Programme: B.Tech

Civil Engineering

Scheme and Syllabi

w.e.f. Academic Session 2020-21

BUEST

SCHOOL OF ENGINEERING & EMERGING TECHNOLOGIES

(Common Curriculum for B. Tech I year – All Branches)

Semester - I

(Group-A)

Sr.	Code	Subject	L	T	P	Credit
1	UMA-101	Engineering Mathematics I	3	1	0	3.5
2	UPY-101	Engineering Physics	3	1	2	4.5
3	UCS-103	Fundamentals of Computer & C programming	3	1	2	4.5
4	UHU-101	Communication & Professional skills in English	3	0	2	4.0
5	UEC-105	Principles of Electronics Engineering	3	1	2	4.5
6	UME-105	Principles of Mechanical Engineering	3	1	2	4.5
7	UPD-101	Personality Development Program (PDP)	2	0	0	1.0
		Total	**20**	**5**	**10**	**26.5**

Total Hours: 35

(Group-B)

Sr.	Code	Subject	L	T	P	Credit
1	UMA-101	Engineering Mathematics I	3	1	0	3.5
2	UCH-101	Engineering Chemistry	3	1	2	4.5
3	UCS-103	Fundamentals of Computer & C programming	3	1	2	4.5
4	UEE-105	Principles of Electrical Engineering	3	1	2	4.5
5	UEG-101	Engineering Drawing	0	0	6	3.0
6	UEN-101	Environmental Science	3	0	0	3.0
7	UWP-110	Workshop Practice	0	0	3	1.5
		Total	**15**	**4**	**15**	**24.5**

Total Hours: 34

(Common Curriculum for B. Tech I year – All Branches)

Semester - II

(Group-A)

Sr.	Code	Subject	L	T	P	Credit
1	UMA-102	Engineering Mathematics II	3	1	0	3.5
2	UCH-101	Engineering Chemistry	3	1	2	4.5
3	UCS-102	Advanced C Programming	3	1	2	4.5
4	UEE-105	Principles of Electrical Engineering	3	1	2	4.5
5	UEG-101	Engineering Drawing	0	0	6	3.0
6	UEN-101	Environmental Science	3	0	0	3.0
7	UWP-110	Workshop Practice	0	0	3	1.5
		Total	**15**	**4**	**15**	**24.5**

Total Hours: 34

(Group-B)

Sr.	Code	Subject	L	T	P	Credit
1	UMA-102	Engineering Mathematics II	3	1	0	3.5
2	UPY-101	Engineering Physics	3	1	2	4.5
3	UCS-102	Advanced C Programming	3	1	2	4.5
4	UHU-101	Communication & Professional skills in English	3	0	2	4.0
5	UEC-105	Principles of Electronics Engineering	3	1	2	4.5
6	UME-105	Principles of Mechanical Engineering	3	1	2	4.5
7	UPD-101	Personality Development Program (PDP)	2	0	0	1.0
		Total	**20**	**5**	**10**	**27.5**

Total Hours: 35

SUMMER BREAK

Sr.	Code	Subject	L	T	P	Credit
1.	UTR- 201	Industrial Training	0	0	0	4

SEMESTER –III

Sr.	Course No.	Course name	L	T	P	Credit
1	UCE-201	Solid Mechanics	3	1	2	4.5
2	UCE-202	Fluid Mechanics-I	3	1	2	4.5
3	UCE-203	Surveying-I	3	1	2	4.5
4	UCE-204	Building Construction and Material	4	0	-	4
5	UCE-205	Concrete Technology	3	1	2	4.5
6	UCE-206	Engineering Geology & Rock Mechanics	3	-	-	3
7	UPD-201	PDP	0	0	2	2
8	UTR-201	Industrial Training (Undertaken during Summer Vacations)	0	0	0	4
9		TOTAL	19	4	10	31
				Total Contact Hours	33	

Total Hours: 33

SEMESTER –IV

Sr.	Course No.	Course name	L	T	P	Credit
1	UCE-251	Structural Analysis-I	3	1	2	4.5
2	UCE-252	Design of Steel Structure-I	3	1	0	3.5
3	**UCE-XXX**	**Departmental Elective-I**	3	1	2	4.5
4	UCE-254	Surveying-II	3	1	2	4.5
5	UCE-255	Soil Mechanics	3	1	2	4.5
6	UCE-256	Principles of Engineering. Economics & Management	3	0	0	3
7	UGP-251	General Proficiency	0	0	0	1
8	UPD-251	PDP	0	0	2	2
			18	5	10	27.5

SUMMER BREAK

Sr.	Code	Subject	L	T	P	Credit
1.	UTR- 301	Industrial Training	0	0	0	4

SEMESTER –V

Sr.	Code	Course name	L	T	P	Credit
1	UCE-301	Structure Analysis-II	3	2	0	4
2	UCE-302	Design of Concrete Structure-I	3	2	0	4
3	UCE-303	Hydrology and Irrigation Engineering	3	1	0	3.5
4	**UCE-XXX**	**Departmental Elective-II**	3	1	0	3.5
5	UCE-305	Geotechnical and Foundation Engineering	3	1	2	4.5
6	UCE-306	Environmental Engineering	3	1	2	4.5
7	UCE-309	Survey Camp	0	0	0	2
8	UPD-301	PDP	0	0	2	2
Total			18	6	6	20

Total Hours: 32

SEMESTER-VI

Sr.	Course No.	Course name	L	T	P	Credit
1	UCE-351	Structure Analysis-III	4	2	0	5
2	UCE-352	Design of steel structure-II	4	2	0	5
3	UCE-353	Design of Concrete Structure-II	4	2	0	5
4	UCE-354	Highway Engineering	4	1	2	5.5
5	**UCE-XXX**	**Departmental Elective-III**	3	1	0	3.5
6	UCE-356	Civil Engineering Software Lab-I	0	0	2	1
7	UGP-351	General Proficiency	0	0	0	1
8	UPD- 351	PDP	0	0	2	2
9		**Total**	19	8	6	28

Total Hours: 33

SUMMER BREAK

Sr.	Code	Subject	L	T	P	Credit
1.	UTR- 401	Industrial Training	0	0	0	4

SEMESTER –VII

Sr.	Code.	Course name	L	T	P	Credit
1	**UCE-XXX**	**Departmental Elective-IV**	3	1	0	3.5
2	**UCE-XXX**	**Departmental Elective-V**	3	1	0	3.5
3	UCE-403	Railways and Airport Engineering	3	1	0	3.5
4	UCE-402	Estimating and Costing	3	1	0	3.5
5	**XXX-XXX**	**Open Elective-I**	3	1	0	3.5
6	UCE-405	Minor Project*	0	0	4	2
7	UCE-406	Civil Engineering Software Lab-II	0	0	2	1
8	UPD-401	PDP	0	0	2	2
	UTR- 401	Industrial Training(During Summer Vacation)	0	0	0	4
			15	5	8	26.5

Total Hours: 28

SEMESTER –VIII

Sr.	Code	Course name	L	T	P	Credit
1	UCE-451	Major Project	0	0	6	3
2	**UCE-XXX**	**Departmental Elective-VI**	3	1	0	3.5
3	**UCE-XXX**	**Departmental Elective-VII**	3	1	0	3.5
4	**XXX-XXX**	**Open Elective-II**	3	1	0	3.5
5	**XXX-XXX**	**Open Elective-III**	3	1	0	3.5
6	UPD-451	PDP	0	0	2	2
7	UGP-451	General Proficiency	0	0	0	1
8		TOTAL	12	4	8	20

Total Hours: 24

DEPARTMENTAL ELECTIVES

Departmental Elective-I (Semester-IV)										
S.NO	Basket 1		Basket 2		Basket 3		L	T	P	Cr
	Course Code	Course Title	Course Code	Course Title	Course Code	Course Title				
1	UCE-253	Fluid Mechanics-II	UCE-258	Water Supply Engineering Including drawing	UCE-260	Basic Structural Design & Drawing	3	1	2	4.5
2	UCE-257	Applied Hydraulics and Fluid Mechanics	UCE-259	Sanitary Engineering Including Drawing	UCE-261	Civil Engineering Drawing	3	1	2	4.5

Departmental Elective-II (Semester-V)										
S.NO	Basket 1		Basket 2		Basket 3		L	T	P	Cr
	Course Code	Course Title	Course Code	Course Title	Course Code	Course Title				
1	UCE-304	Construction Planning and Management	UCE-311	Advanced Concrete Technology	UCE-313	Mechanics of Composite Material	3	1	0	3.5
2	UCE-310	Environmental Impact assessment	UCE-312	Advanced Construction Technique and project Management	UCE-314	Applied Plasticity & elasticity	3	1	0	3.5

Departmental Elective-III (Semester-VI)										
S.NO	Basket 1		Basket 2		Basket 3		L	T	P	Cr
	Course Code	Course Title	Course Code	Course Title	Course Code	Course Title				
1	UCE-361	Air Pollution Control	UCE-365	Advance Environmental Engineering	UCE-360	Matrix computer method of SA	3	1	0	3.5
2	UCE-355	Irrigation Engineering	UCE-359	Traffic Engineering	UCE-362	Design of Tall Buildings	3	1	0	3.5

Departmental Elective-IV (Semester-VI)										
S.NO	**Basket 1**		**Basket 2**		**Basket 3**		**L**	**T**	**P**	**C**
	Course Code	**Course Title**	**Course Code**	**Course Title**	**Course Code**	**Course Title**				
1	UCE-401	Building Repair and Maintenance	UCE-407	Maintenance and Rehabilitation of Structures	UCE-409	GIS for Resource Management	3	1	0	3.5
2	UCE-408	Green Concepts in Buildings	UCE-404	Earthquake Engineering	UCE-410	Urban Transportation Planning	3	1	0	3.5

Departmental Elective-V (Semester-VII)										
S.NO	**Basket 1**		**Basket 2**		**Basket 3**		**L**	**T**	**P**	**C**
	Course Code	**Course Title**	**Course Code**	**Course Title**	**Course Code**	**Course Title**				
1	UCE-452	Water Waste Engineering	UCE-413	Stability of structures	UCE – 412	Building Project Estimates	3	1	0	3.5
2	UCE-473	Principle of Remote Sensing	UCE-414	Prefabricated Concrete Structures	UCE – 478	Dams	3	1	0	3.5

Departmental Elective-VI (Semester-VIII)										
S.NO	**Basket 1**		**Basket 2**		**Basket 3**		**L**	**T**	**P**	**C**
	Course Code	**Course Title**	**Course Code**	**Course Title**	**Course Code**	**Course Title**				
1	UCE-453	Professional Practices and Entrepreneurship Development	UCE-468	Ground Water Engineering	UCE-467	Prestress Concrete Structures	3	1	0	3.5
2	UCE-472	Town Planning	UCE-466	Soil Dynamics	UCE-465	Bridge Engineering	3	1	0	3.5

Departmental Elective-VII (Semester-VIII)										
S.NO	**Basket 1**		**Basket 2**		**Basket 3**		**L**	**T**	**P**	**C**
	Course Code	**Course Title**	**Course Code**	**Course Title**	**Course Code**	**Course Title**				
1	UCE-471	Docks and Harbour	UCE-416	Land Information System	UCE-475	Design of Industrial Structures	3	1	0	3.5
2	UCE-474	Advance Surveying	UCE-470	Hydrology and Dams	UCE-469	Advanced Structural Analysis	3	1	0	3.5

OPEN ELECTIVES

Open Elective-I (Semester-VII)										
S.NO							**L**	**T**	**P**	**C**
	Course Code	**Course Title**	**Course Code**	**Course Title**	**Course Code**	**Course Title**				
1	UCS-480	Software Project Management	UEE-403	Energy Management	UEC-462	Biomedical Instrumentation	3	1	0	3.5
2	UCS-481	Distributed operating system	UEE-408	Illumination Engineering	UEC-463	Television engineering	3	1	0	3.5
3	UME-410	Basic Manufacturing Technology	UME-411	Measurement Techniques	UMG-450	Entrepreneurship Development and Enterprise Management	3	1	0	3.5

Open Elective-II (Semester-VIII)										
S.NO							**L**	**T**	**P**	**C**
	Course Code	**Course Title**	**Course Code**	**Course Title**	**Course Code**	**Course Title**				
1	UCS-482	Grid Computing	UEE-411	Direct Energy Conversion	UEC-464	Satellite Communication	3	1	0	3.5
2	UCS-483	Software Reliability	UEE-452	Non-Conventional Electrical Power Generation	UEC-465	Digital Signal Processing & Applications	3	1	0	3.5
3	UME-464	Renewable energy sources	UME-466	Automation & Robotics	UMG-475	Total Quality Management	3	1	0	3.5

Open Elective-III (Semester-VIII)										
S.NO							**L**	**T**	**P**	**C**
	Course Code	**Course Title**	**Course Code**	**Course Title**	**Course Code**	**Course Title**				
1	UCS-484	E-Commerce & ERP	UEE-456	Hydropower Station Design	UEC-466	Optical Communication	3	1	0	3.5
2	UCS-485	Data Warehousing & Data Mining	UEE-457	Transformer Engineering	UEC-467	Principles of Digital communnication	3	1	0	3.5
3	UME-458	Emerging Automotive Technologies	UME-459	Engineering in Industry & Entrepreneurship	UMG-476	Human Values and Professional Ethics	3	1	0	3.5

Typical Curriculum Structure of AICTE for UG Civil Engineering Degree Programmes

S. No.	Course Work - Subject Area	Range of Total *Credits (%)* ***Minimum*** ***Maximum***		B.Tech. CE (BUEST)
1.	Humanities and Social Sciences **(HS)**, including Management;	**05**	**10**	**10.5**
2.	Basic Sciences**(BS)**including Mathematics, Physics, Chemistry, Biology;	**15**	**20**	**16**
3.	Engineering Sciences **(ES),**including Materials, Workshop, Drawing, Basics of Electrical/Electronics/Mechanical/Computer Engineering, Instrumentation;	**15**	**20**	**26.5**
4.	Professional Subjects-Core **(PC),** relevant to the chosen specialization/branch; (May be split into Hard (no choice) and Soft(with choice), if required;)	**30**	**40**	**114.5**
5.	Professional Subjects – Electives **(PE)**, relevant to the chosen specialization/branch;	**10**	**15**	**07**
6.	Open Subjects- Electives **(OE)**, from other technical and/or emerging subject areas;	**05**	**10**	**07**
7.	Project Work, Seminar and/or Internship in Industry or elsewhere.	**10**	**15**	**18.5**
8.	Personality Development and General Proficiency	**Credits**		**20**
Total Credits				**220.5**

SEMESTER I& II

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name :- ENGINEERING MATHEMATICS-I
Course Code: - UMA-101

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit–I: Calculus of one variable
Differential Calculus: Successive Differentiation, Leibnitz Theorem, Expansion of Function Maclaurin‟s and Taylor‟s expansion, Indeterminate forms, Approximation of errors.

Unit-II: Calculus of two variables
Partial Differentiation, Partial Derivatives, Euler‟s Theorem Total Differentiation, Jacobians and their properties. Maxima and Minima of two variables, Lagrange‟s Method of Undetermined multipliers. Multiple integrals, Change of order, Area, length, volume and surface area.

Unit – III: Vector Calculus
Gradient, divergence and curl of a vector and their physical interpretations, Line, surface and Volume integrals, statement and Theorem of Green, Stoke and Gauss and their applications.

Unit-IV: Complex Analysis
Brief Review of Complex Number, Functions of Complex Variable, Analytic Functions, Cauchy Reimann Equations, Milne Thompson Method, Singularities, Cauchy Integral Theorem, Cauchy Residue Theorem.

Text Book:

1. P.K. Mittal, “Engineering Mathematics” , VrindaPrakashan
2. Complex Analysis, R.V. Churchill and Brown,FifthEditon and McGraw Hill Series.

Reference Books:

1. Calculus, Anton, Bivens& Davis, John wiley& Sons, New York.
2. Advanced Engg. Mathematics, Erwin Kreyszig, John Wiley & Sons, NewYork.
3. Advanced Engg. Mathematics, Michael D. Greenberg, Pearson Education.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - ENGINEERING CHEMISTRY
Course Code: - UCH-101

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 24.5

Unit-I

Polymers and Polymerization-organic polymers, polymerization, various types of polymerization, effect of structure on properties of polymers, preparation properties and technical application of thermo-plastics (PVC, PVA, Polyamides), thermosets (PF,UF), and elastomers (SBR,GR-M), Silicones .

Inorganic Engineering Materials.

Introduction and applications of glass, cement gypsum, lime, plaster of paris,

Composites- Classification, advantages & application of composites.

Refractories- Introduction, classification, properties & important refractory materials & applications.

Unit – II

Water Chemistry: Introduction, Sources of water, Impurities, Hardness, Units, Chemical analysis of water-free chlorine, alkalinity, Estimation of hardness by EDTA method, Analysis by EDTA method, Oxidations (BOD & COD), Boiler Corrosion, Carry Over- Priming and foaming, Scales and Sludges, Caustic embrittlement. Sewage & Treatment, Drinking water treatment, Desalination of water, Softening methods and related numerical problems.

Corrosion -A Threat: Introduction, Types of corrosions, Electrochemical Theory, Pitting, Water Line, Differential Aeration corrosions, Stress Corrosion, Factors affecting Corrosion, Preventive measures.

Unit-III

Lubricants: Introduction, Functions of Lubricants, Mechanism of Lubrication, Additives, Greases and Emulsions, Properties of Lubricants - Viscosity Index, Fire & Flash point, Pour & Cloud point, Aniline point, saponification number, acid number.

Fuels and Combustion: Introduction, class of fuels (Solid, Liquid and Gases) Coal and its origin, Analysis of Coals, Petroleum fuels, Crude Petroleum and its refining, Cracking, Synthetic petrol, knocking, octane number Reforming Hydro finishing and Diesel, cetane number Kerosene, Gasoline.: Coal gas, Oil Gas, Bio- Gas, Nuclear Fuel.

Unit - IV

Stereo Chemistry: Structures, types, applications and stereochemistry of natural products like alkaloids, steroids, quininoidsterpenoides including, allenes and biphenyls**.**

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Soil Chemistry: Soil pH, Inorganic & organic components in soils, Acid base & Ion exchange reactions in soils, Micronutrients and macronutrients, soil testing, Nitrogen pathways and NPK in soil.

Text Books:

1. Engineering Chemistry: By P.C.Jain& Monika Jain, DhanpatRai and Sons.
2. A Text Book of Engineering Chemistry: By ShashiChawla, DhanpatRai& Sons.
3. Physical Chemistry: By R.P.Verma, Pardeep Publishers Jallandhar.
4. Chemistry in Engineering & Technology, Vol.I&Vol.II, Rajaram, Kuriacose (TMH).

Reference Books:

1. Physical Chemistry, P.W.Atkin (ELBS, Oxford Press)
2. Chemistry of Natural products by OP Aggarwal.
3. Engineering Chemistry- by A.K. TripathiSatyaPrakashan, New Delhi.
4. Stereo Chemistry of Organic Compounds by P.S. Kalsi.
5. Environmental Chemistry by A.K. De , New Age International Publishers

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - CHEMISTRY LAB
Course Code:- UCH-101

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practical mandatorily from the given list of practical)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

L T P Cr
3 1 2 4.5

1. To determine the solid carbon, volatile matter, ash content and percentage of moisture in givensample of coal by proximate analysis method and classify the coal.
2. To determine the total alkalinity in a given sample of water using a standard acid.
3. To determine the percentage of Chlorine in a given sample of CaOCl2 which has been dissolved in one liter of solution.
4. Todetermine the surface tension of the two given unknown liquids by using Stalgmometer and identify the given liquid.
5. To determine the coefficient of viscosity of the given unknown liquids by using Ostwald‟s Viscometer and identify the given liquid.
6. To determine the coefficient of viscosity of thegiven lubricating oil using Red Wood Viscometer
7. To determine the surface tension of the given liquid by drop number method by using Stalgmometer and identify the given liquid.
8. To determine the flash point and fire point of given sample of oil using Pens key Marten‟s apparatus.
9. To determine the amount of Chlorine in given sample of water approximate N/20 sodium Thiosulphate solution. Ask for your requirement.
10. Estimation of calcium as CaO volumetrically in cement.
11. To determine the chemical oxygen demand of waste water.
12. To prepare phenolformaldehyde resin.
13. To prepare HexamethylenediamineAdipic acid (Nylon 66) polymer.
14. Determine of total hardness of water by EDTA method.
15. To determine cloud and pour point of lubricating oil.
16. Preparation of Urea Formaldehyde resin.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - FUNDAMENTALS OF COMPUTER & C PROGRAMMING
Course Code: - UCS-101

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 2 4.5

Unit-I

An Overview of Computer System: Anatomy of a digital Computer, various kinds of registers in CPU and their roles, Classification of Computers, Generations of computers, hardware, software, firmware, von Newman and Harvard Architecture.

Memory: Classification of memory- Main, Auxiliary memory and Cache memory, Memory Hierarchy.

Secondary storage devices: Hard disk, Floppy disk.

Input Devices: Keyboard, Mouse, Joystick, etc.

Output Devices: Monitors (CRT, TFT, Plasma panels) Printers (Dot-Matrix, Inkjet, Laser), plotters, Optical mark readers**.**

Radix number system: Decimal, Binary, Octal, Hexadecimal numbers and their inter-conversions; Representation of information inside the computers.

Unit-II

Programming Languages: Machine, Assembly, and High Level Language, introduction to Assembler, Compiler, Interpreter, seven phases of compilers, symbol Table, Debuggers, Linker and Loader.

Programming fundamentals: Algorithms, pseudo codes and Flowcharts, Debugging, testing and documentation, structure-programming concepts, top down and bottom-up design approaches.

Operating System Basics: Introduction and Functions of Operating System, Types of OS and case studies on NT, XP, 2000 and Linux. 13. Operating System**:** Revision of functions of O.S., Windows installation, NT, 2000, XP and Linux Case Studies.

UNIT-III

Networking: Introduction to network,LAN, WAN, MAN, Internet and WWW, Introduction to e-mail.

Introduction: Structure of a C Program, C Compilers, Editing, Compiling & Running of a C program, Data types, Constants and Variables, Operators and Expressions, Different types of expressions and their Evaluation, Conditional Expression, Assignment statement, Library functions, typecasting.

UNIT-IV

Decision Control Structure: Decision making using if, if-else, elseif and switch statements**.**

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Iterative Statements: Looping using for, while and do-while statements, Transferring Program control using break, continue and goto statements.

Text Book:

1. Computer fundamentals:P. K. Sinha,BPB
2. Teach yourself all about computers: Barry Press and Marcia Press, IDG Books India
3. Spirit of C: Mullis Cooper,Jacob Publications

Reference Books:

1. Let us C: Yashwantkanetkar, BPB
2. The C Programming: Language,Kerningha, B.W.& Ritchie D. M--PHI
3. Programming in C: Gotterfied B, Tata McGraw Hill
4. C programming a Practical Approach: Ajay Mittal, Pearson Education

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - COMPUTER LAB
Course Code:- UCS-101

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from thr given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

DOS:

1.Study of internal commands of DOS

2.Study of external commands of DOS.

C Programming:

Write a program to find the largest of three numbers (if-then-else).

