Pump, specific speed, applications. Pumps-Types, Centrifugal Pump- Specific speed, applications, Reciprocating pump – Types – Indicator diagram-Acceleration and friction, heat air vessels	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	S. Nagarathnam, "Fluid Mechanics", Khanna Publishers, New Delhi.
2	Dr R.K. Bansal, " Fluid Mechanics and Hydraulic Machines", Lakshmi Publications, New Delhi
3	Hydraulics & Fluid Mechanics Machines By DrP.N Modi & Dr S.N .Seth.

Course Code	Course Title	Semester
DPCE402PCT	**Design of RCC Elements - II**	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: Theory	Exam Duration : 3 Hours

Course objectives:

- To understand the design concept of slabs, continuous beam and slabs

- To understand the behavior of columns subjected to Axial load and introduction of interaction diagrams

- To study the design of various foundations

- To study the detailing of reinforcements for the various said structural elements

Course Outcomes:

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

- Develop skill of designing various RCC Structural elements

- Develop skill of visualising and drawing the detailing of reinforcement for various RCC structural elements

- Develop skill of using IS code of practice for the design of various RCC structural elements

Unit	Course Content	Instruction Hours
I	**Design of Slabs** - Slabs : Slabs as structural and functional members, Minimum reinforcement and maximum spacing of reinforcement – concrete cover - stiffness criterion - stiffness ratios for simply supported, cantilever and continuous slabs - One Way Slab: Definition, Necessity and Design with necessary Checks. - Two Way Slab: Definition, Necessity and Design with various end conditions, Torsion Reinforcements and necessary Checks. - Flat Slabs: Definition, Necessity, Advantages and Basic Principles	15

II	**Columns** • Columns: Definition, Necessity, Types, Codal Provisions, End Conditions. • Load Carrying Capacity of Short Columns • Design of Axially Loaded Short Columns **Staircase:** Definition, Uses, Types and Design of a dog-legged Staircase.	15
III	**Footings** Footings: Definition, Necessity, Types, Codal Provisions and Design of Rectangular Isolated Footings for Critical Section for Bending, One way Shear and Punching Shear	15
Note	**All Designs as per IS 456-2000**	

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	Reinforced concrete design by N.Krishna Raju and R.N.Pravesh, New age International publishers, New delhi
2	Fundamentals of reinforced concrete by N.C. Sinha and S.K.Roy, S.Chand publishers
3	Limit state design by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi publishers pvt.Ltd, New Delhi
4	Reinforced concrete structural elements behaviour and design by P. Puroshotam, Tata Mc Grawhill.
5	Reinforced Cement Concrete by Dheerendra Babu, Falcon Publishers

Course Code	Course Title	Semester
DPCE403PCT	**Quantity Survey - I**	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: Theory	Exam Duration : 3 Hours

Course objectives:
- To know the importance of preparing the types of estimates under different conditions
- To know about the rate analysis and bill preparations
- To study about the specification writing

Course outcomes:

On completion of the course, the students will be able to:
- Develop skill of suggesting different types of estimates in different situations
- Develop skill of carrying out analysis of rates and bill preparation at different locations
- Develop skill of understanding and demonstrating the concepts of specification writing

Unit	Course Content	Instruction Hours
I	**Introduction** Definition of quantity surveying/estimation –need for estimation –duties of quantity surveyor **Measurement of Materials and works** various items of Civil Engineering works as per I.S: 1200 and their units of measurement, Rules for measurement, General specifications for different items of work **Types of estimates** Detailed Estimate, Abstract Estimate, Definitions – Formats for detailed and abstract estimates, Preliminary or Approximate Estimate – Plinth area estimate – Cubic rate Estimate methods, Problems in Preliminary estimate for residential and non-residential buildings.	15
II	**Detail Estimate of a Building** Detailed estimate for a Compound wall, Single storey -Load Bearing Type. Flat roof building with shallow foundation and RCC roof slab using Short wall long wall method and centre line method. Single and Double room building (load bearing type structure), Small RCC framed building, Steel roof truss, Two storied residential building with number of rooms (load bearing type structure). Deductions in masonry, plastering, white washing, painting etc., multiplying factor (paint coefficients) for painting of doors and windows (paneled/glazed), grills etc.	15

III	**Analysis of Rates and Abstract Estimates**: Cost of materials at source and at site, Cost of labour-Types of labour-Schedule of rates, Lead and lift-Leads statement, Abstract Estimate for, Two roomed building with verandah, Two/Three bed room building **Quantity of Steel for Reinforced Cement Concrete Structures** Simply supported singly reinforced R.C.C beams, Simply supported R.C.C lintels, Simply supported one way & Two Way slab, Preparation of bar bending schedules.	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	Estimating and Costing by B N Datta
2	Quantity Surveying by A. Kamala
3	Estimating by Gurucharan Singh
4	Estimating and Costing by S.C. Rangwala
5	Civil Engg Contracts & Estimates by B.S. Patil

Course Code	Course Title	Semester
DPCE404PCT	**Irrigation Engineering**	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: Theory	Exam Duration : 3 Hours

Course Objectives:

- To study the effect, causes and remedial measures of water logging
- To understand the basic types of irrigation, irrigation standards and crop water assessment
- To provide knowledge on various hydraulic structures such as energy dissipaters, head and cross regulators, canal falls and structures involved in cross drainage works
- To design different types of dams

Course Outcomes :

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

- Develop skill of assessing the irrigation needs of crops
- Develop skill of designing weirs, gravity dam, earthen dam, canal systems on pervious foundation
- Identify various types of reservoir and their design aspects
- Establish the understanding of cross drainage works and its design.