1. Write a program to find the largest number out of ten numbers (for statement).
2. Write a program to find the average male height & average female heights in the class (input is in form of sex code, height).
3. Write a program to find roots of quadratic equation using functions and switch statement.
4. Write a program using arrays to find the largest and second largest no.
5. Write a program to produce ASCII equivalent of given number
6. Write a program to find divisor or factorial of a given number.
7. Write a recursive program for Factorial of a number.
8. Write a pragram to print Fibonacci sequence of numbers is 0, 1, 1, 2, 3, 5, 8…….
9. Write a program that takes two operands and one operator from the user perform the operation and then print the answer
10. Write a pragram to find sum of digits of a number.
11. Write a pragram to find reverse of a number.
12. Write a pragram to check if a number is Armstrong number
13. Write a pragram to check if an entered number is palindrome.
14. Write a pragramto print the following outputs:

1

2 2

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

3	3	3		
4	4	4	4	
5	5	5	5	5

Note: - Record to be maintained both electronically and hard copy for evaluation.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - PRINCIPLES OF ELECTRICAL ENGINEERING
Course Code:-UEE-105

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 2 4.5

Unit-I

D.C.circuits: Ohm‟s law, Kirchoff‟s Laws, Thevenin‟s, Norton‟s, superposition theorem, Maximum power transfer theorem, Nodal and Mesh analysis.

A.C. circuits: Sinusoidal signal, instantaneous and peak values, RMS and average values, phase angle, polar and rectangular, exponential and trigonometric representations RL and C components, behavior of these components in A.C. circuits, concept of complex power, power factor.

Transient Response: transient response RL, RC and RLC circuits with step input.

Unit-II

Series and Parallel A.C. circuits: Series and Parallel A.C. circuit, Series and Parallel resonance. Q factor, cut off frequency and bandwidth.

Three phase circuits: Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by 2-wattmeter method, importance of earthling.

UNIT-III

Electromagnetism: Basic concepts of magnetic circuits, Series magnetic circuits, parallel magnetic circuits, series parallel magnetic circuits, analogy between electrical and magnetic circuits, magnetic circuit with air gap, Laws of electromagnetic induction, self inductance, mutual inductance, coefficient of coupling.

Basic concepts of transformers and rotating electrical machines (operating principle, construction and applications).

UNIT-IV

Measuring Instruments: Voltmeter, Ammeter, Wattmeter, Energy meter.

Batteries: Storage batteries:- Types, construction, charging and discharging, capacity and efficiency of Lead-acid batteries.

Text Books:

1. Kothari &Nagarath: Basic Electrical Engg. (2nd Edition), TMH.

Reference Books:

1. B.L. Theraja& A.K. Theraja, S.Chand: Electrical Technology(Vol-1).
2. Deltoro: Electrical Engg Fundamentals, PHI.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -PRINCIPLES OF ELECTRICAL ENGINEERING LAB
Course Code:-UEE-105

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

L T P Cr
3 1 2 4.5

List of Experiments:

1. To verify KCL and KVL.
2. To study frequency response of series RLC circuit and determine resonance frequency.
3. To study frequency response of parallel RLC circuit and determine resonance frequency.
4. To perform direct load test of transformer and plot efficiency v/s load characteristics.
5. To study and verify Thevenins, Norton‟s, superposition and maximum power theorems.
6. To perform O.C and S.C test of transformer.
7. To study various types of meters.
8. Measurement of power by 3 voltmeter / 3 ammeter method.
9. Measurement of power in 3-phase system by 2-wattmeter method

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - ENGINEERING DRAWING
Course Code:- UEG-101

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

L T P Cr
0 0 6 3.0

Unit-I

Introduction to Conventional Drawing

Various types of lines, Principles of drawing, Size & Location as per IS code (SP-46) for general engg. Drawing, Dimensioning exercises Conventional exercise of Lettering Techniques, Drawing pertaining to symbols, Free hand lettering techniques (in letters & numerals in 3, 5, 8 & 12mm sizes), Vertical& Inclined Drawing at 75^{o}. Instrumental lettering in single stroke, Linear, Diagonal &Vernier Scale, BIS Conventions.

Computer Aided drawing

Computer Screen, Layout of software, std. tool bar/menus & description of most commonly used tool bars, navigation tool bars & tools. Co-ordinate system and reference planes.Definitions of HP, VP, RPP, & LPP.Creation of 2D/3D environment.Selection of drawing size and scale. Commands & creation of lines, Commands and creation of lines, Co-ordinate points, axes, poly lines, square, rectangle polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination & perpendicularity, Dimensioning, Line convention, material conventions & lettering

Unit-II

Orthographic Projections

Definition-Planes of Projection, reference lines & conventions employed, Projections of points in all four quadrants, Projections of straight lines (located in first quadrants/first angle only), true and apparent lengths, true & apparent indications to reference planes**.**

Orthographic Projections of Plane Surfaces &Engg. Objects (First Angle Projections only)

Definitions- Projections of plane surfaces-triangle, square rectangle, rhombus, pentagon, hexagon& circle, planes in different positions by change of position method only (No problem on punched & composite plates), Engg. Objects projections.

Unit-III

Projections of Solids (First Angle Projections only)

Definitions-Projectionsof right regular-tetrahedron, hexahedron(cube),prisms,pyramids,cylinders and cones in different positions**.**

Isometric Projections (Using Isometric scales) Isometric scale & projection of simple plane figures, Isometric projections of tetrahedron, hexahedron (cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres & combination of solids

Unit-IV

Sections & Development of lateral surfaces of solids

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Section planes, Sections, Section views, Apparent shapes, & true shapes of sections of regular prisms, pyramids, cylinders and cones resting with base on HP, Sectioning of Engg. Objects, Developments of lateral surfaces of trays, tetrahedrons spheres and transition pieces

Text Books

1.P.S. Gill:Engg. Drawing & Engineering Graphics
2.N.D. Bhatt: Elementary Engg. Drawing

Reference Books:

1.A primer on Computer Aided Drawing-2006: Published by VTU, Belgaum
2.Computer Aided Engg. Drawing: S.Trymbaka Murthy, I.K. International Publishing

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - ENVIRONMENTAL SCIENCE
Course Code:- UEN-101

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 0 0 3.0

UNIT-I

The Multi-disciplinary nature of environmental studies & Definition Scope & importance, Need for public awareness, Inter- relationship of technology growth.

Natural Resources-Renewable & Non Renewable resources, Forest resources- use & over exploitation, deforestation, Timber extraction, Dams & their effects on forests & tribal people, Water Resources-Use & over utilization of surface & ground, water, floods, draughts-conflicts over water dams benefits & problems, Mineral Resources- Use & over Exploitation, environmental effects of extracting & mineral resources, Food Resources- world food problems changes caused by agriculture & over grazing effects of modern agriculture fertilizer & pesticide problems, water logging, saliency, Energy Resources growing energy needs, renewable & Non-Renewable energy sources, use of alternate energy, Land resources- land as resource, land degradable, man induced land sleds, Soil erosim&desertifical, individual role in conservation of natural resources, Equatable use of resources for sustainable life style.

UNIT-II

Ecosystems-Natural Ecosystems- Concept, Structure & Function, Ecological Succession, Flow of energy in Ecosystem, Ecological Succession, Brief Features of Forest, Grass Land, Desert & Aquatic ecosystem.
Biodiversity-Different genetic & ecosystem diversity, Biogeography classification in it, Biodiversity at global, National & Local levels, Biosphere cycles, Carbon Dioxide Cycle, Eco-Imbalance system, Principles, effects.

UNIT-III

Environmental Pollution- Definition, Causes effects & Control measures of Air, Water, Soil, Marine, Thermal pollution, Nuclear Hazards, Industrial Hazard & safety, Solid Waste & E- waste management causes, effects & control measures of urban & industrial, Role of individual to prevent pollution, Disaster Management, Floods, Earthquakes cyclone & landslides, Brief introduction to safely Engineering.

UNIT-IV

Human Population & Environment-Population growth, Variation among nations, Population Explosion, Environment & Human Health, Human Rights, Value Education, Women Child Welfare, HIV/AIDS-its causes, effects, & control, Role of information Technology in Environment & Human Health, Environment Acts & Social Issues from unsustainable to sustainable

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

development, Urban problems released to energy, water conservation, Rain Water harvesting, watershed management, Resettlement & Rehabilitation of people, its problems & concerns, Environmental Ethics- Issues & possible solutions, Climate change, Global Warming, Acid rain, Ozone layer depletion, Nuclear accidents & holocaust consumerism & waste products, Environment Protection Act Air (Prevention & Control of Pollution) Act-1981 Water (Prevention & Control of Pollution) Act – 1974 Forest Servation Act – 1980 Wildlife protection Act- 1972 , Issue involved in enforcement of environmental legislation.

Text Books:

1. Environment Education: S.S. Randhawa, S.Vikas& Co. Publications
2. E-Waste-Implications, management & regulations in India and current global best practices:RakeshJohri,TERI New Delhi

Reference Books:

1. Environment Science: Kaushik,New AgeInternational
2. Environmental Science & Engineering: S.K. Dhameja, S.K. Kataria& Sons Publications

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - WORKSHOP PRACTICE
Course Code:- UWP-110

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

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Fitting shop: Study of tools and processes; One Simple exercise involving fitting work.

Carpentry Shop:Study of tools and their use,carpentry joints,and Preparation of a half-lap corner joint or mortise and tennon joints. Study of woodworking lathe.

Welding Shop:Study of tools and their use, Simple butt joint,Lap joint, different welding processes and preparation of any one welding joint.

Sheet metal shop:Study of tools and operations, Making one job out of the following: funnel complete with soldering / Fabrication of tool box / tray / electrical panel box etc.

Machine Shop:Study and demonstration of tools and operations on Lathe / Shaper / Milling machine / Grinding machine / Drilling machine.

Materials:Study of different materials of engineering use, Ferrous &Non ferrous materials and their constituents, Properties and their applications. Heat treatment of ferrous metals and its importance, Microstructures of carbon steels

Manufacturing Processes:Study and demonstration of processes such as Rolling, Press working, wire drawing, Shearing and punching,& Plastic molding etc.

Smithy shop & Forging shop:Study of smithy process and forging process describing different methods of forging. and demonstration of a simple smithy job.

Metal Casting:

i. Study of Mold making process and with special emphasis on bench molding .
ii. Demonstration of Casting process of any simple job.

Text Books&Reference Books:

1. Hajra, Bose, Roy: Workshop Technology,Vol 1 & 2, Media Promotors
2. Raghuvanshi B.S.: Workshop Technology, Vol 1 & 2, Dhanpatrai

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - ENGINEERING MATHEMATICS-II
Course Code:- UMA-102

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit-I: Linear Algebra
Rank of a Matrix, consistency and inconsistency of a system of Linear equations, Elementary row and column transformations inverse of matrices, Eigen Values and eigen vectors. Cayley Hamilton Theorem, Diagonalization, Vector spaces R^n over R, linear transformations R^n toR^m

Unit – II: Differential Equations:
Solution of first order and first degree differential equations: variables separable, homogeneous, exact, linear and equation reducible to above types. Linear Differential equations of nth order with constant coefficients.Complementaryfunctionsand particular integrals, Ordinary simultaneous equations.

Unit – III: Laplace Transform
Laplace transform, existence theorem, Laplace transform of derivatives and integrals, Inverse laplace transform, Unit Step function, Dirac delta function, Laplace transform of periodic function, Convolution Theorem.Applications to solve simple linear and simultaneous diff equations.

Unit-IV: Fourier Transform
Fourier series, Euler formulae, half range series, Fourier integral & Fourier Transform.

Text Books:

1. P.K. Mittal: Engineering Mathematics, VrindaPrakashan

Reference Books:

1. Calculus: Anton, Bivens& Davis, John wiley& Sons, New York.
2. Advanced Engg. Mathematics: Erwin Kreyszig, John Wiley & Sons, NewYork.
3. Advanced Engg. Mathematics: Michael D. Greenberg, Pearson Education.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - ENGINEERING PHYSICS
Course Code:- UPY-101

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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3 1 24.5

Unit-I
Optics:
Interference: Division of wave front & Division of amplitude – Fresnel‟s biprism , Thin film interference & Newton‟s rings. Michelson interferometer and its applications.
Diffraction: Fresnel and Fraunhofer diffraction, Half period zone, zone plate, diffraction at straight edge, plane transmission grating. Dispersive power & resolving power of a grating.
Fiber Optics: Introduction,acceptance angle, numerical aperture, type of optical fiber- step index and graded index fibers, applications of optical fibers in communication.
Laser: Spontaneous and stimulated emission of radiation, Population inversion and optical pumping,Principle and production of laser ,three and four level laser, Construction and working of Ruby and He-Ne laser

Unit-II
Electrostatics and Electrodynamics
Basic laws of electricity & magnetism, Gradient, Divergence and Curl and their physical meaning , Divergence and Stokes theorems, continuity equation, Maxwell‟s equations in integral and differential forms, Electromagnetic wave propagation in free space, Poynting vector.
Relativistic Mechanics:
Inertial and non-inertial frames, Galilean transformations, Michelson–Morley experiment , Einstein‟s postulates of special theory of relativity, Lorentz transformation equations.
Length contraction, time-dilation, Addition of velocities,Variation of mass with velocity and mass-energy relation, Relativistic energy-momentum transformation.

Unit-III
Quantum Mechanics:
Quantum theory of light, photoelectric effect, Compton effect, pair production, matter waves and de-broglie hypothesis, particle diffraction, uncertainty principle and applications.
Postulates of quantum mechanics and Schrödinger theory, time dependent and time independent Schrodinger wave equation, wave function, Born interpretation and normalization, expectation.values. Applications to particle in a box (infinite potential well) finite potential step and barrier problems, tunneling, linear harmonic oscillator (one dimensional).

Unit-IV

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Statistical physics:
Classical and Quantum statistics:Maxwell –Boltzmann statistics, Bose- Einstein and Fermi- Dirac statistics, Fermi energy, free electron model and its applications.
Super conductivity:
Occurrence,destruction of super conductivity, Meissen effect, type I and type II Super-conductors; applications of superconductors.

Text Books:

1. Concepts of Modern physics:Beiser (Tata Mc Grow Hill)
2. Fundamentals of Physics:Resnick, Halliday, and Walker (Wiley)
3. Principles of Physics: R.A. Serway and J.W. Jewett (Thomas Asia Pvt. Ltd.)
4. Optics: Jenkins & White

Reference Books:

1. Introduction to special theory of Relativity: Robert Resnick (Wiley)
2. Quantum mechanics: Schiff.
3. Quantum mechanics: Pauling & Wilson.
4. Principle of Optics: B.K. Mathur.
5. Optics: A.G. Ghatak 3rd edition (Tata McGrow Hill – 2005)
6. Optics:Brijlal and Subramaniam (S. Chand)
7. Physics part I and II:Resnick, Halliday, and Krane , John Wiley – 2002).
8. Modern Physics: Kenneth Krane, (2nd Edition, John Wiley &Sons) – 1998
9. Physics of the atom:Wehr, Richards and Adair (4th Edition, Addison- Weseley)
10. Elements of Electromagnetics: Mathew N.D., Sadiku S.A.D. (Oxford University press)
11. Electrodynamics: D.J. Giriffith.
12. Lasers: O. Svelto.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - ENGINEERING PHYSICS LAB
Course Code:- UPH-101

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

1. To determine the wavelength of monochromatic light by Newton‟s ring.
2. To determine the wavelength of sodium light by using plane transmission grating.
3. To determine the wavelength of sodium light by using Michelson interferometer.
4. To find the refractive index of a prism by using spectrometer.
5. To determine the attenuation loss of a signal optical fiber.
6. To determine the numerical aperture of an optical fiber.
7. To determine the low resistance of the material of given wire using Carey Foster‟s bridge.
8. To draw hysteresis curve of a given sample of ferromagnetic material.
9. To find the capacitances of two capacitors (air and dielectric) by De‟sauty Bridge
10. To find the frequency of AC mains by using electric vibrator.
11. To find the value of high resistance by Substitution method.
12. To convert a galvanometer into an ammeter of a given range
13. To determine the variation of magnetic field along the axis of a current carrying coil and thentoestimate the radius of the coil.
14. To study the Hall Effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall-effect set up.
15. To determine the wavelength of He-Ne laser by using single slit experiment.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - ADVANCED C PROGRAMMING
Course Code:- UCS-102

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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Unit-I

Functions: Introduction to user defined functions, passing values between function, Function Prototype and Recursion**.**

Arrays: Introduction to arrays, array initialization, array traversal, bound checking, passingarray element to functions, passing entire array to a function, operations on arrays.

Two dimensional Arrays: creating a 2D array, array operations (addition, subtraction, multiplication, transpose).

Unit-II

Pointers: Introduction to pointers, pointer operator, call by value and call by reference, pointer to array and array of pointers.

Strings: Introduction to strings, string operations (strlen, strcpy, strupr, strlwr, strcat, strcmp), gets v/s scanf, puts v/s printf.

Unit-III

Structure: Use of Structures, Declaring a Structure, Accessing Structure Elements, Storing structure elements, Array of Structures, pointer to structure.

Union: Difference between union and structures, Introduction to enumerations.

Unit: IV

File Handling: Classification of files, file opening modes, Operations on text and binary files (reading, writing, copying, and concatenation).

Text Books:

1. Computer fundamentals: P. K. Sinha,BPB
2. Teach yourself all about computers: Barry Press and Marcia Press, IDG Books India

Reference Books:

1. Spirit of C: Mullis Cooper, Jacob Publications
2. Let us C: YashwantKanetkar, BPB
3. The C Programming Language, Kerninghan B.W. & Ritchie D. M, PHI
4. Programming in C: GotterfiedB,Tata McGraw Hill
5. C programming a Practical Approach: Ajay Mittal, Pearson Education

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - COMPUTER LAB
Course Code:- UCS-102

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from thr given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

1. Write a C program to enter N natural numbers in ascending order in 1-D array, and apply linear and binary search on it.
2. Reading N integers in 1-D array and sort them using Bubble sort and calculate their mean, median.
3. Write c program to evaluate polynomials like p(x)=a*x*x+b*x+c etc. using Horner‟s Rule.
4. Write a program to read two matrices A and B and compute A+B, A-B, A*B, A and B transpose.
5. Write a program to demonstrate call by value and call by reference (use swapping of two numbers), write function to calculate square and cube of a number.
6. Write program to read single and strings separated by space (using gets ()), perform strlen, contact, strup,strcmp on them using appropriate functions.
7. Create a Program using structures and Union which reads Name, Age and Salary of employee print them using dot and -> operators.
   Using enum for name in place of integer values.
   WAP to open a file and print its content on screen.
8. Write a program to edit and print the content of a pre written file.
9. Reading and Write file in Text and binary modes.
10. Write a program which prints its source code.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:-COMMUNICATION & PROFESSIONAL SKILLS IN ENGLISH
Course Code: - UHU-101

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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UNIT I
Grammar and Reading skills:

1. Vocabulary building: parts of speech with usage, phraseology, idioms, one word substitution for a group of words, antonyms, synonyms.
2. Sentence formation, simple sentences of all six types.
3. Clauses.
4. Simple, Multiple and Compound sentences.
5. Verb Forms and Tenses.
6. Active Passive voice.
7. Narration.
8. Reading comprehension.
9. A text book containing short stories, plays and poems.
10. Newspaper reading.

UNIT II
Listening skills:

1. Familiarization with listening skills.
2. Phonetics: word accent, intonation.

UNIT III
Speaking skills:

1. Non Verbal Communications.
2. Phonetics: Consonants and vowel sounds, transcriptions, syllables.
3. Speech presentation, paper reading, extempore, self introduction.
4. Dialogues, debates, role play and quizzes.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

5. Group discussion, Interview skills.
6. Public speaking skills.

UNIT IV

Writing Skills:

1. Letter writing: personal, official and business and covering letters.
2. Resume‟ writing.
3. Essay writing.
4. Report writing.
5. Story writing.

Text Books:

1. An Exordium: Zeenat Khan &AkankshaVashisht.
2. English Grammar: Murphy

Recommended Books:

1. English Grammar and Composition: Prof. M. Krishna swami.
2. Patterns of English structures: A.S. Hornby. (Macmillian publications recommended)
3. A text book of English Poems: stories & essays (Macmillian publications recommended)
4. High school English Grammar: Wren & Martin.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - LANGUAGE LAB
Course Code:- UHU-101

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

1. Self-introduction with one‟s name, family background, place of residence, one‟s educational qualifications and experiences and defining one‟s career objective and projecting ones strengths and skill-sets.
2. Interview Skills: Students will participate in mock interviews.
3. Presentation skills: Students will make presentations on given topics.
4. Group Discussion; Students will participate in group discussions.
5. Phonetics: Stress & intonation- Ear Training- Correct pronunciation- Sound recognition exercise- common Errors in English.
6. Conversation: Face to Face Conversation – Telephone conversation- Role play activities (Student will take on roles and engage in conversation).
7. Reading comprehension and vocabulary.

   Filling in the blanks- vocabulary building –
   Reading and answering question – Newspaper reading
8. Listening comprehension: Students will be excerpts of different conversational recordings and questions based on the respective excerpts will be given to them.
9. Pronunciation Training: Through language lab software.
10. Remedial grammar exercises: Through language lab software.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -PRINCIPLES OF ELECTRONICS ENGINEERING
Course Code:-UEC-105

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 2 4.5

UNIT-I

Brief review of Band Theory, Types of Semiconductors, Charge densities in semiconductor. Semiconductor Diode, Reverse and Forward bias conditions, Diode Characteristics and parameter, Equivalent circuit and frequency response, Ideal vs. Practical diode, Temperature Dependence of P-N junction diode, Diode Capacitance, Half and Full wave Rectifiers, Clipping and Clamping circuits, Avalanche diode, Zener Diode and its role as a voltage regulator.

UNIT-II

Bipolar junction transistor (BJT) and their I/P and O/P characteristics in CE, CB mode, Transistor as a switch, Temperature variation of saturation parameters, h parameters.JFET and MOSFET, Equivalent circuit, Enhancement mode and Depletion mode MOSFETS, Unijunction transistor (UJT), its characteristics, parameters and circuit operation, Photo transistor, its characteristics and applications.

UNIT-III

Bias for transistor amplifier: fixed bias, emitter feed back bias. Feedback principles. Types of feedback, Stabilization of gain, reduction of non-linear distortion, change in resistance by negative feedback in amplifier. Amplifiers coupling, types of coupling, Amplifier pass band, RC-Coupled amplifiers at mid, low and high frequencies.

UNIT-IV

Semiconductor processing, active and passive elements, Integrated circuits, bias for integrated circuits. Basic operational amplifier, applications of operational amplifier – adder, subtractor, Integrator, differentiator and comparator.

Text Books:

1. Electronic Principles: A.P.Malvino,TMH
2. Electronic Fundamentals and Applications: J.D. Ryder,PHI.

Reference Books:

1. Electronic Circuits & Devices: J.Millman&C.C.Halkias, TMH

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

2. Integrated Circuits & Devices: J.Millman&C.C.Halkias, TMH
3. Basic Electronic & Linear Circuits: N.N.Bhargava&Kulshrestha, TMH

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - PRINCIPLES OF ELECTRONICS ENGINEERING LAB
Course Code: -UEC-105

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from thr given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

List of Experiments:

1. To study the use and scope of using an oscilloscope as a measuring device in an electronic laboratory.
2. To study the use and scope of using a multimeter (digital and analog) as a measuring device in an electronics laboratory.
3. To study the use and scope of function generator as a signal source in an electronics laboratory.

Set up an experiment to:

1. Draw forward bias and reverse bias characteristics of a p-n junction diode and use it as a half wave and full wave rectifier.
2. Draw the characteristics of a Zener diode and use it as a voltage regulator.
3. Draw characteristics of common base configuration of p-n-p transistor.
4. Draw characteristics of common emitter configuration of an npn transistor.
5. Draw characteristics of common drain configuration of a MOSFET.
6. Find the voltage and current gain of single stage common emitter amplifier.
7. Draw the characteristics curve of UJT.
8. Find the voltage gain of single stage voltage series feedback amplifier.
9. Use operational amplifier as:
   (a) Inverting amplifier
   (b) Non-inverting amplifier
   (c) Comparator
10. Use operational amplifier as:
    (a) Integrator
    (b) Differentiator
11. Use operational amplifier as:
    (a) Adder
    (b) Precision amplifier
12. Find the overall voltage gain and current gain of a two stage RC coupled amplifier.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Emphasis is on system design and not on discrete components, some of the component around which exercises can be built are

1. SCR as triacs and power control.
2. Power supplies using zener.
3. Opto couplers and isolations where photo diode, transistors, leds are used.
4. Laser diode (laser pointer)
5. Operation amplifiers.
6. Operation amplifiers as instrumentation amplifiers.

Note: - Record to be maintained in the laboratory record book for evaluation. Usage of breadboard approach to be encouraged.

Text Books:

1. Basic Electronic & Linear Circuits: N.N.Bhargava&Kulshrestha, TMH
2.Electronic Devices & Circuit Theory: Robert L.Boylestad& Louis Nashelsky, Pearson Edu.

Reference Books :

1. Principles of Electronics: V.K. Mehta, S. Chand Publisher
2. Electronics Devices & Circuits: MillmanHelkias, TMH.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -PRINCIPLES OF MECHANICAL ENGINEERING
Course Code:- UME-105

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 2 4.5

UNIT-I

First Law of Thermodynamics
Basic concepts of thermodynamics, systems -open and closed, equilibrium, Heat and workEssence and corollaries of the first law, analytical expressions applicable to a process and cycle, internal energy, enthalpy and specific heats, first law analysis of steady flow, applications of steady flow energy equation to engineering devices.

Applications of first law of Thermodynamics
Closed and open systems, analysis of non-flow and flow processes for an ideal gas under constant volume (Isochoric), constant pressure (Isobaric), constant temperature (Isothermal), adiabatic and polytropic conditions. Analysis of free expansion and throttling processes. Representation of these processes on P-V charts and analysis of property changes and energy exchange (work and heat) during these processes.

UNIT-II

Second Law of Thermodynamics
Limitations of first law, various statements of second law and their equivalence, application of statements of second law to heat engine, heat pump and refrigerator. Philosophy of Carnot cycle and its consequences.Carnot theorem for heat engines and heat pump.Third law of thermodynamics.

I. C. engine –basic engine components and nomenclature working principles of 4S and 2S engines, comparison of SI and CI engine, classification of IC engines, applications of IC engines. Lubricating, cooling and Fuel Circuits.

Refrigeration and Air Conditioning: Vapor compression Refrigeration Cycles, working of domestic refrigerator, window type Air conditioner.

UNIT-III

Simple Stresses & Strains
Concept & types of Stresses and strains, Poisson‟s ratio, stresses and strain in simple and compound bars under axial loading, stress strain diagrams, Hooks law, Elastic constants. Numerical problems. Automobile engineering- components of automobile- the basic structure- Frame,axles, Suspension, wheel {just an overview} transmission system (layout and brief description).

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Shear Force and Bending Moments

Definitions, SF & BM diagrams for cantilevers, simply supported beams with or without over-hang and calculation of maximum BM and SF and the point of contraflexure under (i) concentrated loads, (ii) uniformly distributed loads Numerical Problems.

UNIT-IV

Bending Stresses in Beams

Bending Stresses in Beams with derivation of Bending equation and its application to beams of circular, rectangular

Torsion of Circular Members

Torsion of Solid and hollow circular shafts, Numerical Problems.

Fluid Machines: Impulse and reaction turbines construction and working of Pelton turbine, Francis turbine and Kaplan turbine, construction and working of centrifugal and reciprocating pumps.

Text Books:

1. Nag, P.K., "Engineering Thermodynamics": Tata McGraw – Hill, New Delhi.
2. Yadav, R., Thermal Science and Engineering: Central Publishing House, Allahabad.
3. Strength of Materials: G.H.Ryder – Third Edition in S I units 1969 Macmillan India.
4. Mechanics of Materials: Dr. Kirpal Singh, Standard Publishers Distributors, New Delhi.
5. Internal Combustion Engines: V Ganeshan (Second addition) Tata McGraw- Hill, NewDelhi.

Reference Books:

1. Strength of Materials:Popoy, PHI, New Delhi.
2. Strength of Materials: Sadhu Singh, Khanna Publications.
3. Strength of Materials: A Rudimentary Approach – M.A.Jayaram, Revised Ed. 2001, Sapna Book House, Bangalore.
4. Strength of Materials:U.C.Jindal.
5. Moran, M.J. and Shapiro, H.N., Fundamentals of Engineering Thermodynamics, John Wiley, New York.
6. Van Wylen: G.J., Fundamental of Classic Thermodynamics, John Wiley, New York.
7. Spalding, D.B. and Cole, E.H., Engineering Thermodynamics, ELBS, New Delhi.
8. Hibbeler, R.C. Engineering Mechanics – Statics, Addison Wesley Longman, New Delhi.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- PRINCIPLES OF MECHANICAL ENGINEERING LAB
Course Code:- UME-105

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

List of Experiments:

1. To study low-pressure boilers.
2. To study High-pressure boilers.
3. Calibration of thermometers.
4. Calibration of pressure gauges.
5. Study of discharge measuring devices.
6. To determine co-efficient of discharge of orifice meter.
7. To verify the Bernoulli‟s Theorem.
8. To find Young‟s Modulus of Elasticity using Searl‟s apparatus.
9. To find Young‟s Modulus of Elasticity of a beam with deflection beam apparatus.
10. To find Modulus of rigidity with the help of torsion apparatus.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

SEMESTER III

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name :- SOLID MECHANICS
Course Code:- UCE-201

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 2 4.5

UNIT - I
Simple Stresses & Strains

- Introduction, stress-strain curves for elastic materials, different types of stresses & strains.
- Elastic limit, Hook‟s' Law, Young's modulus of elasticity, Bulk Modulus, Modulus of rigidity, Lateral strain.
- Elongation due to self weight, bars of tapering sections, bars of varying sections, equivalent area of composite sections, temperature stresses.
- Relation between elastic constants. Volumetric strain.

UNIT - II
Shear force & bending moment

- Introduction, Types of beams, supports and loading.
- Sign conventions for bending moments and shear forces.
- Shear force and bending moment diagrams for simply supported, cantilever and overhanging beams for different types of loading.
- Relationship between Bending moment, Shear Force and loading

UNIT – III
Torsion

- Introduction, torsion of shafts and springs.
- Derivation of basic torsion equation,
- Power transmitted, sections subjected to combine bending & torsion Principal stresses.
- Equivalent Bending Moment & Torque, Helical spring.

Columns & Struts

- Introduction, Euler's buckling loads for columns with different end conditions.
- Conditions, assumptions & limitations of Euler's formula,
- Column carrying eccentric loads, laterally loaded columns, empirical formula.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

UNIT – IV

Deflection of beams

- Derivation of basic equation of elastic curve.
- Deflection in beams with different end conditions & different loadings by double integration method.
- Macaulay's Method

Strain energy

- Introduction, Strain Energy due to axial Loads.
- Bending shear & Torsion stress, Impact load.
- Strain energy due to Principal stress & strains, theories of failure

Text Books:

- Strength of Materials :R.K.Bansal
- Strength of Materials: Sadhu singh

Reference Books:

- Strength of Materials: S.M.A.Kazimi
- Strength of Materials: S.Ramamrutham

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - SOLID MECHANICS Lab
Course Code:- UCE-201

Evaluation Components for Practical Courses (Students are required to perform at least 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

List of Experiments*:*

1) Draw Stress Strain curve for Ductile and Brittle material.
2) Draw shear stress shear strain curve for ductile and brittle material in torsion strength test machine.
3) Draw load deflection curve for spring in loading and unloading conditions.
4) To determine the hardness strength of the given material.
5) To determine the fatigue strength of the material.
6) To determine the impact strength in Izod and Charpy test.
   To determine the load carrying capacity of the leaf spring

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - FLUID MECHANICS-I
Course Code:- UCE-202

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 2 4.5

UNIT-I

- **Fluid & Their Properties**
  - Concept of fluid, difference between solids, liquids and gases; ideal and real fluids.
  - Continuum concept of fluid: density, specific weight and relative density; Viscosity and its dependence on temperature.
  - Surface tension and capillarity vapour pressure and cavitations.
  - Compressibility and bulk modulus.
  - Newtonian and non-Newtonian fluids.

  Flow Measurement
  - Manometers, Pitot tubes, venturi meter and orifice meters, orifices, mouth pieces, notches and weirs.

UNIT-II

- **:Fluid statics**
  - Concept of pressure.
  - Pascal‟s law and its engineering hydrostatic paradox, Action of fluid pressure on plane (horizontal, vertical and inclined) submerged surface.
  - Resultant force and center of pressure.
  - Force on a curved surface due to hydrostatic pressure.

  Buoyancy and floatation
  - Stability of floating and submerged bodies.
  - Metacentric height and its determination.
  - Rotation of liquid in a cylindrical container.

  Fluid dynamics
  - Euler‟s equation, Bernoulli‟s equation and steady flow energy equation.
  - Representation of energy changes in fluid system, impulse momentum equation, and kinetic energy and momentum correction factors.
  - Flow along a curved streamline, free and forced vortex motions.

UNIT-III

Fluid kinematics

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Classification of fluid flows.
- Velocity and acceleration of fluid particle, local and convective acceleration, normal & tangential acceleration streamline.
- Path line and streak line, flow rate and discharge mean velocity continuity equation in Cartesian co-ordinates.
- Rotational flows- Rotational velocity and circulation, stream & velocity potential functions.

Laminar & turbulent flows

- Flow regimes and Reynolds number, critical velocity and critical Reynolds number.
- Laminar flow in circular cross section pipes.
- Turbulent flows and flow losses in pipes.
- Darcy equation minor head losses in pipe fittings, hydraulic and energy gradient lines.

UNIT-IV

- **: Dimensional analysis & similitude**
  - Fundamental and derived units and dimensions, dimensional homogeneity.
  - Raleigh‟s and Buckingham‟s Pi method for dimensional analysis, dimension less number and their significance.
  - Geometric, kinematic and dynamic similarity, model studies.

Flow through pipes

- Laminar flow through pipes, total and hydraulic gradient line
- Series and parallel connection of pipes, transmission of power through pipes

Reference Books :

- Fluid Mechanics by R.K.Bansal
- Fluid Mechanics by P.N.Modi & S.M.Seth
- Fluid Mechanics by D.S. Kumar

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - FLUID MECHANICS-I Lab
Course Code:- UCE-202

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

LIST OF EXPERIMENTS:

1) To determine the Metacentric height of a floating vessel under loaded and unloaded conditions.
2) To study the flow through a variable area duct and verify Bernoulli"s energy equation.
3) To determine the coefficient of discharge for an obstruction flow meter (Venturimenter/orifice meter).
4) To determine the discharge coefficient for a Vee notch or rectangular notch.
5) To study the transition from laminar to turbulent flow and to ascertain the lower critical Reynolds number.
6) To determine the hydraulic coefficients for flow through an orifice.
7) To determine the friction coefficient for pipes of different diameter.
8) To determine the head loss in a pipe line due to sudden expansion / sudden contraction/ bend.
9) To determine the velocity distribution for pipe line flow with a Pitot static probe.

ADDITIONAL EXERCISES:

1. Construct bounce less switch.
2. Construct a pulse of 1 Hz and 10 Hz, 1k Hzand manual.
3. Construct logic state detector.
4. Construct opto – sensor based.
    (a) Measurement rotational speed of motor.
    (b) Measurement time elapse between two events.
    (c) Measurement of linear velocity.
    (d) Measurement of acceleration.
5. Construct a memory using TTL Circuits. Read and write data onto a memory from bus.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name :- SURVEYING – I
Course Code:- UEC-203

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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UNIT -I

- **: Fundamental principles of Surveying**
  - Definition, objects, classification, fundamental principles.
  - Different types of surveys & methods of fixing stations.

Chain Surveying

- Principal of chain surveying.
- Description of different equipment.
- Methods of chaining & booking.
- Selection of base line and stations, obstacles in chaining.
- Location of In accessible points by chain, tape & ranging rods.

UNIT- II

- **Compass Surveying**
  - Description of Prismatic & surveyors compass methods of traversing.
  - Local attraction and its elimination adjustment of closing error by graphical method.
  - Numerical of compass surveying.

Theodolite Surveying

- Different types of Theodolites, temporary & permanent adjustment, traversing with Theodolites.
- Measurement of angles, repetition and reiteration method.

Traverse surveying with Theodolites, checks in traversing, adjustment of closed traverse by Bowditch & transit rules, examples

UNIT -III

- **: Minor Instruments**
  - Box sextant, hand level, Abney level.
  - Plani-meter, ghat tracer, tangent clinometers etc.

Levelling

- Description of Dumpy & Tilting levels leveling staves.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Methods of leveling sensitivity of bubble tube, setting out grade lines.

Permanent adjustment of above mentioned leveling instruments

UNIT -IV

- **Plane Table Surveying**
  - Description of different equipment.
  - Different methods of plane tabling.
  - Strength of Fix, Two point and three point problems and their solutions.
  - Numerical of compass surveying.

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Contouring

- Setting out contour gradient, different methods of contouring. Simple earth work calculations of areas and volume.

Reference Books:

- Surveying, By C.L. Kochher – Danpat Rai & Sons
- Surveying by Kanetkar
- Surveying by B.C.Punmia
- Kaplan, E.D., Understanding GPS: Principles and applications
- Campbell, J.B. Taylor and Francis, "Introduction to Remote Sensing".

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - SURVEYING – I Lab
Course Code:- UCE-203

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

LIST OF EXPERIMENTS:

1) Chain surveying: Chaining and chain traversing.
2) Compass traversing.
3) Plane tabling: methods of plane table surveying, two point & three point problems.
4) Leveling: Profile leveling and plotting of longitudinal section and cross sections.
5) Y-leveling.
6) Permanent adjustment of level.
7) Reciprocal leveling.
8) Contouring and preparation contour map.
9) Use of tangent clinometers

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -BUILDING CONSTRUCTION AND MATERIALS
Course Code:- UCE-204

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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UNIT - I

Stone and Stone Masonry

- Classification of Rocks
- Characteristics of good building stones
- Common building stones
- Stone masonry
- Technical Terms
- Types of stone masonry

Brick and Brick Masonry

- Classification of Bricks
- Manufacturing of bricks
- Characteristics of good bricks
- Field Tests of bricks
- Technical Terms
- Types of bonds, their merits and demerits.

Walls & Foundation

- Load bearing and Non-load bearing walls
- Estimation of load on walls and footings
- Thickness considerations
- Building components and their requirements
- Partition and Cavity walls
- Design of masonry walls, pillars and footings

Arches & Lintels

- Introduction to terms used in Arches.
- Different types of arches.

Brick & stone arches, types and functions of lintels

UNIT - II

Lime, Cement and Mortar

- Classification of lime
- Uses of lime
- Setting action of Fat lime and Hydraulic lime
- Introduction to Cement
- Manufacturing of cement

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Types of cement
- Preparation of cement mortar and Lime mortar
- Introduction to cement concrete hollow blocks
- Advantages and Disadvantages of concrete block masonry over brick masonry.

Plastering, Pointing & Painting

- Introduction objects and types.
- Special materials for plastered surfaces.
- Distempering, white washing and color washing of plastered surfaces

UNIT – III

Damp Proofing

- Sources, Causes of dampness in buildings, bad effects of dampness.
- Methods of Damp Proofing

Roofs

- Introduction terms used types of roof trusses and roof coverings.
- Details of rain proofing, Rain Water pipes.

Floors

- Introduction, various types of floors commonly used and their suitability for different buildings.
- Constructional details of concrete ant Terrazzo floorings, marble flooring and anti- termite treatment.

Formwork and scaffolding

- Need of formwork and scaffolding
- Types of scaffolding.

UNIT - IV

Timber

- Uses of Timber
- Characteristics of Timber
- Seasoning of timber
- Defects in timber
- Availability of different types of timber in India

Doors & Windows

- Introduction terms used location of doors and windows.
- Types of doors and windows.
- Methods of fixing doors and window frames in walls. Ventilators.

Termite Proofing

- Need of Termite proofing
- Pre construction treatment
- Post construction Treatment

Text Books:

- Building Construction: S.K. Sharma.
- Building Construction: Sushil Kumar
- Building Construction: B.C. Punmia

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -CONCRETE TECHNOLOGY
Course Code:-UCE-205

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 2 4.5

UNIT- I

Introduction to Concrete as a Construction Material

- General Perspective Ingredients of Concrete.

Cement

- Manufacture of Portland cement,
- Basic chemistry of cement, hydration of cement
- Classification of cement
- Types of cement
- Tests on cement.

Aggregate & Water

- Classification, mechanical properties, physical properties.
- Deleterious materials, soundness, alkali-aggregate reaction.
- Sieve analysis: fineness tests on aggregates
- Artificial and recycled aggregate
- Mixing water, curing water, tests on water.

Admixtures

- Use of Admixtures
- Types: mineral and chemical
- IS: specification (9103 & 456).

UNIT- II

Properties of Fresh Concrete:

- Workability andFactors affecting workability
- Workability tests
- Cohesion and segregation, Bleeding
- Mixing - handling, placing, Compaction of concrete
- Curing methods

Properties ofHardened Concrete

- Strength of concrete, factors affecting strength.
- Micro-cracking & stress-strain relationship, other strength properties.
- Relation between tensile and compression strengths.
- Impact strength, abrasion resistance.
- Elasticity and creep, shrinkage and swelling

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

UNIT- III

Concrete Mix Design

- Concepts of Mix Design
- Factors for proportioning of concrete.
- Factors to be considered, Statistical quality control
- Methods of Mix Design - IS (10262, 456).

UNIT- IV

Special Concrete & Concreting Techniques

- Introduction to concrete related equipment.
- Batching plants, hauling, pumps, mixers and vibrators.
- Special concrete: light weight concrete
- Polymer concrete, types of fibers, fiber reinforced concrete, high density concrete, self compacting concrete and applications.
- Special concreting techniques: pumping of concrete, under water concreting.
- Ready mixed concrete, roller compacted concrete and Ferro cement.

Reference Books:

- Financial Management: I.M. Pandey, Vikas Publishing House
- Production Operation Management: Dr. B.S. Goel, Pragati Prakashan
- Indian Economic: RuddarDutt, S.Chand& Co

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - SURVEYING – I Lab
Course Code:- UCE-203

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

LIST OF EXPERIMENTS:

- Fineness, standard consistency, initial and final setting time, soundness and compressive strength on cement.
- Specific gravity and density, sieve analysis, flakiness and elongation, moisture content,impact Value and crushing Value of aggregate.
- Workability of concrete by slump test, compaction factor, Vee Bee test, effect of admixture and retarders on setting time concrete.
- Compressive and tensile strength of hardened concrete, Rebound hammer test.
- Concrete mix design by IS code method.
- Measurement of Heat of Hydration of cement
- Measurement of specific gravity of cement
- Soundness of cement by Le-Chatelier‟s apparatus.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - ENGG. GEOLOGY & ROCK MECHANICS
Course Code: - UCE-206

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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UNIT – I

General Geology

- Importance of Engineering Geology applied to Civil Engineering practices.
- Weathering, definition, types and effect.
- Geological works of rivers, wind, glaciers as agents of erosion, transportation and deposition.

Rocks & Minerals

- Minerals, their identification igneous, sedimentary & metamorphic rocks.
- Classification of rocks for engineering purposes.
- Rock Quality Designation (RQD).

UNIT – II

Structural Geology

- Brief idea about stratification, apparent dip, true dip, strike and in conformities.
- Folds, faults & joints: definition.
- Classification relation to Engineering operations.

Engineering Geology Applications

- Geological considerations in the Engineering projects like tunnels, highways, railways, bridges, buildings, foundation, dams, and reservoirs.
- Earthquake. Definition, terminology, earthquake waves, intensity, recording of earthquake.

UNIT – III

Engineering Properties of Rocks

- Uni-axial compression test, tensile tests, permeability test, shear tests, size and shape of specimen rate of testing.
- Confining pressure, stress strain curves of typical rocks.
- Strength of intact and fissured rocks.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Effect of anisotropy, influence of effect of pore fluid type unsaturated and temperature.
- Tests for using foundation sites
- Tests for using building stones
- Tests for using aggregates

UNIT – IV

In-Situ Determination of Engg. Properties of Rock Masses

Engineering Tests For Rocks

- Lab tests - Uni-axial compression test, tensile test, shear strength tests, modulus of elasticity, triaxial test.
- Field test- flat jack test, shear test, seismic test.

Improvement in Properties of Rock Masses

- Tunnels, rock reinforcement rock bolting.

Reference books:

- Engineering Geology by D.S.Arora
- Engineering Geology by Parbin Singh
- Rock Mechanics for Engineering by B.P. Vsma.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

SEMESTER IV

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -STRUCTURAL ANALYSIS-1
Course Code: -UCE-251

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 2 4.5

UNIT – I

- **Slope & Deflection of Beams**
  - Review of Double Integration Method and Macaulay's Method
  - Moment area theorem, conjugate beam method, unit method and strain energy method.
  - Maxwell‟s reciprocal theorem

Thin Cylinders & Spheres

- Stresses and strains in thin cylinders & spherical shell.
- Volumetric change.
- Wire wound thin cylinders, thin vessels subjected to internal pressure.

UNIT – II

- **Analysis of Determinate Trusses**
  - Determination of forces in member of trusses by method of joints, method of sections
  - Deflection of Joints of plane frames by Castigliano's first theorem and unit load method.

Analysis of Influence Lines

- Construction of Influence lines for reaction, shear forces and bending moment for simply supported, overhauling and compound beams

UNIT – III

- **: Rolling Loads**
  - Introduction to rolling loads and influence lines
  - Determination of shear force, bending moment at a section and absolute shear force and bending moment due to single point load, uniformly distributed load, several point loads etc.

Unsymmetrical Bending

- Centroidal principal axes of sections,
- Bending stresses in beams subjected to unsymmetrical bending

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Shear centre: shear centre for channel, angles and Z-Sections

UNIT – IV

- **Arches**
  - Analysis of three hinged, two hinged and fixed Arches.
  - Spandrel braced arches, Influence lines for horizontal thrust.
  - Shear force and bending moment for three hinged & two hinged arches.

Cable & Suspension Bridges

- Shape of a loaded cable
- Cable carrying point loads and UDL
- Cables with ends at different level
- Cable subjected to temperature stresses
- Suspension bridge with two hinged & three hinged stiffening girders, influence lines.

REFRENCE BOOKS:

- Basic structural Analysis C.S.Reddy.
- Analysis of Structures Vol- I and Vol.-II Vazirani & Ratwani
- Theory of Structures by B.C.Punmia
- Theory of Structures by S.Ramamrutham

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -STRUCTURAL ANALYSIS-1 Lab
Course Code: -UCE-251

Evaluation Components for Practical Courses (Students are required to perform at least 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

L T P Cr
3 1 2 4.5

LIST OF EXPERIMENTS:

- Deflection of a simply supported beam and verification of Clark-Maxwell's theorem.
- To determine the Flexural Rigidity of a given beam.
- To verify the Moment- area theorem for slope and deflection of a given beam.
- Deflection of a fixed beam and influence line for reactions.
- Deflection studies for a continuous beam and influence line for reactions.
- Study of behaviour of columns and struts with different end conditions.
- Experiment on three-hinged arch.
- Experiment on two-hinged arch.
- Deflection of a statically determinate pin jointed truss.
- Forces in members of redundant frames.
- Experiment on curved beams.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -DESIGN OF STEEL STRUCTURES - I
Course Code: -UCE-252

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT – I
Introduction to steel

- Properties of structural steel I.S.Rolled sections and I.S. specifications.
  Connections: Importance, Various types of connections, Simple and moment resistant-riveted, bolted and welded connections.