Unit	Course Content	Instruction Hours
I	**Basic Irrigation Engineering** **Irrigation** Definition-necessity of irrigation-advantages and disadvantages- Types of Irrigation. perennial and inundation irrigation, flow and lift irrigation, direct and storage irrigation. Methods of application of irrigation- Border, Strip, Furrow, Contour, Check, basin, Sprinkler & Drip irrigation. **Water requirement of crops**: Crops and Crops Seasons. Crop period, base period, duty, delta, relation between duty and delta, factors effecting duty, problems. Gross command area, culturable command area, intensity of Irrigation, Crop rotation. Standards of quality for irrigation water. Hydrological cycle, precipitation, types of precipitation. Run off, Infiltration, Evaporation and Transpiration. Measurement of rainfall. Rain Gauges, Types of rain gauges Symons rain gauge, watershed and drainage, catchments area. Estimation of flood discharge by Dicken's, Ryes and other empirical formulae.	15

II	**Canal Works** **Head works:** Classification of head works, Selection of the site for head works, Functions of diversion head works, schematic layout of head works, head regulator, weir and barrage. **Distribution works:** Canal classification-different methods of canal alignment-typical cross section of canal in cutting and embankment, partial cutting, Balanced depth of cutting, Design of canal by Kennedy's and Lacey's theories. Lacy's regime channel, maintenance of irrigation canals, Canal lining, necessity and types of canal lining. **Cross drainage works:** Types of cross drainage works. Aqueduct, siphon aqueduct, super passage, siphon, and level crossing, inlet - outlet. **River training works:** purpose and types of river training works. Marginal embankment, guide banks, groyon or spur and cut off.	15
III	**Gravity dams and Earth dams:** Classification of dams, Zones of storage, rigid and non-rigid dams – Site selection of a gravity dam. Forces acting on Gravity dam, Failures of gravity dams and remedial measures. Elementary profile, Practical profiles of gravity dam – limiting height of dam-low dam and high dam. Grouting of dam foundation. **Types of earth dams** Phreatic line or seepage line, Causes of failure of earthen dams and precautions. Method of construction of earthen dams, Maintenance of earthen dams. **Spill ways** Types of spill ways, location of spillway, design considerations for the main spill way.	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	Irrigation Engineering S.K. Garg
2	Irrigation and water Power Engg. B.C Punnia
3	Subramanya (2013), Engineering Hydrology, 4 th edition, Tata McGraw Hill Co., Graw Hill Co.

Course Code	Course Title	Semester
DPCE405PCT	**Water Supply & Sanitation Engineering**	4

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 make the students conversant with sources and its demand for water
- To understand the basic characteristics of water and its determination
- To expose the students to understand the design of water supply lines
- To provide adequate knowledge about the water treatment processes and its design
- To have adequate knowledge on operation and maintenance of water supply

Course outcomes:

On completion of the course, the students will be able to:
- Identify the source of water and water demand
- Apply the water treatment concept and methods
- Apply water distribution processes and operation and maintenance of water supply
- Understand basic process designs of water and wastewater treatment plants collect, reduce, analyze and evaluate basic water quality data
- Develop skills of management of sanitary systems

Unit	Course Content	Instruction Hours
I	**Introduction, Demand and Source of Water** Definitions of Environmental Science, Environmental Engineering and Environmental. Management, Concepts of Ecology, Food chain, Food Web. Sources of water supply, intake works, Water demand, Variation in demand, Population prediction. Water quality standards, Water Quality parameters - Physical, Chemical, and Biological, parameters – pH, alkalinity, acidity, hardness, solids, plate count, MPN. Water treatment Processes flow sheets, screenings, aeration, sedimentation, Coagulation, flocculation, filtration, softening, and disinfection, Water distribution systems **Quality and Purification of water:** Impurities of water - need for laboratory test – sampling: Grab Sampling – Composite sampling. Tests of water - physical, chemical and bacteriological tests.	15

II	**Water treatment** Flow diagram of different treatment units in a treatment plant. Filtration - Construction and operation of slow sand, Rapid sand and Pressure filters, Disinfection of water - necessity and methods, Chlorination: methods of chlorination - Break point chlorination. Quality standards of water for domestic and industrial purposes as per Indian Standards. **Waste water and Sanitation** Wastewater classification, Wastewater Characteristics: Physical, Chemical and biological Characteristics, Chemical and Biochemical Oxygen demand (COD/BOD), BOD Kinetics, Wastewater effluent standards	15
III	**Waste water Trteatment** Wastewater treatment flow sheet, Grit Removal, Screening, Sedimentation , Activated sludge process (ASP), Stabilization ponds, Trickling filters, Biotowers, Rotating biological Contactors, Wastewater irrigation and reuse, Anaerobic wastewater treatment, Septic tank, Sludge treatment and disposal, Nitrification and denitrification. **Solid waste Management** Classification of solid wastes, Sources and characteristics, methods of disposal of solid wastes, Waste Management Waste Generation, Collection, Processing and Disposal Methods, Resource Recovery in Waste Management, Biological and Thermal Conversion Processes..	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	Environmental Engineering by G.S. Birdie, and others –FALCON Publishers
2	Environmental Engineering by Baljeet Kapoor
3	Environmental Engineering by Ramachandraiah
4	Water supply and Sanitary Engineering by V.N. Vazirani

Course Code	Course Title	Semester
DPCE401PCP	**Fluid Mechanics Lab-II**	4

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1T+2P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation : 25
Instruction Mode: Demonstration + Practical	Exam Duration : 3 Hours

Course Objectives:

- To train students to conduct experiments with pumps.

- Test the performance of pumps and turbines

- To understand the components, function, and uses of centrifugal and reciprocating pumps.

- To understand the components, function, and uses of Pelton wheel, Kaplan and Francis turbines.

Course Outcomes:

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

- Develop skills to analyze various flow problems and fluid characteristics.

- Acquire skills to develop characteristic curves for pumps and understand its usefulness for its efficient operation.

Cycle	Course Content	Instruction Hours
I	1) Determination of loss coefficient due to sudden expansion for the given pipe arrangement 2) Determination of loss coefficient due to sudden contraction for the given pipe arrangement 3) Determination of coefficient of friction for given pipe. 4) Determining the time required for emptying a tank 5) Study of the type of the flow by Reynolds apparatus. 6) Determination of the efficiency of a centrifugal pump	22
II	1) Demonstration of Performance characteristics of jet pump 2) Demonstration of Performance characteristics of gear pump 3) Demonstration of Performance characteristics of reciprocating pump	23

	4) Demonstration of working of Pelton turbine	
	5) Demonstration of working of Francis turbine	
	6) Demonstration of working of Kaplan turbine	

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:	
1	S. Nagarathnam, "Fluid Mechanics", Khanna Publishers, New Delhi.
2	Dr R.K. Bansal, " Fluid Mechanics and Hydraulic Machines", Lakshmi Publications, New Delhi
3	Hydraulics & Fluid Mechanics Machines By DrP.N Modi & Dr S.N .Seth.

Course Code	Course Title	Semester
DPCE402PCP	**Civil Engineering Drawing Lab - II**	4

Scheme of Instruction	**Scheme of Examination**

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

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

Course Objectives:

- To understand the principles of Cross Drainage Works
- To understand the components of Public Health Engineering Works
- To understand the different views of Irrigation engineering Structures

Course Outcomes :

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

- Develop the drawings of different structures associated with Public Health Engineering Works.

- Develop the drawings of different structures associated with Irrigation engineering Structures.

- Develop concept of cross drainage works – their need and construction

Cycle	Course Content	Instruction Hours
I	1. Draw the plan, cross-sectional elevation and longitudinal sectional elevation of Pipe culvert (Single Pipe) 2. Draw the plan, cross-sectional elevation and longitudinal sectional elevation of R.C.C slab culvert. 3. Draw the plan, cross-sectional elevation and longitudinal sectional elevation of Two-Span R.C.C T-beam bridge. 4. Lavatory block of a large building showing internal water supply and sanitary fittings and plumbing fixtures and details of plumbing connections for toilet fixtures. 5. Septic tank with details of connection to a dispersion trench/soak pit 6. R.C.C overhead rectangular tank	22

II	1. Develop the drawings and details of Earthen bunds – Three types – Homogeneous, Zoned embankment type and Diaphragm type. 2. Develop the drawings and details of Tank surplus weir with splayed wing walls. 3. Develop the drawings and details of Canal drop (notch type) and Aqueduct. 4. Develop the drawings and details of Head sluice (Head wall type) 5. Develop the drawings and details of Tank sluice with tower head. 6. Develop the drawings and details of Canal regulator and Super Passage	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	Civil Engineering Drawing by A. Kamala
2	Civil Engineering Drawing by Chakraborthy.

Course Code	Course Title	Semester
DPCE403PCP	**Material Testing Lab-II**	4

Scheme of Instruction	Scheme of Examination
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1T+2P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation:25
Instruction Mode: Practical	Exam Duration : 3 Hours

Course Objectives:

- To find the physical properties of given coarse aggregate
- To find crushing & impact strength of coarse aggregates
- To study the properties of bitumen

Course Outcomes :

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

- Evaluate the quality of coarse aggregates
- Evaluate the quality of bitumen
- Perform Quality Assurance & Quality Control checks of coarse aggregate and bitumen at sites

Cycle	Course Content	Instruction Hours
I	**Tests on Coarse Aggregates** 1. Percentage of voids and Bulk Density 2. Sieve Analysis 3. Specific Gravity 4. Flakiness & Elongation Index 5. Crushing Strength 6. Impact Test	22
II	1. Los Angles Abrasion Test 2. Water Absorption Test **Test on Bitumen** 3. Consistency of Bituminous Material 4. Ductility of Bitumen Binder 5. Softening Point of Bitumen Using Ring & Ball Test **For Demonstration** 6. Demonstration of Benkelman Beam Test 7. Demonstration of California Bearing Ratio Test	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	Concrete Technology by M.S.Shetty. – S.Chand & Co.

Course Code	Course Title	Semester
DPCE404PCP	**AutoCAD Lab - II**	4

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1T+2P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation:25
Instruction Mode: Demonstration and Practicals	Exam Duration : 3 Hours

Course Objectives:

- To learn the advanced level of Computer Aided Drafting.
- Preparation of plan, elevation and sections of various types of buildings along with structural detailing using AutoCAD.
- Improve imagination and creative skills in planning and detailing various building services like electrical layouts, water supply and sanitary lines
- To learn the basics of Packages available for Analysis, Design, Drafting and Estimation

Course Outcomes :

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

- Develop skill of Drawing the plan, section and elevation of a building along with various building services
- Create, analyze and produce 2D drawings of buildings in AUTO CAD environment Reinforcement Detailing of structural elements in CAD environment Apply Spreadsheet calculations to Civil Engineering

Cycle	Course Content	Instruction Hours
I	1. Plan, Elevation, Section of single-roomed building. 2. Single storied load bearing type residential building, One Bed Room House, Two-bed room House. 3. Single storied framed structure type residential building, One Bed Room House, Two-bed room House. 4. Singly reinforced simply supported rectangular beam, Lintel cum sunshade, Continuous Beam 5. Simply supported two-way slab, Isolated Column with Square footing. 6. Layouts of electrical, water supply & Sanitary lines in buildings, One Bed Room House, Two-bed room House	22
II	1. Drawings to be submitted for approval to corporation or municipality showing required details in one sheet such as, Plan 2. Showing Dimensions of all rooms, Section – showing Specifications 3. Typical Foundation Details, Elevation, Site Plan – Showing Boundaries of Site and Plinth Area, Car Parking	23

	4. Location of Septic Tank, Key Plan – Showing the location , Title Block – Showing Signature of Owner & Licensed surveyors.
	5. Location of Over Head Tank, Key Plan – Showing the location Title Block – Showing Signature of Owner & Licensed surveyors.
	6. Exercise – Plan, Sectional Elevation and Front Elevation of a Building.