UNIT – II
Design of tension members

- Types of tension members
- Net sectional areas
- Design of Tension members
- Lug angles and splices

Design of compressions members

- Effective length and slenderness ratio
- Various types of sections used for columns
- Built up columns, necessity, design of built up columns
- Laced and battened. Columns including the design of lacing and battens
- Design of eccentrically loaded compression members

UNIT – III
Column Bases & Footings

- Types of column bases
- Design of slab base & gusseted base
- Design of gusseted base subjected to eccentrically loading
- Design of grillage foundations

Design of Beams

- Types of sections, General design criteria for beams, and design of laterally supported and unsupported beams,
- Design of built up beams,
- Web buckling, web crippling and diagonal Buckling.
- Design of framed and Seat connection

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

UNIT - 4: Plate Girder

- Elements of plate girder
- Design steps of a plate girder
- Necessity of stiffeners in plate girder, various types of stiffeners
- Web and flange splices (brief introduction)
- Curtailment of flange plates
- Design of beam-to-column connections
- Design of framed and Seat connection

Reference books:

Design of Steel Structures by S.K. Duggal

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - FLUID MECHANICS
Course Code: - UCE-253

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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UNIT – I

Laminar Flow

- Navier-stokes equations in Cartesian coordinates (no derivation), meaning of terms
- Flow between parallel plates
- Stokes law
- Flow through porous media
- Transition from laminar to turbulent flow

Turbulent Flow

- Definition of turbulence, scale and intensity
- Effects of turbulent flow in pipes
- Equation for velocity distribution in smooth and rough pipes (no derivation)
- Resistance diagram

Uniform Flow in Open Channels

- Flow classifications
- Basic resistance Equation for open channel flow
- Chezy, Manning, Bazin and Kutter formulae
- Variation of roughness coefficient
- Conveyance and normal depth
- Velocity Distribution
- Most efficient flow sections; rectangular, trapezoidal and circular.

UNIT-II

Boundary Layer Analysis

- Assumption and concept of boundary layer theory, Boundary- layer thickness
- Displacement, momentum & energy thickness
- Laminar and Turbulent boundary layers on a flat plate, Laminar sub-layer,
- Smooth and rough boundaries.
- Local and average friction coefficients. Separation and Control.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Energy, Momentum Principles & Critical Flow

- Energy and specific Energy in an open channel;
- Critical depth for rectangular and trapezoidal channels. Alternate depths,
- Applications of specific energy to transitions and Broads crested weirs.
- Momentum and specific force in open channel flow,
- Sequent depths.

UNIT-III

Gradually Varied Flow

- Different Equation of water surface profile; limitation, properties and classification of water and surface profiles with examples,
- Computation of water surface profile by graphical, numerical and analytical approaches.

Hydraulic Jump & Surges

- Theory of Jump
- Elements of jump in a rectangular Channel, length and height of jump, location of jump
- Energy dissipation and other uses
- Surge as a moving hydraulic jump
- Positive and negative surges

UNIT-IV

Flow Past Immersed Bodies

- Drag and lift deformation Drag and pressure drag. Drag on a sphere
- Cylinder and Airfoil: lift-Magnus Effect and circulation lift on a circular cylinder

Centrifugal & Reciprocating Pumps

- Construction and operational details
- Discharge coefficient volumetric efficiency and slip, work and power input
- Centrifugal vs. reciprocating pumps & Hydraulic Ram

Turbines

- Impulse Turbines, Classification– impulse and reaction turbines, water wheels, component parts.
- Operation and mechanism of a Pelton wheel**,** Francis & Kalpan Turbines its Component parts, Construction and Operation & Performance.

Reference Books:

- Fluid Mechanics by R.K.Bansal
- Fluid Mechanics by P.N.Modi & S.M.Seth
- Fluid Mechanics by D.S. Kumar

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Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - FLUID MECHANICS - II
Course Code: - UCE-253

Evaluation Components for Practical Courses (Students are required to perform atleast 6 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	30

LIST OF EXPERIMENTS:

1) To study the constructional details of a Pelton turbine and draw its fluid flow circuit.
2) To study the constructional details of a Francis turbine and draw its fluid flow circuit.
3) To study the constructional details of a Kaplan turbine and draw its fluid flow circuit.
4) To study the constructional details of a Centrifugal Pump and draw its characteristic curves.
5) To study the constructional details of a Reciprocating Pump and draw its characteristic curves.
6) To study the constructional details of a Hydraulic Ram and determine its various efficiencies

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - SURVEYING-II
Course Code: - UCE-254

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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UNIT- I

Theodolite Surveying

- Different types of Theodolites,
- Temporary & permanent adjustment
- Traversing with a Theodolite
- Adjustment of closing error by Bowditch & transit rules

Curves

- Different types of curves
- Degree and calculation of ordinates and angles of curves
- Obstacles in curves

UNIT- II

Tachometric Surveying

- Different types of tachometer,
- Calculation of vertical and horizontal distances, substance bars
- Tachometric leveling with both angle of depression and elevation
- Errors due to curvature & refraction

Triangulation

- Triangulation systems, classification, strength of figure, selection of triangulation stations, grade of triangulation, field work of triangulation, triangulation computations,
- Introduction to E.D.M. instruments, Principals & working of EDM.
- Total station, concept & working of total stations,
- Automatic levels

UNIT- III

Trigonometric Leveling

- Height and distances- base of the object accessible, base of object inaccessible
- Geodetically observation, refraction and curvature, axis signal correction
- Difference in elevation between two points

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Remote Sensing

- Interaction of EMR with Earth Surface Working Principles and Instrumentation.

UNIT- IV

GIS & GPS

- Concepts and terminology,
- Utility of GIS, Essential components of a GIS, Data acquisition through scanners and digitizers, Data storage, Data manipulation and analysis , Applications of GIS .
- Introduction to GPS, working principle, various applications of GPS related to Civil Engg.,
- components of GPS – Point positioning and differential positioning

Reference Books:

- Surveying, By C.L. Kochher – Danpat Rai & Sons
- Kaplan, E.D., Understanding GPS : Principles and applications
- Campbell, J.B. Taylvor and Francis, "Introduction to Remote Sensing".

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - SURVEYING-II Lab
Course Code: -UCE-254

Evaluation Components for Practical Courses (Students are required to perform atleast 7 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

LIST OF EXPERIMENTS:

1) Measurement of distance, ranging a line, plotting of details in chain survey.
2) Measurement of bearing and angles with compass, adjustment of traverse by graphical method.
3) Different methods of leveling, height of instrument, rise & fall methods.
4) Plane table survey, different methods of plotting two point & three point problem.
5) Setting up temporary and permanent adjustment of a Theodolite. Measurement of horizontal angles by repetition and reiteration methods using a Theodolite. Measurement of vertical angle by Theodolite.
6) Determination of tachometric constants. Determination of reduced levels by tachometric observations.
7) Determination of height of an inaccessible object with instrument axis in the same plane as the object and in different planes.

Setting out a transition curve. Setting out of circular curves in the field using different methods.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - SOIL MECHANICS
Course Code:-UCE-255

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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UNIT-I

Basic Concepts & Determination Of Index Properties

- **Preliminary definitions & relationship**
  - Definition of soil & soil mechanics common soil problems in Civil Engineering field.
  - Principal types of soils. Important properties of very fine soil i.e. adsorbed water.
  - Base Exchange and soil structure. Characteristics of main Clay mineral groups i.e. montmorilonite, illite and kaollite.
  - Basic definitions in soil mechanics & three phase concept.
  - Weight volume relationship theory and determination of specific gravity from picnometer test.

  Index Properties
  - Grain size analysis. Stock‟s law and Hydrometer analysis.
  - Consistency and sensitivity Clay as per I.S. Code Atterberge Limits Flow Index and Toughness Index.
  - Underlying theory of shrinkage limit determination.
  - Classification of coarse grained soils.
  - Classification of fine-grained soils as per Indian standard classification system (IS-1498-1970).

UNIT-II

Permeability & Seepage

- Concept of effective stress principal, seepage pressure
- Critical hydraulic gradient and quick sand condition. Capillary phenomenon in soil
- Darcy‟s Law and its validity
- Seepage velocity
- Co-efficient of permeability and its determination in the laboratory.
- Average permeability of stratified soil mass
- Factors affecting 'K' and brief discussion about Instrumentation

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

UNIT-III

Shear Strength

- Stress analysis of a two dimensional stress system by Mohr circle.
- Concept of pole. Coulomb's law of shear strength coulomb - Mohr strength theory.
- Relation between principal stresses at failure. Mohrs colomb‟s failure envelope.
- Direct, triaxial and unconfined shear strength tests.
- Triaxial shear tests based on drainage conditions typical strength envelopes for clay obtained from these tests.
- Vane shear test
- Derivation of skempton‟s pore pressure parameters.
- Stress strain and volume change characteristics of sands.
- Stability of slope

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UNIT-IV

Consolidation

- Definition and object of consolidation
- Concept of various consolidation characteristics i.e. primary & secondary consolidation.
- Terzaghi's Differential equation & its derivation Boundary conditions for Terzaghi's solution for one dimensional consolidation.
- Consolidation test determination of curve fitting methods.
- Consolidation pressure determination.
- Normally consolidated and over consolidated clays.
- Causes of over-consolidation. Effect of disturbance on e-Log sigma curves of normally consolidated clays,
- Importance of consolidation settlement in the design of structures.

Reference Books:

- Soil Mech. & Foundation Engineering, by K.R.Arora
- Geotechnical Engineering, by P. Purshotama Raj
- Soil Mech. & Foundation Engineering. By V.N.S.Murthy
- Soil Mech. & Foundation Engineering, by B.c.Punmia (Laxmi Publication))
- IS Codes.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - SOIL MECHANICS
Course Code: -UCE-255

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

LIST OF EXPERIMENTS:

- Determination of in-situ density by core cutter method.
- Determination of in-situ density by sand replacement method.
- Determination of Liquid Limit & plastic Limit by Casagrande apparatus and penetrometer method.
- Determination of specific gravity of soil solids by pyconometer method.
- Grain size analysis of a given sample of sand and determination of coefficient of uniformity and coefficient of curvature.
- Direct shear and triaxial test on a given soil sample.
- Unconfined compression test for fine grained soil.
- Determination of permeability by constant Head Methods and variable head method.
- Compaction test (proctor) and modified proctor test.
- Plot of zero air voids line.
- Determination of Relative Density of soil

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -PRINCIPLES OF ENGINEERING ECONOMICS AND MANAGEMENT

Course Code: - UCE-256

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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UNIT-I

ECONOMICS: Definitions, Nature and scope of Economics, Economic Systems-meaning of Capitalism, Socialism & mixed economy.
DEMAND AND SUPPLIES ANALYSIS: Law of demand and supply, exception to the law of demand, Elasticity of demand and supply and their types, Methods of measuring elasticity of demand and supply.

UNIT-II

THEORY OF PRODUCTION: Scales of production, Law of returns, Break even analysis.
MONETARY SYSTEM: Monetary policy- Meaning, objectives, methods, Fiscal policy-Meaning and objectives of fiscal policy in a developing country like India, Functions of Reserve Bank of India and Commercial Banks.
ECONOMICS AND BUSINESS ENVIRONMENT: Privatization-Growth of private capitalism in India, Business/Trade Cycles-Meaning, Characteristics & classification, foreign capital & economic development

UNIT-III

MANAGEMENT PRINCIPLES: Meaning & types of Management, Concept of Scientific Management, Management by objectives, System Approach to Management
FINANCIAL MANAGEMENT: Meaning, functional areas of financial management, Sources of Finance, Meaning of financial accounting, accounting principles-concepts & conventions, Importance of final accounts-profit & loss a/c and balance sheet, Need and importance of capital budgeting.
MARKETING MANAGEMENT: Introduction to marketing management, Market segmentation, Developing and managing advertising programs, Deciding on media & measuring effectiveness

UNIT-IV

PRODUCTION MANAGEMENT: Procedure for production planning & Control, Plant Location and lay-out, Routing, Scheduling, CPM & PERT.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

QUALITY MANAGEMENT: Statistical Quality Control, Introduction Control Charts, X Charts, R Charts, Control Charts for C(N. no of defects per unit), Control chart for P(Fraction Defective), Advantage & Limitations of SQC.

Quality Circles: Structure functions & Limitations.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - OPERATING SYSTEM LAB
Course Code:- UCS-252

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

LIST OF EXPERIMENTS:

1. Study of DOS internal commands.
2. Study of DOS external commands.
3. Writing of Batch files in DOS.
4. Study of GUI features of Windows Operating Systems.
5. Study various settings in Windows Operating Systems (Desktop settings, control panel etc.).
6. Study of LINUX Operating systems (LINUX basic commands).
7. Study of LINUX kernel.
8. Writing of Shell Scripts in LINUX.

Software used: - DOS, Linux

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

SEMESTER V

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - STRUCTURAL ANALYSIS II
Course Code: - UCE-301

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 2 0 4

Unit-I

Analysis of Statically Indeterminate Structures:

- Degree of static and kinematic indeterminacies
- Analysis of indeterminate beams, rigid frames and trusses by method of consistent deformation
- Law of reciprocal deflections
- Method of least work
- Induced reactions on statically indeterminate beams
- Rigid frames and trusses due to yielding of supports.

Influence Lines For Statically Indeterminate Structures:

- Muller Breslau principle for statically determinate and indeterminate beams, trusses and rigid frames
- Influence lines for reactions, shear force and bending moment for statically indeterminate beams, trusses and rigid frames.

Unit-II

Space Frames

- Introduction
- Simple space truss
- Types of supports,
- Tension coefficient method

Fixed And Continuous Beams:

- Analysis of fixed beams, continuous beams and propped cantilevers by moment-area theorem and strain energy method
- Fixed end moments due to different types of loadings, sinking and rotation of supports
- Bending moment and shear force diagrams for fixed beams and propped cantilevers
- Slope and deflection of fixed beams

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Analysis of continuous beams by the Three moment equation (Clapeyron's theorem) due to different types of loadings,
- Effect of sinking of support

Unit-III

Slope-Deflection Method

- Introduction
- Slope-deflection equations
- Analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loads and uneven support settlements.

Moment-Distribution Method:

- Introduction
- Absolute and relative stiffness of members, stiffness and carry-over factors, distribution factors
- Analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loads and uneven support settlements, symmetrical beams and frames with symmetrical, skew- symmetrical and general loading.

Unit-IV

Rotation Contribution Method:

- Introduction
- Basic concept
- Analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loadings and yielding of supports symmetrical beams and frames
- General case storey columns unequal in height and bases fixed or hinged.

Approximate Methods Of Structural Analysis:

- Vertical and lateral load analysis of multi-storey frames, portal, cantilever and substitute-frame methods and their comparison

Reference Books:

- Basic structural analysis - C.S. Reddy
- Intermediate structural analysis - C. K. Wang.
- Indeterminate structural analysis - J. Sterling Kinney
- Theory of structures - B.C. Punmia

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:-DESIGN OF CONCRETE STRUCTURE -1
Course Code:-UEC-302

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 4

UNIT – I

Design Philosophies In Reinforced Concrete:

- Introduction to RCC
- Characteristic strength and Characteristic loads
- Design values, partial safety factors and factored loads
- Permissible stresses in concrete and steel
- Stress-strain relationship for concrete and steel

Working Stress and Limit State Method:

- Working stress and limit state methods
- Basic assumptions used in WSM
- Basic assumptions used in LSM
- Limit state v/s working stress method
- Design principles used in WSM
- Design principles used in LSM

UNIT – II

Design of Beams:

- Under reinforced ,over reinforced and balanced section
- Depth of neutral axis and Critical neutral axis
- Moment of resistance
- Introduction to singly , doubly an Flanged Reinforced beam
- Analysis and design of singly and doubly reinforced rectangular and flanged beams with working stress method
- Analysis and design of singly and doubly reinforced rectangular and flanged beams with limit state method
- Minimum and maximum reinforcement in beams

Design of Slabs:

- General considerations
- Design of one-way and two-way slabs for distributed and concentrated loads,
- Non-rectangular slabs, openings in slabs, Design examples.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

UNIT – III

Analysis & Design Of Shear, Bond & Torsion:

- Diagonal tension
- Shear reinforcement,
- Development length, Anchorage and flexural bond,
- Torsion, stiffness, equivalent shear, Torsional reinforcement, Design examples.

Serviceability Limit State:

- Control of deflection, deflection and moment relationship for limiting values of span to depth,
- Cracking, slenderness and vibrations, limit state of crack width, Design examples.

UNIT – IV

Design of Columns:

- Effective length, Minimum eccentricity
- Slenderness ratio, Short and Long columns
- Short columns under axial compression, Uniaxial and Biaxial bending
- Design of short column subjected to axial, uniaxial and biaxial bending

Concrete Reinforcement & Detailing:

- Requirements of good detailing
- Cover to reinforcement, spacing of reinforcement, reinforcement splicing
- Anchoring reinforcing bars in flexure and shear,
- Curtailment of reinforcement
- Detailing of beams, slabs and columns

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -HYDROLOGY AND IRRIGATION ENGINEERING
Course Code: - UEC-303

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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UNIT-I

Introduction

- General crop seasons
- Humid, arid and semiarid regions necessity of irrigation water requirements
- Duty, Delta, Base period and Crop period
- Water requirement calculation, consumptive use (evapotranspiration)
- Determination of consumptive use irrigation efficiencies
- Factors affecting the duty of water, Methods of improving duty
- Types of irrigation Methods of Application of Water on Field Protective and Productive irrigation works

Hydrology:

- Introduction
- Hydrologic cycle and hydrological data precipitation
- Amount of precipitable water and different forms of precipitation
- Types of rainfall measurements, variability of rain fall with respect to time and space Interpretation of rainfall data, Maximum precipitable water
- Hydrologic Abstractions, Interception and depression storage, evaporation, Transpiration, infiltration, Infiltration Indices
- Runoff, Factors affecting runoff, Estimation of runoff, Empirical formulae, Unit Hydrograph method, Stream Gauging, Flood estimation by empirical formulae, Unit Hydrograph Statistical and Probability methods Flood Frequency Analysis

UNIT-II

Canal Irrigation:

- Classifications of canals, Canal alignment, Inundation canals
- Bandhara irrigation, Advantages and Disadvantages
- Silt Theories- Kennedy's Theory, Lacey's Theory, Drawbacks in Kennedy's &Lacey's theories, comparison of Lacey's and Kennedy's theories

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Design of unlined canals based on Kennedy & Lacey's theories, suspended and bed loads.

Lined Canals:

- Types of lining, selection of type of lining, Economics of lining, maintenance of lined canals, silt removal, strengthening of channel banks
- Measurement of discharge in channels, design of lined canals, methods of providing drainage behind lining.

UNIT-III

Losses In Canals, Water Logging And Drainage:

- Losses in canals-Evaporation and seepage
- Water logging, causes and ill effects of water logging-anti water logging measures
- Drainage of land, classification of drains - surface and subsurface drains Design considerations for surface drains, Advantages and maintenance of tile drains

Investigation And Preparation Of Irrigation Projects:

- Classification of project
- Project preparation-investigations Design of works and drawings
- Concept of multipurpose projects, Major, Medium and miner projects,
- Planning of an irrigation project, Economics & financing of irrigation works, Documentation of project report.

UNIT-I V

Tube Well Irrigation:

- Types of tube wells, strainer type, cavity type and slotted type, type of strainers
- Aquifer, porosity, uniformity coefficient, specific yield & specific retention, coefficients of permeability, transmissibility and storage.
- Yield or discharge of tube well, Assumptions and Theim & Duputi‟s formulae
- Interference of tube wells with canal or adjoining tube-wells, optimum capacity, Duty and delta of a tube well
- Rehabilitation of tube well.

River Training Works:

- Objectives, classification of river-training works
- Design of Guide Banks
- Groynes or spurs their design and classification
- ISI Recommendations of Approach embankments and afflux embankments, pitched Islands, Artificial cut-off objects and design
- Considerations River control -Objectives and methods.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books :

- Garg,S.K., Irrigation Engineering and Hydraulic Structures, Khanna Publishers.
- Punmia, B.C., Pande and Lal, B.B. Irrigation and water power Engineering, Laxmi Publications pvt. Ltd.
- Bharat Singh, Fundamentals of Irrigation Engineering, Nem Chand and Brothers.
- Sahasrabudhe, S.R., Irrigation Engineering and Hydraulic Structures.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -CONSTRUCTION PLANNING & MANAGEMENT
Course Code:-UCE-304

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

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UNIT-I

Construction Management:

- Significance
- Objectives and functions of construction management
- Types of constructions
- Resources for construction industry
- Engineering drawings.

Construction Contracts & Specifications:

- Introduction, Types of contracts, Contract document, specifications, important conditions of contract, arbitration.

UNIT-II

Construction Planning:

- Introduction
- Work breakdown structure
- Stages in planning-pre-tender stages, contract stage
- Scheduling, scheduling by bar charts, preparation of material, equipment, labor and finance schedule, limitation of bar charts, milestone charts.

Construction Organization:

- Principles of Organization, communication, leadership and human relations
- Types of Organizations, Organization for construction firm, Site organization, temporary services, job layout.

UNIT-III

CPM

- Introduction
- Network techniques, work break down
- Classification of activities, rules for developing networks, network development-logic of network, allocation of time to various activities

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Fulkerson‟s rule for numbering events, network analysis ,determination of project schedules, critical path, ladder construction, float in activities, shared float, updating
- Resources allocation, sources smoothing and resources leveling.

PERT:

- Probability concept in network, optimistic time, pessimistic time, most likely time, lapsed time, deviation, variance, standard deviation, slack critical path, probability of achieving completion time, central limit theorem.

UNIT-IV

Cost-Time Analysis:

- Cost versus time, direct cost, indirect cost, total project cost and optimum duration
- Contracting the network for cost optimization, steps in time cost optimization, illustrative examples.

Inspection & Quality Control:

- Introduction
- Principles of inspection
- Enforcement of specifications
- Stages in inspection
- Quality control and testing of structures
- Statistical analysis.

Reference Books :

- Construction Planning & Management by B.C.Punmia&K.K.Khandelwal
- Construction Planning &Management by P.S. Gehlot&B.M.Dhir
- PERT & CPM -Principles & Applications by L.S.Srinath

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - GEOTECHNICAL AND FOUNDATION ENGINEERING
Course Code: -UCE-305

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 2 4.5

UNIT – I

Stress Distribution In Soils And Bearing Capacity

- Soil elasticity Homogeneity and Isotropy
- Semi-infinite mass, Stress distribution by dispersion Boussinesq‟s theory, Newmark‟s influence chart Westergaard‟s theory, Bulb of pressure Elastic settlement.
- Models to determine the bearing capacity- Prandtl‟s theory, Terzaghi‟s theory and Terzaghi‟s bearing capacity factors, Skempton‟s bearing capacity analysis for clays, Meyerhof‟s bearing capacity analysis for clays, Brinch Hansen‟s shape, Depth and inclination factors
- Plate bearing test, Codal values for presumptive safe bearing pressures, Prandtl‟s theory, Terzaghi‟s theory Terzaghi‟s bearing capacity factors, Brinch Hansen‟s shape, Depth and inclination factors, Meyerhof‟s theory
- Effect of water table on bearing capacity Settlement and differential settlement.
- Settlement and differential settlement

UNIT – II

Subsoil Exploration And Sampling, Field Tests:

- Trenches Auger boring, Helical and Posthole augers. Wash boring, Percussion drilling & Rotary drilling.
- Sampling methods, Sample disturbances.
- Geophysical methods.
- Static & dynamic cone penetration tests Standard penetration test.

Classification Foundation:

- Types of foundations important definitions and their classifications
- Choice of foundation, Net load
- Geotechnical design of footings, Combined Footings and Rafts Compensated rafts
- Classification of piles based on different criteria, Mechanics of load transfer through piles, Negative skin friction, Underreamed piles
- Pile load tests, Construction of piles, Piers, Caissons types and construction

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

UNIT – III

Earth Pressures And Retaining Structures:

- Active, Passive and At-rest pressures
- Rankine‟s theory of earth pressure, Coulomb‟s theory of earth pressure
- Graphical methods by Rebhan/Poncelet and Culmann Influence of surcharges, Earth pressure under submergence, Layered backfills
- Gravity retaining structures Masonry and RC cantilever retaining walls, Stability analysis, Drainage provisions Sheet pile walls.

UNIT – IV

Compaction

- Wet and Dry densities, Proctor compaction test, Optimum moisture content and Maximum dry density
- Field compaction tests, Core-cutter method, Sand replacement method, Proctor needle.
- Field compaction of soils by rollers, Mechanical stabilization, Lime and Cement stabilization.rollers, vibrators.
- Soil Stabilization, various methods of stablization

Reference Books:

- Soil Mechanics & Foundation Engineering by B.C.Punmia
- Geotechnical Engineering by Alam Singh
- Soil Mechanics by V.N.S. Murthy
- Soil Mechanics & Foundation Engineering by K.R.Arora
- Gulhati, S.K. and Datta, M , Geotechnical Engineering, Tata McGraw-Hill, New Delhi
- Kurian, N.P., Design of Foundation Systems Principles and Practices, Narosa Publishing House, New Delhi
- IS Codes

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - GEOTECHNICAL AND FOUNDATION ENGINEERING
Course Code: - UCE-305

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

LIST OF EXPERIMENTS:

1) Grain size analysis by hydrometer method.
2) Shrinkage limit determination.
3) Relative density of granular soils.
4) Consolidated drained (CD) triaxial test.
5) Consolidated Undrained (CU) triaxial shear test with pore water pressure measurement.
6) Consolidation test.
7) Undisturbed sampling.
8) Standard penetration test.
9) Dynamic cone penetration test.
10) Model plate load test.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: ENVIRONMENTAL ENGINEERING
Course Code: - UCE-306

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 2 4.5

- **UNIT 1: QUANTITY AND QUALITY OF WATER**
  - Objectives of water supply systems.
  - Quantity of water estimating requirements.
  - Design period per capita consumption.
  - Fluctuations in demand pattern, Factors affecting per capita demand.
  - Population forecasting methods.
  - Sources of water - Surface water and Ground water sources.
  - Properties of water - physical, chemical and biological aspects.
  - Analysis of water quality standards

- **UNIT 2: QUANTITY AND QUALITY OF WASTE WATER**
  - Definition & Classification of waste water.
  - Impurities in waters – Suspended, colloidal and dissolved impurities and their importance.
  - Assessment of organic solids by BOD, COD, TOC, ThOD and TOD

- **UNIT 3: WATER CONVEYANCE SYSTEM**
  - Hydraulics and Design of Pressure Pipes - Analytical Methods and Nomo grams flow in pipes Series and Parallel Pipes.
  - Different Materials of Pipes Jointing and Testing of Commonly used Pipes Appurtenances of Pipes Pumps and their selection.

WATER DISTRIBUTION:-

  - Distribution system-Gravity system, Pumping system, Dual system, Layout of Distribution system – Dead end System, Ring System, Radial System, Their merits and demerits.
  - Distribution reservoir – Their functions.

- **UNIT 4: WASTEWATER CONVEYANCE AND SEWERAGE SYSTEM**
  - Methods of collection -conservancy system and water carriage system, their merits and demerits.
  - Types of sewerage system, Patterns of collection system.
  - Quantity of Sanitary Sewage and Storm Water.
  - Estimation of peak runoff using rational and other empirical formulas.
  - Fluctuations in Flow Pattern.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Design of Sewers, Sewer Sections, Materials for Sewers, Laying, Jointing and testing of Sewers.
- Appurtenances and Maintenance.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - ENVIRONMENTAL ENGINEERING
Course Code: - UCE-306

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

LIST OF EXPERIMENTS:

1) Determination of pH
2) Determination of Conductivity.
3) Determination of Turbidity.
4) Determination of Hardness
5) Determination of Alkalinity
6) Determination of Acidity.
7) Determination of Chlorides.
8) Determination of Dissolved oxygen.
9) Determination of Fluorides.
10) Determination of Optimum Coagulant Dose by Jar Test Apparatus
11) Estimation of Iron and Manganese.
12) 12. Estimation of Phosphates
13) 13. Estimation of Nitrates.

ANALYSIS OF WASTE WATER CHARACTERISTICS:-

1) Determination of Total Solids, Dissolved Solids and Suspended Solids.
2) Determination of BOD.
3) Determination of COD.
4) Determination of MPN Index for coliform.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

SEMESTER VI

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: STRUCTURE ANALYSIS III
Course Code: - UCE-351

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L	T	P	Cr
4	2	0	5

UNIT 1:Basic concepts of structural analysis:

- Static and kinematic indeterminacies of beams
- Rigid-jointed plane and space frames
- Pin-jointed plane and space frames and hybrid structures, Actions and displacements, action and displacement equations
- Generalized system of coordinates, Unit-load method, conjugate-beam method, slope-deflection equations.

UNIT 2:Flexibility matrix (physical approach):

- Basic definitions and types of matrices
- Matrix operations, matrix inversion,solution of linear simultaneous equations, matrix partitioning
- Development of flexibility matrices for statically determinate and indeterminate beams
- Rigid-jointed plane frames and pin-jointed plane frames using physical approach.

Stiffness matrix (physical approach):

- Development of stiffness matrices for statically determinate and indeterminate beams
- Rigid-jointed plane frames and pin-jointed plane frames using physical approach
- Reduced stiffness matrix, total stiffness matrix, translational or lateral stiffness matrix.

UNIT 3:Stiffness matrix (element approach):

- Transformation of system displacements to element displacements through displacement transformation matrix
- transformation of element stiffness matrices to system stiffness matrix
- development of stiffness matrices for statically determinate and indeterminate beams
- Rigid-jointed plane frames and pin-jointed plane frames using element approach
- Relation between flexibility and stiffness matrices.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Flexibility matrix (element approach):

- transformation of element flexibility matrices to system flexibility matrix
- development of flexibility matrices for statically determinate and indeterminate beams
- Rigid-jointed plane frames and pin-jointed plane frames using element approach
- Relation between flexibility and stiffness matrices.

UNIT 4: Stiffness method of analysis:

- Analysis of continuous beams
- Rigid-jointed plane frames and pin-jointed plane frames using the physical and element approaches
- Effect of support settlements, temperature stresses and lack of fit
- Comparison of flexibility and stiffness methods of analysis.
-

Finite element method (FEM)

- Introduction to finite element approach
- Application of FEM in various fields

Reference Books:

- Structural analysis A matrix approach GS Pandit and SP Gupta
- Basic structural analysis C.S. Reddy
- Finite element analysis C.S. Krishnamurthy
- Finite element methods O.C. Zeincwicz.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: Design of Steel Structure II
Course Code: - UCE-352

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L	T	P	Cr
4	2	0	5

UNIT 1: Elementary Plastic Analysis and Design:

- Introduction
- Scope of plastic analysis
- Ultimate load carrying capacity of tension members and compression members, flexural members
- Shape factor, mechanisms, plastic collapse analysis
- Plastic analysis applied to steel beams and simple portal frames and design.

UNIT 2: Industrial Buildings:

- Loads, general arrangement and stability and design considerations
- Design of purlins
- Design of roof trusses, industrial building frames, bracings and stepped columns.

Design of Water Tanks:

- Introduction
- Permissible stresses
- Design of circular, rectangular and pressed steel tanks including staging.

UNIT 3: Design of Steel Stacks:

- Introduction
- Various loads to be considered for the design of steel stacks
- Design of steel stacks including foundation.

Towers:

- Transmission line towers, microwave towers, design loads, classification, design procedure and specification.

UNIT 4: Cold Formed Sections:

- Introduction
- Brief description of various types of cold formed sections
- Local buckling
- Concepts of effective width and effective sections and elements with stiffeners

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Design of compression and bending elements.

Reference Books:

- Design of Steel Structure by A.S. Arya&J.L.Ajmani
- Design of Steel Structures by P.Dayartnam
- Design of Steel Structures by Gaylord & Gaylord Design of Steel Structures by N.Subramanian
- IS:800-2007, Indian Standard by BIS
- IS-801-1975, Indian Standard Code of Practice for Use of Cold formed light gauge steel structural members in general Building

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- DESIGN OF CONCRETE STRUCTURE-II
Course Code: - UCE-353

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L	T	P	Cr
4	2	0	5

UNIT 1:Design of foundations:

- Design of isolated footing, square, circular and rectangular.
- Design of Combined Footing: Trapezoidal and Rectangular
- Design of strap and Raft Footing.

Retaining walls

- Classification
- Forces on retaining walls, design criteria, stability requirements
- Proportioning of cantilever retaining walls
- Counterfort retaining walls, criteria for design of counteforts
- Design examples.

UNIT 2:Domes:

- Introduction
- Different types of Domes
- Design of Spherical and Conical domes
- Design of Cylindrical Shells Supported on Edge Beams.

Water tanks:

- General Design Requirements
- Design of Circular and Rectangular Tanks Resting on Ground
- Design of Underground Rectangular tanks
- Different Types of Over Head Service Reservoirs, Design of Intz Tank.

UNIT 3:Pre-stressed concrete:

- Introduction to pre-stressed concrete
- Types of pre-stressed concrete
- Difference between pre-stressed, pre-tensioned concrete & pre-stressed post-tensioned concrete
- Losses in pre-stressed concrete and Numerical based on it.

UNIT 4: Design of Miscellaneous Structures:

- Design of Continuous slab -Flat slab
- Simply supported and continuous deep beams
- Grid floors, Waffle slab

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books:

- Design of Reinforced Concrete Structures by S.Ramamrutham
- Reinforced Concrete-Limit State Design by A.K.Jain
- Reinforced Concrete by I.C.Syal & A,K,Goel
- IS:456-2000, Indian Standard by BIS.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: HIGHWAYS ENGINEERING
Course Code: -UCE-354

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
4 2 25.5

UNIT 1:Highway Planning and Alignment:

- Role of transportation in National Development.
- Different modes of transportation
- Historical development of road construction
- Objectives and achievements of organizationssuch as Jaykaar Committee IRC and CRRI.
- Twenty years road development plans
- Factors controlling selection of Highway alignments.
- Modern methods of conducting Engineering surveys.
- Rural & Urban Road classification inIndia.
- Cross-sectional elements of road Definition and Significance.

Highway Geometric Design:Design of horizontal alignment

- Sight distance PIEV theory Problems in S.S.D.
- Super elevation Theory & Problems.
- Highway widening on horizontal curves, (Theory & Problems).
- Transition curves Theory & Problems.

Design of Vertical Alignment:

- Terrain classification.
- Categories of Gradient Grade compensation.
- Types of vertical curves (Theory and problems).

UNIT 2: Pavement Design

- Objects and requirements of pavements.
- Types of pavement structure and functions of pavement components.
- Factors to be considered in Design of pavements.
- Design of Flexible pavement using CBR method (based on IRC: 37 2001).
- Design of Rigid pavement using Westergaard‟s modulus of sub grade Reaction and Westergaard‟s stress equation for wheel loads (Interior, Edge and Corner loading) (Based on IRC:58 2002).
- Comparison between Rigid & Flexible pavements.

UNIT 3: Highway Materials and Construction Practice.

- Desirable Properties and Testing of Highway Materials.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Soil – California Bearing Ratio Test, Field Density Test
- Aggregate - Crushing, Abrasion, Impact Tests, Water absorption, Flakiness and Elongation indices and Stone polishing value test
- Bitumen - Penetration, Ductility, Viscosity, Binder content and Softening point Tests.
- Construction Practice - Water Bound Macadam Road, Bituminous Road and Cement Concrete Road [as per IRC and MORTH specifications]
- Highway Drainage [IRC Recommendations]

Traffic Engineering

- Definition, scope and function of traffic engineering.
- Factors governing traffic engineering, traffic characteristics
- Traffic studies, traffic volume study, speed study
- Passenger car unit, parking studies, accident studies and traffic operations and regulations.

- **UNIT 4: Highway Maintenance**
  - Types of defects in Flexible pavements – Surface defects, Cracks, Deformation, Disintegration – Symptoms, Causes and Treatments.
  - Failures in Rigid & Flexible Pavements – Scaling, Shrinkage, Warping, Structural Cracks Spalling of Joints, Mud Pumping & Special Repairs.
  - Pavement Evaluation – Pavement Surface Conditions and Structural Evaluation.
  - Overlay design by Benkelman Beam Method [Procedure only], Principles of Highway Financing.

Reference Books:

- Highway Engineering by Khanna & Justo
- Highway Engineering by L.R.Kadyali
- S.C.Saxena & S.P.Arora, by , Dhanpat Rai Publishers

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - HIGHWAYS ENGINEERING Lab
Course Code: - UCE-354

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

LIST OF EXPERIMENTS:

1) Aggregate sieve analysis test.
2) Aggregate Impact value Test.
3) Specific gravity and water absorption test on aggregates.
4) Los-Angeles Abrasion Test on Aggregates.
5) Flakiness and Elongation test on aggregates
6) Dorry‟s Abrasion Test on Aggregates.
7) Deval Attrition Test on Aggregates.
8) Crushing Strength Test on Aggregates.
9) Penetration Test on Bitumen.
10) Ductility Test on Bitumen.
11) Viscosity Test on Bituminous Material
12) Softening Point Test on Bitumen.
13) Flash and Fire Point Test on Bitumen

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: IRRIGATION ENGINEERING
Course Code: - UCE-355

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit 1:Introduction

- Irrigation necessity, advantages, disadvantages
- Impact of irrigation on human environment, need and development of irrigation in India.

Regulation works:

- Canal falls-necessity and location, development of falls.
- Design of Sarda type fall, Design of Straight Glacis fall, off-take alignment
- Cross-regulator and distributory head regulators
- Devices to control silt entry into the off-taking channel
- Silt ejector, canal escapes, types of escapes

Unit 2: Cross drainage works:

- Classification and their selection, Hydraulic design aspects of aqueducts
- Syphon aqueducts, super passage, canal syphon and level crossing, design of transitions.

Diversion canal headworks:

- Diversion headworks, Bligh‟s creep theory, Khosla‟s method of independent variables
- Use of Khosla‟s theory to design syphon aqueducts, super passage, canal syphon and level crossing, design of transitions

Unit 3: Storage Headworks:

- Types of dams, selection of a site, Gravity dams- two dimensional design
- Forces acting,stability criterion, elementary profile of a dam, cutoffs and drainage galleries, arch dams-constant. Angle and constant radius arch dam.
- Simple design and sketches, most economical angle, Earth dam.
- Design principles, seepage through earth dams, seepage line, control of seepage, design of filters

Unit 4: Spillways a Energy Dissipaters:

- Essential requirements of spillway and spillway`s capacity

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Types of spillways and their suitability, Ogee spillways, chute, side channel, shaft and syphon spillways
- Energy dissipation below spillways, stilling basins, USBR and I.S.Stilling Basins.

Reference Books:

- Garg,S.K., Irrigation Engineering and Hydraulic Structures, Khanna Publishers.
- Bharat Singh, Fundamentals of Irrigation Engineering, Nem Chand and Brothers.
- Sharma S. K., Irrigation Engineering, Khanna Publishers New Delhi.
- Michael A.M., Irrigation-Theory & Practice, Vikash Publications.
- Arora K. R., Irrigation, Water Power and Water Resources Eng, Standard Publishers

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - CIVIL SOFTWARE LAB - I
Course Code: - UCE-356

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

L	**T**	**P**	**Cr.**
0	**0**	**2**	**2**

LIST OF EXPERIMENTS:

Introduction:

Main frame Mini and Micro computers system configuration Functions Hardware, Software, Operating System Basics File Processing Techniques High level languages packages.

Development and Implementation of Programs for the following in C Language:

1. Solution of simultaneous equations by Gauss Jordan method.
2. Solution of non-linear equations using Newton-Raphson technique.
3. Drawing the S.F and B.M. diagrams for simply supported beams and cantilever beam subject to point, udl and uniformly varying loads
4. Analysis of plane, pinjointed frames.
5. Deflection of cantilever and simply supported beams.
6. Limit state Design of R. C. Rectangular and T-beams.
7. Design of tension and Compression Steel Members.
8. Expert Systems for Classification of soil.
9. Water surface profiles.
10. Determination of friction factor
11. Stability of slopes

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: ENVIRONMENT IMPACT ASSESMENT
Course Code: - UCE-310

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT-I: Environment and Human Activity
Resources, Pollution, Reuse and Environment Management
Management of Aquatic Environment
Water quality controls, Drainage Basin Activities & Water Pollution. The impact of human activities on aquatic resources. The control measures and regional planning.

UNIT-II: Air Quality Management
Atmospheric effect of Human Activity on air quality, waste disposal alternatives, Optimization, Planning of waste disposal

UNIT-III: Waste Management, Water disposal method, impact of waste disposal of human activity
Land use management
Impact of land used on human life. Control of hazards in land use, Management of Land use.

UNIT-IV: Environment Assessment
National environmental policy, implication of environmental assessment in design process. Preparation of assessment, quantification. General requirement of environmental standards. Techniques of setting standards
Case study of EIA of river valley project and thermal projects

UNIT V
Composition: Letter writing: personal, official, business and covering letters; Resume‟ writing; Essay writing;
Report writing; Story writing

UNIT VI
Listening and Speaking Skills: Familiarization with listening skills; Phonetics: Place and manner of articulation, Consonants and vowel Sounds, transcriptions, syllables; Speech presentation, paper reading, extempore, self introduction; ; Dialogues, debates, role play and quizzes; Group discussion, Interview skills Public speaking skills.

Reference Books:

- An Exordium by Zeenat Khan and Akanksha Vashisht.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- English Grammar and Composition by Prof. M. Krishna swami
- High School English Grammar and Composition by Wren and Martin.
- English Grammar and Composition by Prof. M. Krishna swami.
- Patterns of English structures by A.S. Hornby. (Macmillian publications recommended)
- McGraw, SJ;Basic Managerial Skills for All, Prentice Hall of India, New Delhi 1991
- Handbook of Practical Communication Skills by Chrissie Wright
- Business Communication by K.K.Sinha
- The Functional Aspects of Communication Skills by Dr. P Prashad

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: ADVANCE CONCRETE TECHNOLOGY

Course Code: - UCE-311

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1:: **Introduction:**

- Structure of hydrated Cement
- Special Cements
- Chemical admixtures
- Concept of Green Concrete using Mineral Admixtures
- Corrosion protection
- Fire resistance
- Sulphate attack on concrete
- Diffusion of chlorides in concrete
- Evaluation of concrete strength
- NDT Techniques

Unit 2: Concrete mix design:

- Principles of Concrete mix design
- Methods of Concrete mix design
- Design of high strength concrete and
- High performance concrete

Unit 3: Properties of concrete:

- Rheological behavior of fresh Concrete
- Properties of fresh concrete
- Properties of hardened concrete
- Strength
- Elastic properties
- Creep and Shrinkage
- Variability of concrete strength

Unit 4: Modern Trends in concrete:

- Modern trends in concrete manufacture
- Placement techniques
- Methods of transportation
- Placing of concrete
- Curing Techniques
- Extreme whether concreting

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Special concreting methods
- Vacuum dewatering of concrete
- Under water concreting

Special concrete:

- Guniting
- Shortcrete
- Light weight Concrete
- Mass concrete
- Fly-ash Concrete
- Fibre reinforced Concrete
- Polymer Concrete
- Ferro Reinforcement in concrete
- Utilization of waste Material
- Epoxy resins and screeds for rehabilitation- properties and application

Reference Books:

- Krishnaraju, N., Advanced Concrete Technology, CBS Publishers, 1985.
- Nevile, A.M., Concrete Technology, Prentice Hall, Newyork, 1985.
- A.R. Santhakumar, :Concrete Technology" Oxford University Press, 2006

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: ADVANCE CONSTRUCTION TECHNIQUES AND PROJECT MANAGEMENT

Course Code: - UCE-312

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1:: **Introduction**

- Materials - Modular co-ordination, standardization and tolerances-system for prefabrication.
- Pre-cast concrete manufacturing techniques
- Moulds –construction design, maintenance and repair

Unit 2: Construction Techniques

- Pre-casting techniques - Planning, analysis and design considerations
- Handling techniques -Transportation Storage and erection of structures.

UNIT 3: CPM

- Introduction
- Network techniques, work break down
- Classification of activities, rules for developing networks, network development-logic of network, allocation of time to various activities
- Fulkerson‟s rule for numbering events, network analysis ,determination of project schedules, critical path, ladder construction, float in activities, shared float, updating
- Resources allocation, sources smoothing and resources leveling.

PERT:

- Probability concept in network, optimistic time, pessimistic time, most likely time, lapsed time, deviation, variance, standard deviation, slack critical path, probability of achieving completion time, central limit theorem.

UNIT 4: Cost-Time Analysis:

- Cost versus time, direct cost, indirect cost, total project cost and optimum duration
- Contracting the network for cost optimization, steps in time cost optimization, illustrative examples.

Inspection & Quality Control:

- Introduction
- Principles of inspection

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Enforcement of specifications
- Stages in inspection
- Quality control and testing of structures
- Statistical analysis.

Reference Books:

- Krishnaraju, N., Advanced Concrete Technology, CBS Publishers, 1985.
- Nevile, A.M., Concrete Technology, Prentice Hall, Newyork, 1985.
- Construction Planning &Management by P.S. Gehlot&B.M.Dhir
- PERT & CPM -Principles & Applications by L.S.Srinath

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: MECHANICS OF COMPOSITE MATERIAL
Course Code: - UCE-313

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1: FIBRE REINFORCED CONCRETE :

- Properties of Constituent Materials, Mix Proportions, Mixing and Casting Procedures,
- Properties of Freshly mixed FRC, Mechanics and properties of Fiber reinforced concrete,
- Composite Material approach, Application of fiber reinforced concrete.

FLY ASH CONCRETE :

- Classification of Indian Fly ashes,
- Properties of Fly ash, Reaction
- Mechanism, Proportioning of Fly ash concretes,
- Properties of Fly ash concrete in fresh and hardened state, Durability of fly ash concrete.

UNIT - 2: POLYMER CONCRETE :

- Terminology used in polymer concrete, P
- properties of constituent materials,
- Polymer impregnated concrete,
- Polymer modified concrete,
- Properties and applications of polymer concrete and polymer impregnated concrete.