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	Ronald W., Leigh, AutoCAD: A Concise Guide to Commands and Features, Galgotia Publications, 2004.

Course Code	Course Title	Semester
DPCC401SEP	**Communication & Interactive Skills Lab**	4

Scheme of Instruction	**Scheme of Examination**

Total Duration : 45 Hrs   Maximum Score : 50
Periods / Week: 1T+2P   Internal Evaluation : 25
Credits: 2   End/ External Evaluation:25
Instruction Mode: Demonstration + Practical   Exam Duration : 3 Hours

Course Objectives

The course enables the students to:

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

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
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	Course Title	Semester
DPCE501PCT	**Design of Steel Structures**	5

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: Theory   Exam Duration : 3 Hours

Course objectives:

- To understand IS 800-2007 and Latest codes of practice of IS 875 for the design of Compression, Tension, Flexural members
- To study the components of truss, loads on trusses, analysis and design of purlins and truss members
- To study the design of welded connections and arranging field visit to industries
- To study the design of slab base along with a cement concrete pedestal.
- Awareness about Gantry girder, welded plate girder, stiffeners and bolted connections

Course Outcomes:

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

- Develop skill of using IS 800-2007 and Latest codes of practice of IS 875 codes of practice for the design of steel structural elements subjected to Bending, Compression, Tension and wind forces
- Develop skill to analyze the behaviour and design of welded connections
- Develop skill to visualise and to draw the various Steel Connections

Unit	Course Content	Instruction Hours
I	**Properties of Sections and Loads on Steel Structures**: Merits and demerits of steel structures, Properties of structural steel sections - I, T, angle and channel sections, flats and tubular section, Permissible stresses in bending, shear, bearing, tension and compression, Use of steel tables and IS : 800 – 2007, Loads on steel structures –Dead loads, Live loads, wind loads as per IS : 875, Seismic loads etc. **Design of Welded joints:** Different types of joints, Differentiate welded joints with riveted joints, Different forms of welded joints (Butt / Fillet / Slot / Plug), Specifications of fillet welds - Size, effective throat thickness effective length., Allowable stresses in welds – Strength of a given Fillet Welded Joint	15
II	**Design of Simple Beams**: Fundamental theory of simple beams and girders – Permissible bending stresses for laterally supported and laterally unsupported beams, Load carrying capacity of laterally supported (Simple and Built-up) and laterally unsupported beams (Simple sections only),	15

	Design of laterally & Check for shear, deflection and web crippling. Sketches of Built-up beams & Plate girders showing components. **Design of Compression members:** Introduction to columns and struts, Columns – End conditions, effective length, slenderness ratio, Use of steel tables and IS:800-2007 for permissible stress in compression, Strength of columns - Determine the strength and design of a given simple and built-up column Design specifications of single lacing / double lacing and battening for built-up columns.	
III	**Design of Tension Members:** Various sections of tension members - Single & double angle members, Single Tee section- Effective area - Allowable stresses – Determine the Strength and Design of tension members connected on same or both sides of gusset plate and its welded end connections. **Roof Trusses**: Types - Suitability of truss for different spans – Definitions and Basics of different Components involved in Roof Truss.	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	Limit State Design of Steel Structures by S.K.Duggal
2	Design of Steel Structures by S.S.Bhavikatti
3	IS 800-2007, Code of practice for general construction in steel, Bureau of Indian Standards, New Delhi.
4	IS875 Part (3) - 2015, Code of Practice for Design Loads (other than earthquake) for buildings and structures: Wind loads., Bureau of Indian Standards, New Delhi.

Course Code	Course Title	Semester
DPCE502PCT	**Transportation Engineering**	5

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: Theory	Exam Duration : 3 Hours

Course Objectives:

- To obtain the understanding of Highway Geometrics
- To learn the basic concepts of railway engineering
- To obtain the concepts of Traffic Engineering
- To learn the concepts of Pavement Construction and Maintenance

Course Outcomes :

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

- Understand the functionality of highway geometrics and its importance in Roadways
- Conduct the surveys required for Highways
- Understands the Concepts of Traffic Engineering
- Demonstrate the different Pavements and their construction procedures
- Understand different factors required for construction of bridges.
- Develop the basic understanding of railway engineering.

Unit	Course Content	Instruction Hours
I	**Highway Geometrics** • Importance of transportation engineering-I.R.C.-Classification of roads as per I.R.C. • Cross section of a road structure-sub grade-sub-base, base and wearing course-Width of pavement, shoulder, formation width, right of way, road boundaries-road widths for different classification of roads, traffic lane widths-camber–recommended • Camber and I.R.C values for different roads. • Gradients-Ruling gradient, limiting, exceptional gradient – Recommended I.R.C values of gradients. • Super elevation-Necessity and Design. • Curves-necessity of curves in roads-transition curves-Horizontal alignment and vertical alignment details. **Highway Surveys and Traffic Engineering**	15