FERRO CEMENT:

- Constituent materials and their properties,
- Mechanical properties of Ferro cement,
- Construction techniques and application of ferro cement.

UNIT - 3 HIGH PERFORMANCE CONCRETE :

- Materials for high performance concrete,
- Supplementary cementing materials,
- Properties and durability of high performance concrete,
- Introduction to silica fume concrete,
- Properties and applications of silica fume concrete.

UNIT - 4 : SULPHUR CONCRETE AND SULPHUR INFILTRATED CONCRETE

- Process technology,
- Mechanical properties,
- Durability and applications of sulphur concrete, Sulphur infiltrated concrete,
- Infiltration techniques,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Mechanical properties, Durability and applications of sulphur infiltrated concrete.
- Light Weight Concrete
- Properties of light weight concretes,
- Pumice concrete,
- Aerated Cement mortars,
- No fines concrete,
- Design and applications of light weight concrete.

Reference Books:

- R.M. Jones, Mechanics of Composite materials, Taylor and Francis
- M. Daniel and O. Ishai, Engineering mechanics of Composite materials, Oxford Press
- Kollar, L.P. and Springer, G.S., "Mechanics of Composites Structures", Cambridge Press

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- APPLIED ELASTICITY & PLASTICITY
Course Code: - UCE-314

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit 1

Analysis of stress: state of stress at a point, stress notation ,stress transformation ,principle stresses, invariants , Mohr 's circle, maximum shear stress, octahedral shear stress, mean stress and deviatoric stresses, some special states of stress.

Analysis of strain: State of strain at a point and notations, invariants, normal strain, shear strain, volumetric strain, strain components, strain displacement relations, strain compatibility equations, some special states of strain

Unit 2:

Equilibrium equations: differential equations of equilibrium, compatibility equations -stress strain relation for linearly elastic solids, generalized Hooke‟s law, stress function, anisotropic elasticity, composite elastic components, and stress strain relations for large elastic deformations.

Two dimensional elastic problems: plane stress and plane strain- simple two dimensional problems in Cartesian and polar coordinates, airy's stress function in rectangular and polar coordinates, solution of axisymetric problems: thick cylinders, curved bars, stress concentration due to presence of circular holes

Unit 3:

Torsion : St. Venant's approach ,Prandtl's approach , membrane analogy, torsion of straight bars, elliptical and circular sections, torsion of thin rectangular section, application of energy methods torsion problems, torsion of thin tubes. Elementary problems of elasticity in three dimensions

Unit 4:

Energy methods: strain energy, principle of virtual work, Energy theorems, Rayleigh Ritz method, finite difference method, application of elasticity problems: solving beams, buckling and torsion by energy principles. Theories of failure: Significance of theories of failure, Haigh-Westergard stress space representation of Von mises and Tresca yield criteria, effective stress and effective strain, yield surface of Tresca and Von mises.

Plastic behavior of metals: Introduction to ideally plastic solids , elements of plasticity, theories of plastic flow , Prandtl- Reuss and Levy-Mises constitutive equations of plastic flow, equation of plasticity, plastic stress strain relation, elastic perfectly plastic behavior, plasticity with hardening, isotropic hardening, kinematic hardening, work of plastic deformation, Elasto-plastic problems in bending, torsion of thick cylinders.

Reference Books:

- Theory of elasticity and plasticity by Sadhu Singh

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: TRAFFIC ENGINEERING
Course Code: - UCE-359

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1:
TRAFFIC STUDIES (PART I)
Basic principles of Traffic Volume, Speed and Density; Definitions and their inter relationships. Traffic Volume studies – Objectives, Methods of Volume Counts, Presentation of Volume data; Speed Studies- Types of Speeds, Objectives, Methods of Speed Studies, statistical Methods for the speed data Analysis, Presentation of Speed Data. Delay Studies; Head Ways and Gap Studies – Headway and Gap Acceptance, Origin and Destination Studies

UNIT - 2:TRAFFIC STUDIES (PART II)
Parking studies; Parameters of parking, Definition, Parking Inventory study, Parking Survey by Patrolling Method; Analysis of Parking survey Data; Accident studies- Causative factors of Road Accidents, Accident data Collection; Accident analysis and Modeling; Road Safety Auditing, Measures to increase Road Safety

UNIT - 3: CAPACITY AND LOS ANALYSIS
Introduction to Traffic Capacity, Analysis concepts, Level of Service, Basic Definitions, Factors affecting capacity and LOS, capacity of Urban/Rural Highway, With or Without Access control, Basic freeway segments – Service flow rate of LOS, Lane width or Lateral Clearance adjustment; Heavy Vehicle adjustment; Driver population adjustment.

UNIT - 4: DATA ACQUISITION SENSORS (MICROWAVES)
Signal Designing- Fixed Time Signals, Determination of Optimum Cycle Length and Signal Setting for Fixed Time Signals, Warrants for Signals, Time Plan Design for Pre-Timed Control- Lane group analysis, saturation flow rate, and Adjustment Factors, Uniform and Incremental Delay, Vehicle Actuated Signals, Signal Coordination

Reference Books:

- Traffic Engineering and Transportation Planning-L.R. Kadiyali, Khanna Publishers
- Principles of Highway Engineering and Traffic Analysis – Fred Mannering and Walter Kilareski, John Wiley and Sons Publications
- Fundamentals of Transportation Engineering – C.S. Papacostas, Pretice Hall India.
- IRC Codes Traffic Engineering – Theory and Practice – Louis J. Pignataro, Prentice Hall Publication

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: MATRIX COMPUTATION METHOD OF STRUCTURE ANALYSIS

Course Code: - UCE-360

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT I
Introduction

- Matrix Arithmetic
- Matrix Operations
- Linear Equations [A].[x]= [b]
- Eigen values and Eigen Vectors

UNIT II
Linear Structure Analysis and Planning

- Modal analysis of a 4 story shear Building
- Elastic Buckling of a Pin-Ended Column
- Eigen Value Analysis of a cantilever Beam with End support

UNIT III
Non Linear Structure Analysis :

- Force-Displacement Response of Material Softening Composite Bar
- Force-Displacement Response of Nonlinear Mass- Spring System

UNIT IV
Structure Dynamics and Earthquake Analysis:

- Earthquake Response Spectrum Analysis of 4 story Shear Building

Reference Books

- Structure Analysis A Matrix Approach by GS Pandit
- Matrix Computation method of structure analysis by GS Pandit

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: AIR POLLUTION CONTROL
Course Code: - UCE-361

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1: INTRODUCTION
Definition, sources and classification of Air Pollutants, Photochemical smog, Effects of air pollution on health, Vegetation & Materials, Air Quality, Global effects of Air Pollution.

UNIT - 2: METEOROLOGY
Temperature Lapse Rates and Stability, Wind velocity and turbulence, plume behavior, Measurement of Meteorological Variables

MODELING OF DISPERSION OF AIR POLLUTANTS:
Dispersion of Air Pollutants. Theories on modeling of Air pollutants, Gaussian Model etc. Equations of the estimation of the pollutant concentrations. Plume Rise- Equations for the estimation. Effective Slack Height and mixing Depth.

UNIT - 3: SAMPLING AND PARTICULATE POLLUTION CONTROL METHODS:
Atmospheric Sampling and stack sampling methods. Air Quality Standards. Types of particulate pollution control Methods- setting Chambers, Cyclone Separators, Scrubbers, Filters and Electrostatic precipitators, Design Aspects and principle of these air pollution control Units.

UNIT - 4: GASEOUS POLLUTION CONTROL METHODS AND AUTOMOBILE POLLUTION:
Types of gaseous pollution control methods – absorption, adsorption and combustion processes. Auto mobile pollution, Sources of pollution, composition of auto exhausts, Control Methods

AIR POLLUTION SURVEY AND LEGISLATION-GLOBAL PROBLEMS:
Planning for conducting Air pollution survey- Air Acts in India and Global Problems of Air Pollution and remedial Measures. Case Studies

Reference Books

- H.C. Perkins, Air Pollution.
- Peavy and Rowe, Environmental Engineering, Mc-Graw Hill Publication
- N.D. Nevers, Air Pollution Control Engineering, Mc-Graw Hill Publication
- M.N. Rao et al. Air Pollution Tata Mc-Graw Hill Publication
- Noel de Nevers, Air Pollution Control Engineering, Mc-Graw Hill Publication , New York
- Richard W. Boubel et al., Fundamentals of Air Pollution, Academic Press, New York

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: DESIGN OF TALL BUILDINGS
Course Code: - UCE-362

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1: THE TALL BUILDING IN THE URBAN CONTEXT

The tall building and its support structure –Devolopment of high rise building structures- General planning considerations. Dead loads- live loads –construction loads –snow-rain And ice loads- wind loads- seismic loading- water and earth pressure loads- loads –loads Due to restrained volume changes of material- impact and dynamic loads- blast loads- Combination of loads.

UNIT 2:- THE VERTICAL STRUCTURE PLANE

Dispersion of vertical forces – dispersion of lateral forces – optimum ground level space- Shear wall arrangement – behavior of shear walls under lateral loading. The floor structure Or horizontal building plane floor framing systems - horizontal bracing- composite floor systems The high – rise building as related to assemblage kits skeleton
Frame systems-load bearing wall panel system- panel - frame systems - multistory box systems.

UNIT 3:- COMMON HIGH- RISE BUILDING STRUCTURES AND THEIR BEHAVIOR UNDER LOAD

The bearing wall structure – The shear core structure – rigid frame systems- The wall-beam structure:
Interspatial and staggered truss systems – frame- shear wall building systems- flat slab building structures- shear truss - frame interaction system with rigid – bolt trusses- tubular systems- composite
Buildings – comparison of high- rise structural systems other design approaches controlling building
Drift efficient building forms – The counteracting force or dynamic response.

UNIT 4:- APPROXIMATE STRUCTURAL ANALYSIS AND DESIGN OF BUILDINGS

Approximate analysis of bearing wall building the cross wall structures- the long wall structure
The rigid frame structure approximate analysis for vertical loading- approximate analysis for lateral
Loading – approximate design of rigid frame buildings – lateral deformation of rigid frame buildings
The rigid frame- shear wall structure- the bierendeel structure- the hollow tube structures.

OTHER HIGH – RISE BUILDING STRUCTURE

Deep- beam systems – high rise suspension systems – pneumatic high- rise buildings- space frame Applied to high- rise buildings – capsule architecture.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books

- WOLFGANG SCHUELLER "High-rise building structures", john wiley and sons, New York 1976.
- BRYAN STAFFORD SMITH AND ALEX COULL," Tall building structures", Analysis and Design , john Wiley and sons, 1991.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: ADVANCED ENVIRONMENTAL ENGINEERING
Course Code: - UCE-365

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT – 1 ADVANCED WASTEWATER TREATMENT:

Need for advanced wastewater treatment, process selection, granular- medium filtration, micro screening, control of nutrients, combined removal of nitrogen and phosphorus by biological methods, removal of toxic compounds and refractory organics, removal of dissolved inorganic substances, natural treatment systems- floating aquatic plant treatment systems.

UNIT – 2 AIR AND WATER QUALITY MONTORING:

Design of air monitoring survey network, siting criteria, models for monitoring site selection, principles and techniques for ambient and stack sampling, acquisition and analysis of monitored data, BIS methods. Monitoring of water quality, planning sampling networks and schedules, sample collection and analysis, presentation and interpretation of results, methods and instruments for monitoring water pollutants, standards.

UNIT – 3 ENVIRONMENTAL MODELLING AND SIMULATION:

Principles of modeling and simulation, classification, introduction to air quality models, air pollution meteorology, impact on local and global climate, atmospheric stability, Gaussian models and modifications. Introduction to river, estuaries and lake hydro dynamics, dissolved oxygen models, eutrophication and nutrient- phytoplankton models, toxic substance models, temperature models, models for management applications.

UNIT – 4: RESOURCES AND ENERGY RECOVERY FROM SOLID WASTE:

Processing techniques, material recovery systems, recovery of biological conversion products, recovery of thermal conversion products, recovery of energy from conversion products, materials and energy recovery systems.

Reference Books

- Waste water Engineering- treatment and Reuse (Fourth Edition) : Metcalf & Eddy Inc: Tata McGraw Hill
- Air Monitoring Survey Design K.E. Noll & T.L. Miller : Ann Arbor Science
- Air Pollution Control Engineering (Second Edition): N.D. Nevers: McGraw Hill

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

SEMESTER VII

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: BUILDING REPAIR AND MAINTENANCE
Course Code: - UCE- 401

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT 1: Building Defect Causes

- Distress monitoring
- Causes for distress
- Defects due to climate, chemicals and wear
- Qualityassurance, Quality audit, Quality Management system and Quality control
- Structural Appraisal,Concrete floors and pavements

Non Destructive Testing

- Ultrasonic and sonic test
- Rebound hammer Test

UNIT 2: Building Cracks

- Causes of cracks in building
- Diagnosis of cracks
- Thermal and Shrinkage cracks
- Vegetation and trees
- Foundation movements
- Techniques for Repair – Epoxy injection.

Moisture Penetration

- Sources of Dampness
- Moisture movement from ground
- Reasons for ineffective dampingLeakage in concrete slabs
- Pitched roofsDampness in solid wallsCondensation, Remedial treatments, Chemical coatings

UNIT 3: Steel Structures

- Types and causes of deterioration
- Preventive measures and Repair Procedure for Brittle Failure
- Defects in welded joints
- Test for defects
- Mechanism of Corrosion
- Design and fabricationerrors – Distress during erection.

Masonry Structures

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Discolouration and weakening of stones
- Preservation and Chemical preservatives
- Brick masonry structures – Distress and remedial measures

UNIT 4:Special Materials for Repair

- Special concretes and mortar, special chemicals for accelerated strength gainin elements.
- Expansive cement, polymer concrete, Sulphur infiltrated concrete, Ferro cement overlay, Fibre reinforced concrete.

Techniques for repair

- Polymer coating for rebars
- Mortar and dry pack, Vacuum concrete, Guniting and Shotcrete, Shoring and underpinning, plating.

Strengthening of Existing Structures

- General principle, relieving loads
- Strengthening super structures
- Conversion to composite construction by Post stressing – Jacketing, Bonded overlays, reinforcement addition
- Strengthening the substructures– Increasing the load capacity of footing.

Reference Books

- Johnson. S.M. ,"Deterioration, maintenance and repair of structures", McGraw-Hill book company, New York,
- R. T. Allen and S. C. Edwards, " Repair of concrete structures", Blakie and Sons, UK,
- Denison Campbell, Allen and Harold Roper, "Concrete structures", Materials,
- Maintenance and Repair, Longman Scientific and technical UK,
- Relevant code (FEMA, ATC)

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: ESTIMATING COSTING AND SPECIFICATIONS
Course Code: - UCE- 402

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L	T	P	Cr
4	2	0	5

UNIT I: Procedure of Estimating Quantities

- Introduction – Main items of work.
- Calculation of quantities of earth work, stone masonry, brick masonry, plastering, cement concrete, R.C.C.
- Doors, Windows, Flooring, White Washing, color washing, Distempering and their Units.

UNIT II: Rate Analysis

- Factors affecting rates – importance – Materials for different items of work.
- Rates of materials and labour – analysis of Rates for cement concrete,
- R.C.C., brick masonry, Stone masonry, Hollow block masonry, Plastering, Painting, Flooring, Road works, Sanitary Works,
- Water supply works and Electrical works.

Cost Estimate of Buildings

- Approximate methods – Plinth area estimate – Cubical Contents estimate.
- Detailed estimate – Estimation of the cost of single storied buildings by individual wall method and centre line method.
- Estimation of Roofs – R.C.C. slab roof, GI sheet roof, Tiled Roof, Roof Truss.
- Estimation of R.C.C. works Beam, T-beam and Slab, Column, Foundation, Stair case, Retaining wall etc

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UNIT III: Cost Estimate of Other Structures

- Estimation of roads – Earth work, Pitching of Slopes, Hill roads.
- Estimation of R.C.C. slab culvert, Pier, Pipe culvert, R.C.C. T-beam Bridge.
- Estimation of Irrigation works like Canals, Aqueducts, Syphon, etc.
- Estimation of Water supply and sanitary works like septic tank, Soak pit, Manhole, sewer line, etc.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

UNIT IV: Specifications and Valuation

- Specifications – Objectives – types of specifications – principles of specification writing – typical specifications.
- Valuation – Market value – Book value – Scrap value – Salvage value – annuity – Capitalized values – sinking fund – depreciation.
- Valuation of a building – Rent fixation – Mortgage – Lease.

Reference Books

- Johnson. S.M. ,"Deterioration, maintenance and repair of structures", McGraw-Hill book company, New York,
- R. T. Allen and S. C. Edwards, " Repair of concrete structures", Blakie and Sons, UK,
- Denison Campbell, Allen and Harold Roper, "Concrete structures", Materials,
- Maintenance and Repair, Longman Scientific and technical UK,
- Relevant code (FEMA, ATC)

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: RAILWAYS & AIRPORT ENGINEERING
Course Code: - UCE- 403

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
31 0 3.5

UNIT I: Introduction, Permanent Way And Rails

- Rail transportation and its importance in India.
- Permanent way: requirements and components.
- Gauges in India and abroad. Selection of gauge.
- Coning of wheels. Adzing of sleepers.
- Rails: functions, composition of rail steel, types of rail sections.
- Requirements of an ideal rail section, length of rails. Defects in rails.
- Creep of rails. Long welded rails and continuously welded rails.

Sleepers, Fastenings And Ballast

- Sleepers: functions, requirements of an ideal sleeper.
- Types of sleepers: wooden, cast iron, steel and concrete sleepers.
- Advantages, disadvantages and suitability of each type.
- Sleeper density. Fastenings for various types of sleepers: fish plates, spikes, bolts, bearing plates, keys, chairs, jaws, tie bars. Elastic fastenings.
- Ballast: functions, requirements, types of ballast and their suitability.

UNIT-II: Points And Crossings

- Necessity of providing points and crossing
- Turnout: various components, working principle.
- Switch: components, types. Crossing: components and types.
- Design elements of a turnout, design of a simple turnout.
- Layout plan of track junctions: crossovers, diamond crossing, single-double slips, throw switch, turn table, triangle.

Signaling, Interlocking And Train Control

- Signals: objects, types and classification.
- Semaphore signal: components, working principle.
- Requirements / principles of a good interlocking system.
- Brief introduction to devices used in interlocking.
- Methods of control of train movements: absolute block system, automatic block system, centralized train control and automatic train control systems.

UNIT-III: Geometric Design Of The Track

- Gradients, grade compensation.
- Super elevation, cant deficiency, negative super elevation.
- Maximum permissible speed on curves.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Tractive resistances and its types.
- Hauling capacity of a locomotive.

Stations, Yards And Track Maintenance

- Stations: functions and classification. Junction, non-junction and terminal stations.
- Yards: functions, types. Marshalling yard: functions, types.
- Maintenance of railway track: necessity, types of maintenance.
- Brief introduction to mechanized maintenance, M.S.P and D.T.M.

UNIT-IV: Introduction and Airport Planning

- Air transportation, its importance and characteristics, status in India.
- Layout plan of an airport and its basic elements: terminal area, apron, taxiway, runway, hanger.
- Aircraft characteristics, their effect on elements of an airport. Site selection of an airport.
- Classification of airports.

Runway Layout And Pavement Design

- Runway orientation, Wind Rose diagram.
- Basic runway length. Corrections to basic runway length. Runway patterns.
- Difference between highway and runway pavement.
- Types of runway pavements.
- Design factors for runway pavement.
- Brief introduction to design of thickness of a runway pavement.

Reference Books

- A text book of Railway Engineering By S.C.Saxena & S.P.Arora, (Dhanpat Rai Publicatios, N.Delhi).
- Railway Track Engineering. By J.S.Mundray (Tata McGraw-Hill Publishing Co. Ltd. N.Delhi).
- Airport Planning and Design By S.K.Khanna, M.G.Arora, Nem Chand Bros.
- The Planning and Design of Airports By Robort Hornjeff, (Tata McGraw-Hill Publishing Co. Ltd. N.Delhi).
- Air Transportation Planning and Design By Virender Kumar & Satish Chandra (Galgotia Publications, N.Delhi).

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: EARTHQUAKE ENGINEERING
Course Code: - UCE- 404

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT 1: Introduction

- Elements of engineering seismology
- Causes of earthquakes,
- Seismic waves,
- Magnitude, intensity and energy release
- Indian seismology
- Earthquake history – catastrophic failures lessons learnt from past earthquakes
- Seismic zone map of India

Theory of Vibration

- Free vibration – single degree of freedom system with and without damping and Multi degree of freedom system
- Fundamental time period by power method
- Forced vibration of SDOF system with and without damping
- Response spectrum characteristics.

UNIT 2: Seismic Design of Buildings

- Idealization of building frames
- Introduction of methods to the seismic analysis Equivalent static analysis IS 1893 provisions – Design horizontal seismic coefficient
- Design base shear and distribution
- Seismic resistant design of building.

UNIT 3:Earthquake Resistant Construction

- Earthquake resistant properties of materials
- lateral force resisting systems
- strong column weak beam
- guidelines for seismic resistant construction building configuration requirements
- ductile detailing of reinforcements in RC buildings – behaviour and design of masonry structures

UNIT 4: Repairs and Retrofitting

- Code of practices for repairs and retrofitting
- Retrofitting of RC buildings and structural elements

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Techniques of retrofitting
- Improving structural integrity of masonry buildings
- Retrofitting by seismic isolation – case studies..

Reference Books

- Pankaj Aggarwal and Manish Shrikande, "Earthquake resistant design of structures"
- S.K.Duggal, "Earthquake resistant design of structures", Oxford University Press
- Aggarwal "Earthquake resistant design of structures", Nem chand, New Delhi
- Anil K. Chopra, "Dynamics of structures- Theory and applications to earthquake
- Relevant codes

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: - Civil Software Lab - II
Course Code: - UCE-406

Evaluation Components for Practical Courses (Students are required to perform atleast 8 practicals mandatorily from the given list of practicals)	
Lab Performance	10
Lab file work	10
Viva – Voce	10
Total	**30**

L	**T**	**P**	**Cr.**
0	**0**	**2**	**2**

LIST OF EXPERIMENTS:
Introduction:

Main frame Mini and Micro computers system configuration Functions Hardware, Software, Operating System Basics File Processing Techniques High level languages packages.

Development and Implementation of Programs for the following in C Language:

1. Analysis of 2D Truss using STAAD-pro
2. Analysis of 2D and 3D Rigid Frames using STAADpro
3. Analysis of 3D pin jointed frames using ANSYS
4. Analysis of suspension cables using ANSYS
5. Design of Footings and Retaining Walls using STAADpro
6. Structural Design of the following, using STAAD-pro and detailing of the same using AUTO CAD
   a. R.C. Beams
   b. R.C. Slabs
   c. R.C. Columns and Footings
   d. Steel beams
   e. Steel columns
7. Design of circular water tanks using STAADpro
8. Deflection and Stresses in beams using FEAST
9. Building Drawing, including perspective view using Floor Plan 3D
10. Concrete mix design and mathematical calculations using MATHCAD
11. Application to Transportation Engineering, Environmental Engineering, Estimation and Costing, Management, etc

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: WASTE WATER ENGINEERING
Course Code: - UCE- 452

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT 1: Disposal Effects on Environment

- Effects of industrial wastes on streams, land and air
- Wastewater treatment plants - water qualitycriteria
- Effluent standards Process modification
- Bioassay studies
- Environmental legislation

Pollutants Reduction:

- Waste minimization
- Housekeeping Volume and strength reduction
- Material and processmodifications - recycle, reuse and by-product recovery
- Environmental audit

UNIT 2: Effluent Treatment

- Conventional methods of treatment and disposal of industrial wastes
- Equalisation andNeutralisation
- Separation of solids by Sedimentation and filtration, Coagulation and flocculation, absorption, chemical precipitation, chemical oxidation
- Physiochemical treatment methods
- Removal of dissolved impurities
- Residue management, Combined treatment of industrial and municipal wastes.

UNIT 3: Industrial Process and Waste Treatment - I

- Manufacturing process, waste water characteristics, composition
- Effects and appropriate treatment flow sheets for chemical industries, chemical industries, Refineries, Pharmaceutical, Textiles Apparel industries Metallurgical industries Steel plants, mines Power industries Fertilizer plants Cement industry

Industrial Process and Waste Treatment – II

- Manufacturing process, waste water characteristics, composition
- Effects and appropriate treatment flow sheets for Pulp and paper industry Agro-industries, Sugar Distilleries, Food processing industry meat packing, pickles, poultry dairy Leather tanning

UNIT 4: Biological Treatment Methods

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Principles and methods for removal of suspended impurities and organics
- Aerobic and anaerobic decomposition of organic matter, Stabilization ponds, activated sludge process, Oxidation ditch

Advanced Waste Water Treatment

Removal of Nitrogen, Phosphorous, refractory Organics, Dissolved inorganic substances by Chemical precipitation, ion exchange, Reverse OsmosisandElectro dialysis.

Reference Books

- Rao.M.N. and Dutta Waste Water Treatment, Oxford and IBH Publishing Ltd., Calcutta,
- Eckenfelder, W.W., Industrial Waste Pollution Control, McGraw Hill Book Co., New Delhi,
- Nemerow, N.L., Theory and Principles of Industrial Waste Treatment, Addison Wesley

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: PROFESSIONAL PRACTICE AND ENTREPRENEURSHIP DEVELOPMENT

Course Code: - UCE- 453

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT-I

Entrepreneurship

Definition and concept of enterprising profile of an entrepreneur need, scope and characteristics of entrepreneurship Individual, psychological and sociological Globalization WTO, WB, IWF Exposure to demand based, resource based, import substitute and export promotion industries

UNIT-II

Marketing

Market survey techniques: need, scope and approaches for project formulation. Criteria for principles of product selection and development: Structure of project report choice of technology, plant and equipment. Project feasibility analysis: Marketing, technical and financial feasibility project report preparation. Elements of marketing and sales management: Nature of project and market strategy, after sales service.

UNIT-III

Financial Management

Interest and time value of money: simple interest, compound interest, present value, future value, pay back period accounting rate of return, net present value. Financial management: Capitalworking capital-financial institutions, RBI and commercial banks. Banking procedures and foreign exchanges regulations act, letter of Credits:s: and its importance.

UNIT-IV

Tax and Acts

Starting a small-scale industry steps involved-role of financial institutions Tax factors: Income tax, sales tax, excise duty, customs duty. Legal factors: Factories act, pollution act and labour act

Organization and Human Resources

A need for Organization, formulizing the organizational structure Employee selection, training, personnel relations Professional practice as applicable to Civil Engineers

Reference Books

- Prasanna Chandra, “Project Preparation, appraisal and implementation”, Tata Mc Graw Hill,
- Saravanavel.P, “Entrepreneurship Development”, ESS Pee Kay Publishing House
- Philip Kotler, “Marketing Management”, Prentice Hall,
- Prasanna Chandra, “Fundamentals of financial management”, Tata McGraw Hill Publications,
- John J.Mampton, “Financial decision making concepts, problems and cases”,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: MAINTENANCE AND REHABILITATION OF STRUCTURES
Course Code: - UCE- 407

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT1-

General:- Distress monitoring, Causes for distress, Defects due to climate, chemicals, wear, Quality assurance, Quality audit, Quality Management system and Quality control, Structural Appraisal, Concrete floors and pavements

Non Destructive Testing:-Ultrasonic and sonic test Rebound hammer Test- Strength evaluation of existing structures.

UNIT2-

Building Cracks :-Causes Diagnosis Thermal and Shrinkage cracks Vegetation and trees Foundation movements Techniques for Repair Epoxy injection.

Moisture Penetration:-Sources of Dampness Moisture movement from ground Reasons for ineffective damping Leakage in concrete slabs Pitched roofs Dampness in solid walls Condensation Remedialtreatments Chemical coatings

UNIT3-

Steel Structures:- Types and causes of deterioration Preventive measures Repair Procedure Brittle FailureDefects in welded joints Test for defects;Mechanism of Corrosion Design and fabricationerrors Distress during erection.

Masonry Structures

Discolouration and weakening of stones Preservation Chemical preservatives Brick masonry structures Distress and remedial measures

UNIT4-

Special Materials for Repair

Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, Sulphur infiltrated concrete, Ferrocement overlay, Fibre reinforced concrete.

Techniques for repair: Polymer coating for rebars, Mortar and dry pack, Vacuum concrete, Gunite and Shotcrete, Shoring and underpinning, plating.

Strengthening of Existing Structures

General principle relieving loads Strengthening super structures Conversion to composite construction Post stressing Jacketing Bonded overlays reinforcement addition strengthening the substructures Increasing the load capacity of footing.

Reference Books

- Johnson. S.M. ,"Deterioration, maintenance and repair of structures", McGraw Hill book company, New York,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- R. T. Allen and S. C. Edwards, " Repair of concrete structures", Blakie and Sons, UK,
- Denison Campbell, Allen and Harold Roper, "Concrete structures", Materials
- Maintenance and Repair, Longman Scientific and technical UK, .

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: GREEN CONCEPTS IN BUILDING
Course Code: - UCE- 408

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit I
Environmental implications of buildings energy, carbon emissions, water use, waste disposal; Building materials:sources, methods of production and environmental Implications. Embodied Energy in Building Materials: Transporation Energy for Building Materials; Maintenance Energy for Buildings.

Unit II
Implications of Building Technologies Embodied Energy of Buildings: Framed Construction, Masonry Construction. Resources for Building Materials, Alternative concepts. Recycling of Industrial and Buildings Wastes. Biomass Resources for buildings.

Unit III
Comforts in Building: Thermal Comfort in Buildings- Issues; Heat Transfer Characteristic of Building Materials and Building Techniques. Incidence of Solar Heat on Buildings-Implications of Geographical Locations.

Unit IV
Utility of Solar energy in buildings concepts of Solar Passive Cooling and Heating of Buildings. Low Energy Cooling. Case studies of Solar Passive Cooled and Heated Buildings.

Unit V
Green Composites for buildings: Concepts of Green Composites. Water Utilisation in Buildings, Low Energy Approaches to Water Management. Management of Solid Wastes. Management of Sullage Water and Sewage. Urban Environment and Green Buildings. Green Cover and Built Environment.

Reference Books

- K.S.Jagadish, B. U. Venkataramareddy and K. S. Nanjundarao. Alternative Building Materials andTechnologies. New Age International, 2007.
- Low Energy Cooling For Sustainable Buildings. John Wiley and Sons Ltd, 2009.
- Green My Home!: 10 Steps to Lowering Energy Costs and Reducing Your Carbon Footprint, by Dennis C.
- Brewer, ISBN:9781427798411, Publisher: Kaplan Publishing, Publication Date: October 2008.
- B. Givoni, Man, Climate and Architecture Elsevier, 1969.
- Climate Responsive Architecture. TataMcGraw Hill, 2001.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: GEOGRAPHIC INFORMATION SYSTEMS FOR RESOURCES MANAGEMENT

Course Code: - UCE- 409

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT-I

Principles of GIS

Introduction to the basic Components and structure of GIS, Geographic concepts, Geographical Entities and Spatial data formats will be introduced.

UNIT-II

Intorduction to ArcGIS

Introduction to ArcGIS Software and its Components(ArcMap, ArcCatalog and ArcToolbox).

UNIT-III

Spatial data formats

Data Types, the differences between raster and vector formats, non-native data formats and metadata. Data analyses and function are highly dependent on these spatial data.

UNIT-IV

Map Projection

Overview of geographic coordinate systems and Map projections. Essention to geo-reference spatial data and superimpose spatial datasets

Spatial data Analysis;

An overview of multiple vector-based and raster-based (local, Focal, Zonal, and Global) spatial operations will be provided. Queries, The Field calculator, raster calculator and model maker provide operational tools to conduct spatial analize within the Arc GIS Environment.

Reference Books

- Heywood L, Comelius. S and S. Carver (2006) An Introduction to Geographic Information System, Dorling Kinderseley (India) Pvt. Ltd.
- Burrough P A 2000 P A McDonnell (2000) Principles of Geographic Information Systems, London: Oxford University Press
- Lo.C.P., Yeung. K.W Albert(2002) Concepts and Techniques of Geographic Information Systems, Prentice-Hall of India Pvt. Ltd. New Delhi

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: URBAN TRANSPORTATION PLANNING
Course Code: - UCE- 410

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT 1: Introduction

Role of transportation in the economic development of nations, overview of transport modes, frowth trends, National transport policy of India – Case Studies, Transportation Planning in the developing world; and comparative international policies; Fundamental of transportation, Principles of Planning, evaluation, selection, adoption, financing, and implementation of alternative urban transportation systems; formulation of community goals and objectives, inventory of existing conditions; transportation modeling trip generation, distribution, modal choice, assignment

UNIT 2: Data collection and Inventories:

Collection of data – Organization of surveys and Analysis, Study Areas, Zoning, Types and Sources of data, Road Side Interviews, Home Interviews Surveys, Commericial Vehicle Surveys, Sampling Techniques, Expansion Factors, Accuracy Checks, Use of Secondary sources, Economic data – Income – Population – Employment – Vehicle – Owner Ship

UNIT 3: Travel Demand Issues

Trends, Overall Planning Process, Long term vs Short Term palnning, Demand Function, Independent variables, travel attributes, assumptions in Demand Estimation, Detailed approach on 4step travel demand estimation; Seuential and Simultaneous approaches, Aggregate and Disaggregate Techniques

UNIT 4: Demand and Supply Planning:

Planning for Sustainable urban mobility, positive and negative externalities in urban transport, congestion in pricing, parking policy, demand management , urban travel and transportation system characteristics – a systems perspective, Data management and us in making decisions, Demand analysis , Urban activity analysis , supply analysis; Plan Preparation and Evaluation , Travel Forecast to evaluate Alternative Improvements, Impacts of new Development on Transportation facilities , Master plans, Selection of Corridor, Corridor identification, Corridor Deficiency Analysis

Reference Books

- Introduction to Transportation Planning – MJ Bruton ; Hutchinson of London Ltd.
- Introduction to urban system planning –B.G.Hutchinson; Mc Graw Hill.
- Traffic Engineering and Transport Planning – Kadyali L.R. , Khanna Publishers
- Lectures notes on UTP- Prof. S. Raghavachari ,REC Warangal.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- BUILDING PROJECT AND ESTIMATES
Course Code: - UCE- 412

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT 1: Procedure of Estimating Methods of Estimating ;Main item of work; Deduction for openings; Degree of accuracy. Methods of Building Estimates: Individual Wall Method; Center Line method; Arch masonary calculation

UNIT 2: Estimate of RCC works Estimate of RC Slab ; RCC Beam; RCC T-beam slab and RCC coloumn with foundation, Road Estimating: Estimate of Earthwork; Estimate of Pitching of Slopes; Estimate of Earthwork of road from longitudinal sections; Estimate of Earthwork in hill roads Canal estimate : Earthwork in canals- Different cases; Breached sections/ Breach closures.

UNIT 3: Specifications Purpose and Method of writing specifications; Detailed Specifications for Brickwork; RCC; Plastering; Mosaic Flooring; R.R Stone Masonary; Analysis of Rates; Preparing analysis of rates for the following items works:1)Concrete 2)RCC Works 3) Brickwork in foundation and superstructure 4) Plastering preparing leed statements.

UNIT 4: PWD accounts and procedure of works: Organization of Engineering department; work charged establishment; Contract ; Tender; Tender Notice; Tender Schedule; Plinth Area; FLOOR Area; Carpet Area; Approximate Estimate; Plinth Area estimate ; revised Estimate Supplementary estimate. Annual budgets of work, cash flow allocations yearly, TF Accounts of materials USR Valuation: Cost; Price & Value; Methods of Valuation; Out Goings: Depreciation; Methods for estimating cost depreciation; Valuation of Building.

UNIT 5: Contracts ; Types of Contracts, Contract Law, EMD, Tenders, acceptance of contract, Branch of contract, Cancellation of contract, Re-tendering- work order , running pavement, Final Bill, Deviation orders,Completion Certificate

Reference Books

- Estimating & Costing in Civil Engineering by B.N. Dutta
- Valuation of real properties by S.C. Rangwal, Charotar Publishing House
- Estimating and Costing by M. Chakraborty , S chand publishing House

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:-STABILITY OF STRUCTURES
Course Code: - UCE- 413

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT-I

Introduction

Static Equilibrium, Governing Equation for columns, Analysis for various Boundary Conditions

UNIT-II

Analysis of Eccentrically Loaded Column

Beam Columns, Theory of Beam Column, Stability Analysis of Beam Column with different types of Loads, Failure of Beam Columns.

UNIT-III

Analysis and Stability of Frames

Plates subjected to in-plane forces, Differential Equation, Analysis, Approximate Techniques.

UNIT-IV

Techniques for repair

Analysis for various boundary conditions, wood and Armor equation for analysis and Design. Buckling of Shells, Differential Equations, Analysis, Applications.

Reference Books

- Ashwini Kumar, (2002), Stability Theory of Structures, Tata McGraw Hill Publishing Co. Limited, New Delhi.
- Timoshenko & Gere (2000), Theory of Elastic Stability, McGraw Hill.
- N.G.R Iyengar (1996), Structural Stability of Columns and Plates, Affiliated East West Press
- D.O. Brush & B.O. Almorth (1995), Bucklng of bars, Plates & shells , McGraw Hill, Kogakusha Ltd:

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: PREFABRICATED CONCRETE STRUCTURES
Course Code: - UCE- 413

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT1- Design Principles
General Civil Engineering requirements, specific requirements for planning and layout of prefabrication plant. IS Code specifications. Modular co-ordination, standardization, Disuniting of Prefabricates, production, transportation, erection, stages of loading and code provisions, safety factors, material properties, Deflection control, Lateral load resistance, Location and types of shear walls.

UNIT II REINFORCED CONCRETE
Prefabricated structures - Long wall and cross-wall large panel buildings, one way and two way prefabricated slabs, Framed buildings with partial and curtain walls, -Connections – Beam to column and column to column.

UNIT III FLOORS, STAIRS AND ROOFS
Types of floor slabs, analysis and design example of cored and panel types and two-way systems, staircase slab design, types of roof slabs and insulation requirements, Description of joints, their behaviour and reinforcement requirements, Deflection control for short term and long term loads, Ultimate strength calculations in shear and flexure.

UNIT IV WALLS & INDUSTRIAL BUILDINGS AND SHELL ROOFS
Types of wall panels, Blocks and large panels, Curtain, Partition and load bearing walls, load transfer from floor to wall panels, vertical loads, Eccentricity and stability of wall panels, Design Curves, types of wall joints, their behaviour and design, Leak prevention, joint sealants, sandwich wall panels, approximate design of shear walls. Components of single-storey industrial sheds with crane gantry systems, R.C. Roof Trusses, Roof Panels, corbels and columns, wind bracing design. Cylindrical, Folded plate and hyper prefabricated shells, Erection and jointing, joint design, hand book based design.

Reference Books

- Koncz.T, Manual of Precast Concrete Construction, Vol.I II and III & IV Bauverlag, GMBH,1971.
- Laszlo Mokk, Prefabricated Concrete for Industrial and Public Structures, Akademiai Kiado,Budapest, 2007.
- Lewicki.B, Building with Large Prefabricates, Elsevier Publishing Company, Amsterdam/ London/New York, 1998.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: PREFABRICATED CONCRETE STRUCTURES
Course Code: - UCE- 414

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT1- Design Principles
General Civil Engineering requirements, specific requirements for planning and layout of prefabrication plant. IS Code specifications. Modular co-ordination, standardization, Disuniting of Prefabricates, production, transportation, erection, stages of loading and code provisions, safety factors, material properties, Deflection control, Lateral load resistance, Location and types of shear walls.

UNIT II REINFORCED CONCRETE
Prefabricated structures - Long wall and cross-wall large panel buildings, one way and two way prefabricated slabs, Framed buildings with partial and curtain walls, -Connections – Beam to column and column to column.

UNIT III FLOORS, STAIRS AND ROOFS
Types of floor slabs, analysis and design example of cored and panel types and two-way systems, staircase slab design, types of roof slabs and insulation requirements, Description of joints, their behaviour and reinforcement requirements, Deflection control for short term and long term loads, Ultimate strength calculations in shear and flexure.

UNIT IV WALLS & INDUSTRIAL BUILDINGS AND SHELL ROOFS
Types of wall panels, Blocks and large panels, Curtain, Partition and load bearing walls, load transfer from floor to wall panels, vertical loads, Eccentricity and stability of wall panels, Design Curves, types of wall joints, their behaviour and design, Leak prevention, joint sealants, sandwich wall panels, approximate design of shear walls. Components of single-storey industrial sheds with crane gantry systems, R.C. Roof Trusses, Roof
Panels, corbels and columns, wind bracing design. Cylindrical, Folded plate and hyperprefabricated shells, Erection and jointing, joint design, hand book based design.

Reference Books

- Koncz.T, Manual of Precast Concrete Construction, Vol.I II and III & IV Bauverlag, GMBH,1971.
- Laszlo Mokk, Prefabricated Concrete for Industrial and Public Structures, Akademiai Kiado, Budapest, 2007.
- Lewicki.B, Building with Large Prefabricates, Elsevier Publishing Company, Amsterdam/ London/New York, 1998.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: LAND INFORMATION SYSTEM
Course Code: - UCE- 416

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT-I

Intorduction

Computer Science, Data Information, Geodesy and Cartography-Photogrammetry (Analogical Analytic, Digital) **Remote Sensing**- Global Satellite Positioning System-Laser Scanning, Geographic Information System, Decision support systems and expert Systems, Spatial Information

UNIT-II

Application of LIS

Introduction-LandCover,Land Use, Agriculture, Forestry-Geology-Geomorphology, Urban Application, City Town Planning, Hydrology, Mapping-Oceans and coastal Monitoring of Atmospheric Constituents, Introduction- Environmental Fields- Forestry-Hydrlogy-Military Health management-Geology-business-Infrastructure and Utilities- Land Information-computer Cartography- Agriculture- Archeology- fisheries- Transport-Urban/Cities, Town Planning- Irrigation-Case studies.

UNIT-III

Geographic Information system Geospatial Analysis

Introduction: Information System and Geographic Information System, Key Componets of GIS , An Integration of Spatial and Attribute information, function and Advantages of GIS, Spatial Data Model, Attribute Data Management and Metadata Concept, Process of GIS, Geospatial Analysis , Planning, Implementation and management of GIS, Modern Trends of GIS, Concepts of Maps, Co-ordinates System and Processing

UNIT-IV

Satellite Positioning System

NAVSTAR Global Positioning System, The GPS Signal, GPS Measurement operative mode, errors, Geodetic reference system Recoveries.
GLONASS Global Positioning System, Characteristics GLONASS V/S NAVSTAR GPS.
GALILEO Global Positioning System, Positioning Services, Technical Characteristics
IRNSS (Indian Regional Navigation Satellite system) Application of GPS

Reference Books

- Bhatta, Basudeb (2012). Remote Sensing and GIS, Oxford University Press
- Punmia, B.C., Jain, Asok K and Jain, Arun K(2005). Surveying-III Higher Surveying, Laxmi Publications
- Gopi, Satheesh., Sathikumar, R and Madhu, N (2007). Advance Surveying, Total station, GIS and Remote Sensing, Dorling Kindersly India.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- BRIDGE ENGINEERING
Course Code: - UCE- 465

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT-I

Analysis And Design of Concrete Bridges

Loading standards: IRC and Railway loadings Reinforced concrete bridge decks: slab, T-beam andslab, arch, bow string girder types Prestressed concrete bridges: simple spans, continuous decks; cantilever construction; anchorage of tendons; grounting of tendons.

Steel Bridges

Steel superstructure: Plate girder, box girder truss and arch types Cable stayed bridges and suspension bridges; principles of design, aerodynamic stability and vibrations; simplified designs.

UNIT-II

Substructure And Foundations

Substructure design: piers and abutments of different types Foundations: Shallow foundations, deep foundations, piles, wells and pneumatic caisons River training works.

UNIT-III

Construction And Maintenance

Bearing: metallic and elastometric types; fixed and movable bearings Joints: expansion joints; Contraction joints; joint seals Innovative construction methods: incremental push launching; cantilever construction; erection of precast elements Bridge maintenance management: inventory, inspection and rehabilitation.

UNIT-IV

Case Studies

Case studies of recently constructed major bridges Critical studies of failure of major bridges

Reference Books

- Johnson Victor, D., "Essentials of Bridge Engineering", Oxford & IBH Publishing Co.,
- Ponnuswamy, S., "Bridge Engineering", Tata McGraw Hill, New Delhi,
- Bakht, B. and Jaeger, L.G., "Bridge Deck Analysis Simplified", McGraw Hill International Edition, Singapore,
- Krishna Raju, N., "Design of Bridges", Oxford & IBH Publishing Co., New Delhi, Third Edition

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: SOIL DYNAMICS
Course Code: - UCE- 466

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

- **UNIT 1: Theory of Vibration**
  - Damped and Undamped vibration, forced vibration with harmonic excitation
  - System under transient forces, Rayleigh method, logarithmic decrement, determination of viscous damping.
  - Transmissibility, principles of vibration measuring instrument systems with two degree of freedom (vibration absorber) systems with multi-degree of freedom, spectral response.

Fundamental of Vibration

- Soil mechanics and soil dynamics, Nature of dynamic loads.
- Stress conditions on soil elements under earthquake loading.
- Problems of Dynamic loading of soil and soil structures

- **UNIT 2: Wave Propagation in an Elastic Medium:**
  - Wave propagation in an elastic rod.
  - Wave propagation in an elastic infinite medium.
  - Wave propagation in a semi-infinite elastic half space.
  - Waves generated by a surface footing.

Stress Strain Characteristics of Soil under Dynamic Loads:

- Introduction to dynamic tests, Pendulum loading apparatus
- Behaviour of saturated sands under transit loading
- Effects of static stress level and number of pulses on strength of cohesive oscillatory simple shear
- Resonant column apparatus wave propagation methods.

- **UNIT 3: Dynamic Bearing Capacity**
  - Behavior of retaining walls during earthquakes.
  - Modification of Coulomb‟s theory.
  - Modified Culmann‟s construction.
  - Analytical solution of c-ϕ soils Displacement analysis, Indian Standard Code of practice.

- **UNIT 4:Liquefactions of Soils**
  - Theory and criterion of liquefaction.
  - Factors affecting liquefaction characteristics.
  - Liquefaction studies in Triaxial shear and oscillatory simple shear.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Evaluation of liquefaction potential.
- Liquefaction analysis from standard penetration test data
- Introduction to shake table and field test

Reference Books

- Soil Dynamics by ShamsherParkash
- Fundamentals of Soil Dynamics by B.M. Das
- Dynamics of bases and foundations by Barken

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- PRESTRESSED CONCRETE STRUCTURES
Course Code: - UCE- 467

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT 1: Prestress System –Losses Of Prestress

- Definition of Type I, Type II and Type III structures
- Basic assumptions – Permissible stresses in steel and concrete as per IS:1343 Code
- Basic requirements of prestressing
- Design and choice of sections of post-tensioned beams
- Check for limit state of collapse
- Layout of cables
- Location of positions of wires in pre-tensioned beams.