	• Alignment-Factors influencing alignment of road in plain and hilly areas –Surveys-Reconnaissance, preliminary and final location surveys. • Traffic census and its importance. Road intersections-At grade intersections-Types-Traffic islands – Channelizing islands - Round- about –Interchange-Fly over—Diamond intersections-Clover Leaf junction. Pavement marking and Kerb markings. • Traffic signs-informatory signs-Mandatory Signs-Cautionary signs.	
II	**Highway Constructions & Maintenance** • Purpose of road drainage-Surface and sub-surface drainage-Typical cross section of highway in cutting and embankment. • Water bound macadam roads-Materials used- Maintenance of W.B.M road – Machinery used in the construction-Construction procedure. • Bitumen – Bitumen Material and its Properties. Types of Bitumen roads- interface treatments-seal coat, tack coat, prime coat –Full grout and semi-grout-premix-methods-Construction procedure. • Cement concrete roads Construction of concrete roads-Machinery used for construction. Joints in C.C Roads – Construction, Longitudnal, Transverse. Use of Dowel Bars • California bearing ratio – definition and its importance in the design of pavements. **Bridges**-Classification -Selection of site for a bridge. • Defines waterway, Afflux, vertical clearance, linear waterway, freeboard for bridges and culverts-Economical span-Scour depth • Definition and Functions of pier, abutment, wing wall and approaches. Sketches and suitability of different culverts- slab culverts, pipe culverts and box culverts.	15
III	**Railway Engineering** • Importance of Railways-Gauges-Classification of rails based on gauges. • Structure of permanent way-Different types of rails- requirements	15

	of a good rail. Rail joints-Types of joints-Requirements of a good rail joint-Fixtures and fastenings of rails-coning of wheels. Maintenance of track	
	• Sleepers-Definition-Functions-Types of sleepers–characteristics of a good sleeper- Spacing of sleepers-Sleeper density.	
	• Ballast-Definition-Function –Characteristics of good ballast.	
	• General description and sketches for turnout –general layout of a simple left hand and right-hand turnout and different crossings.	
	• General idea with sketches of station yards, Marshalling yard, goods yard, passenger yard and loco yard.	

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	Highway Engineering by Khanna and Justo.
2	Railway Engineering by S.C.Rangwala

Course Code	Course Title:	Semester
DPCE503PCT	**Construction Quality and Management**	5

Scheme of Instruction	Scheme of Examination
Total Duration : 45 Hrs Periods / Week: 3L Credits: 3 Instruction Mode: Theory	Maximum Score : 100 Internal Evaluation : 30 End/ External Evaluation:70 Exam Duration : 3 Hours

Course Objectives:

- To study about the construction contract and tender documents.
- To impart the idea about planning and scheduling of activities, payments and stores.
- To introduce the concepts of resource planning and allocation and control.
- To study about the Total Quality Management and Quality Control in construction sites.

Course Outcomes:

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

- Apply theoretical and practical aspects of project management techniques to achieve project goals.
- Develop skill of organizational and leadership capabilities for effective management of construction projects.
- Apply knowledge and skills of modern construction practices and techniques

Unit	Course Content	Instruction Hours
I	**Planning and Organising** Defines the term construction management. States the need for construction management. Lists the factors involved in construction management. Explains the importance of preliminary planning. Explains the difference between feasibility report and project report. Explains the data to be collected and aspects to be considered in project report. Lists the aspects to be considered during preliminary planning in respect of Minor & irrigation project, Road project, Rural water supply project.Housing colony, Rural hospital. Defines the terms administrative approval and technical sanction.	15

II	**Constructional Planning, Contracts & Tenders:** Understands Constructional Planning, Contracts and tender systems: Distinguishes between construction stages and construction Operations. Explains the concept and use of construction schedules. States the need for material schedule and labour schedule. Explains the methods of procurement of labour, material and equipment. Explains the use of bar chart and its limitations. Lists the effects and causes of accidents and safety measures to be adopted in construction industry. Prepares network diagram based on C.P.M for construction works. Defines terms; Contract and Contractor Explain the various contract systems available for construction works. Lists the merits and limitations of each of the contract systems. Explains the need for calling of tenders.Lists the steps involved in fixing up the agency through tender system. Drafts a tender notice for a work. Prepares tender documents Explains the need of earnest money and security deposit. Draws up a comparative statement. Explains the methods of selecting a contractor from the tenders. Lists out the conditions of contract agreement	15
III	**Execution of works and Payment** Explain the difference between the regular establishment and work charged establishment. Explains the need for inspection of works. Explains the need and methods of quality control. Explains the need and principles of supervision Explains the need for imprest amount. Lists the common irregularities in a muster roll. States the importance of measurement book. Lists the rules to be followed in recording measurements. M-Book, Pre-measurement and check measurement. States the need for materials at site account. List the use of indent, invoice in store accounts. Explains the necessity of periodical inspection of stores. T.Q.M. & Quality Control **:** Discuss ISO 9000 series of quality systems. Know the quality systems and elements of quality systems. Know the Principles of Quality Assurance. Know the Indian standards on quality systems.. Quality control in constructions & Tolerance levels: Describe control aspects of batching and mixing. Explain the inspection of reinforcement grills. Explain the inspection and examination of formwork. Describe the quality of the filler materials. Establish relationship between the strength of brickwork and strength of mortar. State the tolerances levels in construction industry.	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	Entrepreneurship and Construction Management by P.Venkataiah
2	Entrepreneurship and Construction Management by N. Sreenivasulu

Course Code	Course Title	Semester
DPCE504PCT	**Quantity Survey - II**	5

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: Theory   Exam Duration : 3 Hours

Course objectives:
- To know about the Estimation and rate analysis for Earthwork
- To study about the Estimation for Public Health Engineering works
- To understand the valuation of land and buildings

Course outcomes:

On completion of the course, the students will be able to:
- Develop skill of suggesting different types of estimates in different situations
- Develop skill of carrying out analysis of rates and bill preparation at different locations
- Develop skill of understanding and demonstrating the concepts of specification writing

Unit	Course Content	Instruction Hours
I	<u>**Earth work Calculations**</u>, Trapezoidal-Prismoidal-Mid-ordinate –mean sectional area rules for computing volumes in level sections for roads and canals, Leads and Lifts and their standard values, Taking out quantities from L.S and C.S in cutting and embankment of level sections, Capacity of reservoirs from contours maps	15
II	<u>**Roads, Culverts, and Public health Engineering Works**</u> Water bound macadam road**,** Road with Bitumen Surface dressing, Cement concrete road, Pipe culvert**,** R.C.C slab culvert with straight returns, Open well with masonry steining**,** R.C.C Overhead Water tank., Septic tank with dispersion trench/soak pit	15
III	<u>**Valuation**</u> Definition, meaning and purpose of valuation, Factors governing valuation-Life of structure, type location maintenance, legal control, Scrap value, salvage value, market value and book value sinking fund**,** Calculation of depreciation by different methods, Methods of valuation. Rent fixation of Buildings : Rental value based on plinth area method. Case Study of any Project.	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	Estimating and Costing by B N Datta
2	Quantity Surveying by A. Kamala
3	Estimating by Gurucharan Singh
4	Estimating and Costing by S.C. Rangwala
5	Civil Engg Contracts & Estimates by B.S. Patil

Course Code	Course Title	Semester
DPCE501PCP	**Environmental Engineering Lab**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1T+2P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation : 25
Instruction Mode: Practical	Exam Duration : 3 Hours

Course Objectives:

- To introduce students to how the common environmental experiments relating to water and wastewater quality are performed.
- This course will help students know which tests are appropriate for given environmental problems, statistically interpret laboratorial results and write technical reports, and apply the laboratorial results to problem identification, quantification, and basic environmental design and technical solutions.

Course Outcomes :

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

- Perform common environmental experiments relating to water and wastewater quality, and know which tests are appropriate for given environmental problems.
- Statistically analyze and interpret laboratorial results.
- Apply the laboratorial results to problem identification, quantification, and basic environmental design and technical solutions.
- Understand and use the water and wastewater sampling procedures and sample preservations.
- Demonstrate the ability to write clear technical laboratorial reports.
- Understand the impact of water and wastewater treatment on people and the environment.
- Understand and apply ethical issues associated with decision making and professional conduct in the laboratorial and field environment.

Cycle	Course Content	Instruction Hours
I	1) Determination of pH value of water/waste water sample using pH meter 2) Determination of Turbidity of water/waste water sample 3) Determination of Conductivity of water/waste water sample 4) Determination of Acidity/ Alkalinity of water/waste water sample 5) Determination of Chorine Demand	22

	6) Optimization of coagulant dose with Jar Test for the treatment of water/ wastewater/ effluent.	
II	1) Determination of COD and BOD of the wastewater sample. 2) Determination of Chlorides 3) Determination of Phosphate and Orthophosphate using UV/Visible Spectrophotometer. 4) Confirmative test for confirmation of E. Coli. 5) Determination of Nitrate in the given wastewater sample using UV/Visible Spectrophotometer/ Ion Selective electrode 6) Determination of fluoride concentration in the given waste water sample using UV/Visible Spectrophotometer/ Ion Selective electrode.	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	De A.K., "Environmental Chemistry ", New Age International Ltd., New Delhi, 1995.
2	Sawyer C.N., McCarty P.L. and Parkin G.F., "Chemistry for Environmental Engineering and Science", Tata McGraw Hill Publishing Company Ltd., New Delhi.
3	American Public Health Association, "Standard Methods for Examination of Water and Wastewater", American Water Works Association, Water Environment Federation.

Course Code	Course Title	Semester
DPCE502PCP	**Material Testing Lab-III**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1T+2P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation:25
Instruction Mode: Practical	Exam Duration : 3 Hours

Course Objectives:

- To understand the physical properties of soil
- To analyze the behavior of soil under load
- To study the classification of soil

Course Outcomes :

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

- Distinguish the different types of soils
- Study the different properties of soils
- Study the strength of soil and propose the proportions for stabilization

Cycle	Course Content	Instruction Hours
I	**Tests on Soil** 1. Specific gravity of given soil sample 2. Sieve analysis 3. Classification of soil. 4. Liquid limit and Plastic limit 5. Shrinkage Limit 6. Proctors Standard Compaction Test	30
II	1. Field density of soil (sand replacement method). 2. Constant Head Permeability Test 3. Variable Head Permeability Test **For Demonstration** 4. Consolidation Test 5. Triaxial Compression Test(U.U. Test) 6. Unconfined Compression Test	30
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	Soil mechanics and foundation engineering by Dr.B.C. Punmia
2	Modern Geo Technical Engineering by Alam Singh
3	Soil Mechanics' (SI Version) by T. William Lambe and Robert V. Whitman
4	Geotechnical Engineering by Dr C. Venkatramaiah.

Course Code	Course Title	Semester
DPCE503PCP	**Advanced Surveying Lab**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45Hrs	Maximum Score : 50
Periods / Week: 1T+2P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation: 25
Instruction Mode: Demonstration and Practicals	Exam Duration : 3 Hours

Course Objectives:

- To know about significance of advanced surveying in field measurements in terms of utility and precision of data collection
- To learn the principles of Electronic distance measurements, Total station and their accuracy
- To get introduced to the concept of Photogrammetry in preliminary identification and map making
- To know in detail the concept of remote sensing in identification of land features from space and to get introduced to different data acquisition techniques
- To get introduced to the field of geodesy, coordinate systems, Map projections, GPS, its working principles, data collection, data processing and analysis

Course Outcomes:

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

- Apply advanced surveying techniques in different fields of civil engineering
- Select the advanced surveying technique which is best suited for a work
- Apply total station in distance measurement and traversing
- Demonstrate the principles of the earth surface, its projections and different coordinates involved in map making
- Apply GPS in transportation engineering, structural engineering and land use planning

Cycle	Course Content	Instruction Hours

I	**Electronic Theodolite**
	    1. Horizontal Angle between two stations by Electronic Theodolite.
	    2. Vertical Angle between two points by Electronic Theodolite.
	Total Station
	    3. Total Station - Parts and the functions - Adjustments of total station for taking Observations.
	    4. Measurement of Horizontal Distance, Slope distance, Difference in Height Between two points
	    5. Elevation of a point.
		22

	6. Horizontal angle and distance between two stations and Setting out right angles at different points on a base line.	
II	1. Setting out plan of a building on the ground. 2. Prolonging a straight line. 3. Area of a closed traverse. 4. Earthwork calculation. **Global Positioning System** 5. Parts and the functions of G.P.S - Coordinates of given point on the earth. Linking the G.P.S data with total station. 6. Digitization using Auto CAD Map	23

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

Text Books and References:	
1	Course material on G.I.S, G.P.S by NITTTR, Chennai.
2	Computer applications in Civil Engineering by NITTTR, Chennai.
3	Course material on Modern surveying instruments by NITTTR, Chennai.

Course Code	Course Title	Semester
DPCE504PCP	**S.E Drawing Lab**	5

Scheme of Instruction

Total Duration : 45Hrs

Periods / Week: 1T+2P

Credits: 2

Instruction Mode: Demonstration and Practicals

Scheme of Examination

Maximum Score : 50

Internal Evaluation : 25

End/ External Evaluation: 25

Exam Duration : 3 Hours

Course Objectives:

- To learn Structural Planning
- Marking of position of various structural elements like slab, beam, column, staircase, footing.
- Improve imagination and creative skills in planning and detailing various Structural elements
- To study and interpret drawings and prepare schedule of reinforcement

Course Outcomes:

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

- Develop skill of Structural Planning and marking different structural elements on respective grid schemes.
- Develop skill of Preparing BBS(Bar Bending Schedule) of structural elements
- Develop skill of Reading and interpreting the structural drawings.

Cycle	Course Content	Instruction Hours
I	1. Detailing of the position of columns, beams, slabs, stairs and footing in a given line diagram of building 2. Prepare member reference scheme of given building following Column reference scheme & Grid reference scheme as per IS:5525(recommendations for detailing of reinforced concrete works) & SP: 34. 3. Detailed working Drawings of Singly reinforced simply supported rectangular beam 4. Detailed working Drawings of Lintel cum sunshade, 5. Detailed working Drawings of Simply supported one-way slab 6. Detailed working Drawings of Two-way slab simply supported corners not held down	22

II	1) Detailed working Drawings of Two-way slab simply supported corners held down and not held down 2) Detailed working Drawings of T-beam (with details of slab and T-beam) 3) Detailed working Drawings of Column with square footing of uniform thickness 4) Detailed working Drawings of Stair case – stairs spanning longitudinally (Dog legged stair case)**,** Frame showing the details of reinforcement for earth quake resistant structures. 5) Structural Steel Connection Drawings. 6) Preparation of Schedule of reinforcement for a given structural Drawing from the details of reinforcement given in the Drawings.	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	Reinforced concrete design by N.Krishna Raju and R.N.Pravesh, New age International publishers, New delhi.
2	Limit state design by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi publishers pvt.Ltd, New Delhi
3	Reinforced concrete structural elements behaviour and design by P. Puroshotam, Tata Mc Grawhill.
4	Fundamentals of reinforced concrete by N.C. Sinha and S.K.Roy, S.Chand publishers

Course Code	Course Title	Semester
DPCC501SEP	**Employability Skills Lab**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs	Maximum Score : 50
Periods / Week: 1T+2P	Internal Evaluation : 25
Credits: 2	End/ External Evaluation:25
Instruction Mode: Demonstration + Practical	Exam Duration : 3 Hours

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	Course Title	Semester
DPCE501PET	**Concrete Technology**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs Periods / Week: 3 L Credits: 3 Instruction Mode: Theory	Maximum Score : 100 Internal Evaluation : 30 End/ External Evaluation:70 Exam Duration : 3 Hours

Course Objectives:

- To understand the properties of ingredients of concrete
- To study the behaviour of concrete at its fresh and hardened state
- To know about the procedures in concreting
- To understand special concrete and their use

Course Outcomes :

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

- Develop skill of Testing all the concrete materials as per IS code
- Develop skill of testing the properties of fresh concrete at site and hardened concrete at lab
- Develop awareness about mixing of special concretes and their specific applications
- Develop skill of maintaining quality control while testing/ sampling and acceptance criteria

Unit	Course Content	Instruction Hours
I	**Aggregate, Cement and Admixtures:** Aggregate Particle shape & texture – Bond, strength & other mechanical properties of Aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction- sieve analysis- Fineness modulus. Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate Cement – Test on physical properties – Different grades of cement – Admixtures – Mineral and chemical admixtures.	15
II	**Fresh and Hardened Concrete:** Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and	15

	vibration of concrete – Steps in manufacture of concrete - Water / Cement ratio – Abram's Law– Gel space ratio –Maturity concept – Strength in tension & compression – Factors affecting strength .	
III	**Special Concretes:** Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete– High density concrete – Fibre reinforced concrete – Different types of fibres – Factors affecting properties of F.R.C –Self consolidating concrete.	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	Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi
2	Concrete Technology by M.S.Shetty. – S.Chand & Co.
3	Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
4	Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi

Course Code	Course Title	Semester
DPCE502PET	**Geo Technical Engineering**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration : 45 Hrs Periods / Week: 3 L Credits: 3 Instruction Mode: Theory	Maximum Score : 100 Internal Evaluation : 30 End/ External Evaluation:70 Exam Duration : 3 Hours

Course Objectives:

- To explain how three phase system is used in soil and how are soil properties estimated using three phase system
- To determine shear parameters and stress changes in soil due to foundation loads
- To explain the concept of bearing capacity and how to estimate the safe bearing capacity for various foundation system including settlement consideration

Course Outcomes :

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

- Develop skill of Carrying out soil classification and soil investigation for any civil engineering construction
- Solve any practical problems related to soil stresses estimation, permeability and seepage including flow net diagram
- Develop skill of Estimating the stresses under any system of foundation loads
- Estimate bearing capacity using IS code methods

Unit	Course Content	Instruction Hours
I	**Soil and its Characteristics** - Soil mechanics – its importance, Types of soils – Residual soil, Transported soil, sand, silt, clay, peat, loess, muram, caliche, clay, bentonite – soils in India. - Mechanical analysis of soils – Hydrometer and sieve analysis of soil, particles –Physical properties of soils – plasticity, cohesion, consolidation- - Soil exploration – need for soil exploration – methods of soil exploration – Subsoil and ground water exploration- - Different properties of soils and related tests on soil samples– soil	15

	moisture content – Oven drying method - soil plasticity, Atterberg's Limits - Liquid Limit, Plastic Limit, Shrinkage Limit – – plasticity index– pycnometer method, • Definitions and relationships of volume of voids, density of soil mass, dry density, saturated density, submerged density, void ratio degree of saturation, percentage of air voids, simple problems using the above relationships.	
II	**Classification of soils** • Different systems of classification of soils – textural classifications of soils – I.S. classification of soils. • Hydraulic and Mechanical Properties of Soils, Permeability of soils, Compressibility of Soils, Shearing resistance of soils – shear strength experiment with testing procedure of Direct shear apparatus and Triaxial compression test. • Bearing capacity of soil – definition – importance of bearing capacity in foundation design – bearing capacity of shallow footings, presumptive bearing capacity values – code equation for computing bearing capacity (No derivation) - field plate load test	15
III	**Settlement of Foundation** • Settlement – definition – vertical pressure in soil beneath loaded areas – foundation settlement, Importance of bearing capacity and settlement in building foundations • Consolidation of compressive soil – definition- Terzaghi's model analogy of compression/ springs showing the process of consolidation – field implications. • Compaction of Soils-Theory of compaction – compaction and its objectives – factors affecting compaction	15

	• Laboratory compaction tests -Field measurement of compaction by core cutter method and sand replacement method – compaction control

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	**Soil mechanics and foundation engineering** by Dr.B.C. Punmia
2	**Modern Geo Technical Engineering** by Alam Singh
3	**Soil Mechanics' (SI Version)** by T. William Lambe and Robert V. Whitman
4	**Geotechnical Engineering** by Dr C. Venkatramaiah.

Course Code	Course Title	Semester
DPCE503PET	**Engineering Hydrology**	5

Scheme of Instruction	Scheme of Examination

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

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

Course Objectives:

- To provide knowledge about the causes of precipitation, precipitation types and pattern and its engineering correlation with the earth's surface characteristics for hydrological calculations.
- To help students to develop skills in stream flow measurements and run-off computations.
- To help students to develop skills in flood forecasting and flood control.

Course Outcomes :

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

- Develop skills to know the precipitation potential and analysis of precipitation data.
- Develop skills in hydrograph analysis for flood calculation.
- Understand how to plan and construct irrigation structures.
- Understand the measures for flood control and economic functioning of hydrologic structures.
- Develop skills in application of empirical methods and statistical methods of flood forecasting.
- Learn about the flood control methods and develop application skill in real life situation.

Unit	Course Content	Instruction Hours
I	**<u>Hydrology</u>** Introduction: Definition – Development of hydrology – hydrologic design – Hydrologic failures – Importance in Engineering – Hydrological budget. Precipitation and Abstraction: Formation of precipitation – forms of precipitation – types of precipitation – Rainfall measurement – gauges – recorders – processing precipitation data – check for consistency – supply of missing data – Aerial mean mass curve technique – Intensity duration	15

	frequency curves. Process of evaporation, transpiration – Infiltration factors affecting evaporation – Measurement of evaporation and infiltration indices – Horton's equation.	
II	**Runoff** Runoff: Factors affecting runoff – measurement – stream gauging – stage discharge relationship – Hydrograph components – Hydrograph separation – Unit hydrograph – Derivation of unit Hydrograph – S. Hydrograph – Synthetic hydrograph.	15
III	**Ground Water Hydrology** Occurrence and Movement of Groundwater – Introduction to Hydrologic cycle – Origin and Age of groundwater, classification of groundwater, aquifer, water table, Darcy's Law, Coefficient of Transmissibility and storage, Flow rates and equation. Well Hydraulics and Design – Geophysical methods, study of radial flow, well flow, multiple well system, characteristic well losses, open well, tube well, well depth, well screen, head losses through the screen gravel packing and formation stabilisation.	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	Todd, D.K. and Mays,L.W., Groundwater Hydrology, 3rd Edition, Wiley & Sons, 2004.
2	Varshney R.S. (1995), Engineering Hydrology.
3	Subramanya (2013), Engineering Hydrology, 4 th edition, Tata McGraw Hill Co., Graw Hill Co.

Course Code	Course Title	Semester
DPCE601PCP	**Industrial Training**	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**
Total Marks				*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.