Deflection

- Short term deflections of uncracked members
- Long term deflection
- Deflection due to creep in members –
- Code requirements for the limit state of deflection
- Factors influencing deflection

UNIT 2: Design For Shear and Torsion

- Shear and principal stresses
- Limit state shearing resistance of cracked and uncracked sections
- Design of Shear reinforcement by the limit state approach
- Interaction diagrams under combined bending, torsion and transverse shear.

Transfer of Prestressing

- Transmission of prestressing force by bond
- Transmission length - Factors affecting transmission length , Check for transmission length
- Anchorage zone stresses in post tensioned members
- Calculation of bearing stress and bursting tensile forces and reinforcement in anchorage zone based on I.S. 1343 code and Guyon's method.

UNIT 3: Composite Construction of Prestressed & Insitu Concrete

- Types of composite construction
- Analysis for stresses
- Effect of Differential shrinkage

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Design for flexure and shear

Statically Indeterminate Prestressed Concrete Structures

- Methods of achieving continuity
- Assumptions in elastic analysis
- Pressure line , Linear transformation
- Concordant cables
- Guyon's theorem - Analysis and design of continuous beams.
- Circular prestressing in liquid retaining tanks - Analysis for stresses - Design of tank wall incorporating the recommendations of IS:3370 Part III Code
- Types of Prestressed concrete pipes -Design of pipes

UNIT 4: Other Structures

- Methods of achieving partial prestressing
- Advantages and disadvantages
- Design of prestressed concrete columns, sleepers, poles and tension members
- Use of non prestressed reinforcement
- Methods of prestressing concrete shell structures

Reference Books

1. Krishna Raju, N., "Prestressed Concrete" Tata McGraw Hill Publishing Company Ltd., New Delhi,
2. Lin, T.Y., and Ned H Burns., "Design of Prestressed Concrete Structures", John Wiley and sons, Newyork,

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: GROUNDWATER ENGINEERING
Course Code: - UCE- 468

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT 1: Ground water occurrence and quality

- Introduction to ground water, water bearing formations.
- Aquifers, aquicludes and aquitard.
- Confined and unconfined and leaky aquifers
- Ground water origin, modes of occurrence,
- Yield of water and water quality

UNIT 2: Ground water movement:

- Permeability, states of flow, Darcy‟s laboratory permeability
- Tests, formation constants, flow through aquifers
- Storage equations and differential equations governing ground water flow.

Ground water exploration:

- Exploration by geologic and hydraulic methods
- Surface geophysical methods
- Map and tracer techniques

UNIT 3: Well hydraulics:

- Definition of terms used in well hydraulics
- Equilibrium and non-equilibrium well equations.
- Effect of hydro-geologic conditions on draw down.
- Draw down from pumping tests, well interference and well efficiency,
- Radius of influence, recharge and boundary conditions, Effect of partial penetration, Theiss equation

Well drilling:

- Cable tool method, California stove-pipe method
- Direct rotary, drilling fluids, air and jet drilling
- Drilling with earth augers, grouting and sealing of well casing

UNIT 4: Design of well

- Casing diameter, casing material, well depth, well screens length
- Slot opening and diameter, open area, entrance velocity,
- Design of wells

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Development of water wells

- Introduction, factors affecting development,
- Methodof development over pumping, back washing, mechanical surging. Other method of well development

Reference Books

- Ground water and wells by F.G. Driscoll
- Ground water engineering by K.R. Karanth
- Groundwater by H.M. Raghunath

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- ADVANCE STRUCTURE ANALYSIS
Course Code: - UCE- 469

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1: Beams of Elastic Foundation:

- Beams on elastic foundations, infinitely long and semi infinite beams of uniform cross-sections.
- Network of beams of floor system.

UNIT – 2: Theory of Plates And Shells:

- Analysis of folded plates and shells

UNIT - 3: Analysis of Space Frames:

- Analysis by stiffness method.

Introduction to Finite Element Method:

- Finite Element Approach to Structural Analysis
- Basic steps of finite element method for structural analysis, types of elements and shape functions.

UNIT - 4: Stress analysis:

- General state of stress
- Failure criterion, stress concentration.
- Concentrated loads, change of sections and fatigue failure.

Approximate methods for structural analysis: Cantilever and portal methods two cycle moment distribution

Reference Books

- Strength of Materials Vol. II BY S.P. Timoshenko
- Theory of plates and shells BY S.P. Timoshenko
- Theory of elasticity BY S.P. Timoshenko
- Matrix Analysis of Framed Structures BY Weaver & Gere
- Finite Element Analysis BY C.S. Krishnamoorthy

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- HYDROLOGY & DAMS
Course Code: - UCE- 470

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

- **UNIT 1: Introduction**
  - Precipitation: Importance of hydrological data in water resources planning.
  - The hydrologic cycle. Mechanics of precipitation types and causes.
  - Measurement by rain gauges, Gauge net-works, hyetograph.
  - Averaging depth of precipitation over the basin, mass-rainfall curves.
  - Intensity duration frequency curves, and depth area-duration curves.

Evapo-transpiration & infiltration

- Factors affecting interceptionevaporation from free water surfaces and from land surfaces.
- Transpiration, Evapotranspiration. Infiltration Factors affecting infiltration.
- Rate, Infiltration capacity and its determination.

- **UNIT 2: Surface Runoff**
  - Factors affecting runoff, run-off hydrograph,
  - Unit hydrograph theory, S-curve hydrograph,
  - Synder‟s synthetic unit hydrograph

Peak flows

- Estimation of Peak flow-rational formula.
- Use of unit hydrograph, frequency analysis.
- Gumbel‟s method, design flood and its hydrograph

- **UNIT 3: Gravity dam-non overflow section**
  - Forces acting, Stability factors, stresses on the faces of dam.
  - Design of profile by the method of zoning.
  - Elementary profile of a dam.

Gravity dam-spillways

- Elementary profile neglecting velocity of approach.
- Profile taking velocity of approach into account.
- Upstream lip and approach ramp, Advantages of gated spillways.
- Discharge characteristics of spillways

- **UNIT 4: Arch & buttress dams**:
  - Classification of arch dam-constant radius, constant angle and variable radius.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Cylinder theory, Expression relating central angle and Cross-Sectional area of archtypes of buttress dams, Advantages of buttress dams.

Earth dams

- Components of earth dams and their functions.
- Phreatic line determination by analytical and graphical methods.

Reference Books

- Hydrology by S.k. Garg
- Hydrology by R.k. Sharma
- Engg. Hydrology by Stanley Butler

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- DOCKS & HARBOURS
Course Code: - UCE- 471

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT 1:Harbour Planning & Natural Phenomena

- Harbour components
- Ship characteristics
- Characteristics of good harbour
- Principles of harbour planning
- Size of harbour
- Site selection criteria and layout of harbour
- Wind, waves tides and currents phenomena
- Their generation characteristics and effects on marine Structures
- Silting
- Erosion and littoral drift

UNIT 2:Marine Structures, Docks and Locks

- General design aspects, breakwaters – function
- Types general design principles
- Wharves
- Quays, jetties, piers, pier heads, dolphin, fenders, mooring accessories- function.
- Types, suitability, design and construction features.
- Tidal basin, wet docks-purpose
- Design consideration
- Operation of lock gates and passage
- Repair docks - graving docks
- Floating docks

UNIT 3:Port Amenities & Navigation Aids

- Transfer bridges
- Floating landing stages
- Transit sheds, ware houses
- Cold storage
- Aprons, cargo handling equipments
- Purpose and general description
- Channel and entrance demarcation
- Buoys, beacons, light house electronic communication devices.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

UNIT 4:Harbour Maintenance

- Costal protection-purpose and devices
- Dredging-capital and maintenance dredging, purpose, methods, dredgers-types, suitability. Disposal of dredged material.

Reference Books

- Rangwala,P.S., Airport Engineering, Charotar publishing house
- Srinivasan R and Rangwala, S.C., Harbour Dock and Tunnel engineering, Charotar
- Publishing House
- Bindra, S.P., Docks and Harbour Engineering, Dhanpat Rai and sons, New Delhi,
- Shahani, Aiport Techniques,Oxford and IBH Publishing CO, PVT, LTD

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: TOWN PLANNNING & ARCHITECHTURAL ASSISTANTSHIP
Course Code: - UCE- 472

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT 1: Basics of Town Planning

- Definition, Objectives, Necessity & Principles adopted
- Types of Urban Growth Their advantages and disadvantages.
- Town planning Surveys, Necessity, Objectives and Classification
- Urban road patterns Types and specific advantages & disadvantages.

UNIT 2: Land use Planning

- Scope and Content of Master plan, Regional plan, Structure plan, detailed development plan.
- Urban renewal -Planning standards for Neighborhood
- Basic principles in planning various land uses: Residential, Commercial, Industrial, and Recreational.

UNIT 3: Planning Legislations

- Evolution of planning legislation in India Organization
- Administration of planning agencies at National, State, Regional level and Metropolitan Level
- Tamil Nadu Town and Country Planning Act
- Building bye laws, Function of local Authority, Provision of Building Regulations

UNIT 4: Introduction To Architecture

- Definition of the term „Architecture
- Key factors influencing the architecture of any region, Culture, Climate, Topography, Building materials, Economic & Technology
- Prominent World Architecture styles during various periods in history
- Anthropometrics – Human Scale in Architecture. Space requirements for Human activity
- **Principles of Architectural Composition:** Unity, Contrast, Rhythm, Proportion, Scale, Character, Harmony, Color, Light and Shade, Solids and Voids, Balance and Symmetry
- **Landscape Architecture:** Concept – Necessity – Study of trees, plants & Shrubs for landscaping

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Reference Books

- Rangwala,S.C., Town Planning, Charotar Publishing House, Anand, .
- Pramar V.S., Design Fundamentals in Architecture, Somaiya Publications Pvt.
- Gurcharan Singh & Jagdish Singh, Building planning, Designing and Scheduling, Standard Publishers Distributors, Nai Sarak.
- M.S. Ramaswami, The Tamil Nadu Town and Country planning act, C.Sitaraman and Co., Publishers, Booksellers and Distributors.
- S.P. Arora, S.P. Bindra, A textbook of Building Construction, Dhanpat Rai and Sons, Michael Young, Architectural and Building Design, Heinemann ltd.
- Hiraskar.G.K., The Great ages of World architecture, Dhanpat Rai and Sons, Delhi.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: PRINCIPLES OF REMOTE SENSING
Course Code: - UCE- 473

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT 1: Physics of Remote sensing

- Introduction of remote sensing, Electromagnetic spectrum.
- Physics of remote sensing, effects of atmosphere, atmospheric windows.
- Spectral reflectance of earth‟s surface features in different wave length regions of EM spectrum.
- Atmospheric influences on spectral response patterns.
- Multi concept of remote sensing.

UNIT 2: Data acquisition

- Platforms, various types of platforms.
- Importance of remote sensing data for naturalresources management.
- Different types of aircraft, manned and unmanned space craft used for data acquisition.
- Characteristics of different types of platforms.
- LANDSAT, SPOT, IRS, ERS, INSAT, JERS IKONOS and other platforms.

UNIT 3: Data acquisition sensors (Visible and Infrared)

- Photographic products, B&W, Colour and Colour Infrared films and their characteristics.
- Resolving power of lenses and films,
- Electro optical sensor, spatial, spectral and radiometric resolution.
- Thermal sensors, geometric characteristics of thermal imagery.
- Calibration of thermal scanner, signal to noise ratio.

UNIT 4: Data acquisition sensors (Microwave)

- Concepts of microwave remote sensing.
- SLAR, SAR, Scaterometers, Altimeter.
- Satellite and Airborne Sensors.
- Characteristics of microwave imageries.

Data Analysis

- Different types of data products and their characteristics.
- Basic principles of digital analysis.
-

Reference Books

- GPS and Surveying using GPS by Gopi S, Tata McGraw Hill

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Introduction to GIS by Chang, Tata McGraw Hill
- An Introduction to Geographical Information Systems by Heywood, Cornelius and Carver, Pearson Edu., New Delhi

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: ADVANCED SURVEYING
Course Code: - UCE- 474

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT1- Tacheometric Surveying & Geodetic Surveying:
Introduction, purpose, principle & use of tacheometry, Instrument used & stadia hairs & Fixed hair methods of tacheometry, Tacheometry constant & Problems Anallatic lens theory, subtense bar, Field work in tacheometry. Reduction of readings, errors and precisions. Difference between Theodolite & Tacheometer.
Introduction & object of Geodetic Surveying,Principal & classification of triangulation system, Selection of base line and stations, Orders of triangulation-triangulation figures, Station marks and signals-marking signals, Examples on Phase error, Extension of base, reduction of centre, selection and marking of stations

UNIT II Theory of Errors & Field Astronomy:
Introduction, types of errors, Definitions, Laws of accidental errors, laws of weights, Examples, Theory of least squares, Rules for giving weights and distribution of errors to the field observations, Normal Equations, Determination of the most probable values of quantities Examples on most probable values of quantities.
Introduction & Instruments & purpose, Astronomical terms, Time & conversion of time, Abbreviations, Determination of azimuth, Latitude and longitude & Examples of azimuth , Latitude and longitude.

UNIT III Photogrammetric Surveying & Special Survey Instruments
Introduction, principle, uses Aerial camera, aerial photographs Definitions, scale of vertical and tilted photograph Ground coordinates, ground control, examples on scale, Displacements and errors, Examples on Displacement and errors, Procedure of aerial survey, Examples on flight planning, Photomaps and mosaics. Difference between Mosaic & Map, Stereoscopes, Parallax bar,Examples on Parallax bar Electromagnetic Distance Measurement, Electronics Theodolite, Total station, Site square, PentaGraph, Autoset Level, Transit level, Special Compasses, Brunton Universal Pocket Transit, Mountain Compass Transit.

UNIT IV Remote Sensing & Geographical Information System
Introduction, principles of energy interaction in atmosphere and earth surface features, Image interpretation techniques, visual interpretation, Digital image processing, Global positioning system,Types, Applications of GPS,Method of operation,System Segmentation Integration of remote sensing and GIS, applications in civil engineering.

Reference Books
1. Duggal, S. K., Surveying Vol. I & II, Tata Mcgraw Hill, New Delhi
2. Subramanian, R., Surveying & Levelling, Oxford University Press, New Delhi

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

3. Punamia, B.C., Surveying Vol. I, II & III, Laxmi Publications An Introduction to Geographical Information Systems by Heywood, Cornelius and Carver, Pearson Edu., New Delhi

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: DESIGN OF INDUSTRIAL STRUCTURES
Course Code: - UCE- 475

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1: Review of Plastic Design:

- Concept of minimum weight design

Storage Structures

- Design of containers like bunkers, silos

UNIT 2: Design of Industrial Buildings:

- Framing
- Crane girders & columns
- Analysis of trussed bents
- Design of industrial frame

UNIT 3: Design of Space Structures:

- Transmission towers
- Steel domes
- Pre-cast building components.

Aluminum structures:

- Permissible stresses
- Tension members
- Compression members
- Design of beams
- Local buckling of compression elements
- Riveted and bolted construction,

UNIT 4: Design of chimneys

- Load analysis
- Design of steel supporting chimney
- Chimney foundation

Construction Practices:

- Shop practice in steel construction
- Fabrication erection and production after participating in this course you will be able to Prevent serviceability failures that affect productivity
- Calculate design loads and methods to combine them with anticipated loads
- Determine dynamic loading, including crane, equipment and seismic factors

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Provide durable, flat, low maintenance concrete floors on grade
- Select economical structural systems that would provide long life and scalability for the inevitable future changes
- Ensure suitable and efficient crane buildings
- Design floor systems for vibration control, fatigue, ultimate strength and deflection control

Reference Books

- Dunham, C.W., Planning of Industrial Structures, John Wiley and Sons (2001).
- Gary, W., Steel Designer‟s Manual, Prentice Hall (2008).
- Glower, F., Structural Pre-cast Concrete, Oxford Publishers (2008).
- A. L. and Arya, A. S., Design of Steel Structures, Nem Chand and Brothers (2000).

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: DAMS
Course Code: - UCE- 478

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1:
Reservoir and Planning for Dam Reservoirs: Definition and types, Capacity-elevation and area-elevation curves, Designing Reservoir Capacity: Catchment yield and reservoir yield, Fixing reservoir capacity, mass curves of inflow and outflow, flood routing or flood absorption, reservoir regulation.

UNIT - 2:
Design and construction of gravity dams: Definition and types, typical cross sections, stability analysis, High and Low Gravity dams, Profile of a Dam, Design of Gravity Dams, Construction of Gravity Dams.

UNIT - 3:
Earthen Dams and Rock fill Dams: Introduction, types, Methods of Construction, Various kinds of Densities and their Relations, Seepage Analysis, Stability of Earthen Slopes, Seepage Control in Earthen Dams, Design of Filters, Slope Protection, Rock fill Dams.

UNIT - 4:
Arch and Buttress Dams: Definition and types of Arch Dams, Forces Acting on Arch dams, Design of Arch dams, Definition and types of Buttress Dams

Reference Books

- Design and Construction of Dams: Edward Wegmann, John Wiley and sons, New York.
- Engineering for Dams, Vol. III (Earth, Rock fill, Steel and Timber Dams): Creager, Justin and Hindus, John Wiley and sons, New York.
- Irrigation (Vol.III) – Arch, Buttress, Earth and Rock fill Dams: K.B. Khushalani and Manohar Khushalani, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: SOFTWARE PROJECT MANAGEMENT
Course Code: - UCS - 480

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit 1: **Conventional Software Management**

- The waterfall model
- Conventional software Management performance.

Evolution of Software Economics

- Software Economics
- pragmatic software cost estimation

Improving Software Economics

- Reducing Software product size
- improving software processes
- improving team effectiveness
- improving automation
- Achieving required quality
- Peerinspections

Unit 2: The old way and the new

- The principles of conventional software Engineering
- principles of modern software management
- Transitioningtoaniterativeprocess

Life cycle phases

- Engineering and production stages
- inception
- Elaboration
- construction
- transitionphases

Artifacts of the process

- The artifact sets
  - Management artifacts
  - Engineering artifacts
  - programmatic artifacts

Unit 3: Model based software architectures

- A Management perspective and technical perspective

Work Flows of the process

- Software process workflows
- Iteration workflows

Checkpoints of the process

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Major mile stones
- Minor Milestones
- Periodic status assessments

Iterative Process Planning

- Work breakdown structures
- planning guidelines
- cost and schedule estimating
- Iteration planning process
- Pragmatic planning

Project Organizations and Responsibilities

- Line-of-Business Organizations
- Project Organizations
- evolution of Organizations

Process Automation

- Automation Building blocks
- The Project Environment

Unit 4: Project Control and Process instrumentation

- The seven core Metrics
- Management indicators
- quality indicators
- life cycle expectations
- pragmatic Software Metrics
- Metrics automation.
- **Tailoring the Process**
- Process discriminants
- **Future Software Project Management**
- Modern Project Profiles
- Next generation Software economics
- modern process transitions
- **Case Study**

The command Center Processing and Display system- Replacement (CCPDS-R)

Reference Books

- Course Notes by the Instructor
- Walker Royce: Software Project Management
- Bob Hughes and Mike Cotterell: Software Project Management
- Joel Henry: Software Project Management Pankaj Jalote: Software Project Management in practice

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- DISTRIBUTED OPERATING SYSTEM
Course Code: - UCS - 481

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Module 1: Distributed computing systems fundamentals

- Introduction to Distributed computing systems,
- Models, Popularity.
- Distributed Computing system.
- Design issues of Distributed operating system.
- Distributed computing environment

Module 2:Message Passing

- Features of a good Message Passing System.
- Issues in IPC by Message Passing Synchronization,
- Buffering, Multi datagram Messages,
- Encoding and Decoding Message data, Process Addressing,
- Failure Handling, Group Communication.
- RPC Model, Transparency of RPC,RPC messages,
- Marshaling Arguments and Results.
- Server Management, Parameter Passing semantics,
- Call semantics, Communication Protocols for RPCs,
- Client Server Building, Exception handling,
- Security ,RPC in Heterogeneous Environments, Lightweight RPC.

Module 3:Distributed Shared Memory:

- General architecture of DSM systems.
- Design and implementation Issues of DSM,
- Granularity, Structure of Shared Memory Space. Consistency models,
- Replacement strategy, Thrashing.Synchronization:
- Clock Synchronization.
- Event Ordering, Mutual Exclusion, Deadlock, Election
- Algorithms.

Module 4:Resource Management

- Features of global scheduling algorithm.
- Task assignment approach,
- Load-Balancing and Loadapproach.
- Process Management: Introduction, Process Migration,
- Threads. Distributed File Systems:

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Features of good DFS, File models, File Accessing models

Reference Books

- Pradeep Sinha K., "Distributed Operating Systems concepts and design", PHI learning private limited.
- Mukesh Singhal, Niranjan G Shivarathri, "Advanced Concepts in Operating systems", Tata McGraw Hill Ltd.
- Coulouris.G, Dollimore J & Kindberg T, "Distributed Systems concepts and design", 4thedition, Pearson Education.
- Tanenbaum A S, " Modern Operating System", PHI learning private limited, 3rd edition.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- GRID COMPUTING
Course Code: - UCS - 482

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit 1 : Introduction

- Grid Computing
- Benefits of Grid Computing
- VirtualOrganizations
- Grid Architecture and its relationship to other distributed technologies
- Grid Application Areas,
  - OGSA
  - OGSI
  - Introduction to Semantic Grids.
- Building Blocks for Grid Systems
  - XML
  - SOAP
  - UDDI
  - Service Oriented Architecture
  - Web Services
  - Web Services Architecture
  - WSRF
  - Relationship between Grid and Web Services
  - Grid and Web Services Invocation**.**

Unit 2 : Data Management

- Overview of Data Management in GT4
- Data Movement:
  - Grid FTP
  - RFT
  - Data Replication
  - RLS
  - Higher level data services.
- Resource Management and Scheduling
- Resource Management Concepts
- Generalized Resource Management Framework
- Grid Resource Management Systems

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Scheduling in Grids
- QoS
- Introduction to GRAM

Unit 3 :**Security**

- Security Issues in Grids
- Authentication Issues
- Trust and Privacy related Issues
- Authorization Issues
- Grid Security Frameworks
- Standards
- Web Services Security Specifications.
- Monitoring and Discovery Services:
  - Index Services
  - Resource Discovery
  - UDDI
  - Introduction to MDS in GT4

Unit 4 : Grid Middleware and Programming Model

- Study of Globus Toolkit 4 Components
- Programming Model
- Singleton and Multiple Resources
- Logging
- Lifecycle Management
- Notifications
- Study of important distributed systems like Legion,
- CRISI

Reference Books

- Grid Computing, First Edition by Joshy Joseph, Craig Fellenstein , Pearson Education
- The Grid 2: Blueprint for a New Computing Infrastructure, Second Edition, by Ian Foster, Carl Kesselman , Morgan Kaufman
- Introduction to Grid Computing, First Edition by Bart Jacob, Michael Brown, Kentaro Fukul, Nihar Trivedi , IBM Red Books
- Grid Resource Management - State of the Art and Future Trends by Zarek Nabrzyski, Jennifer M. Schopf, Jan Weglarz , Kluwer Academic Publishers
- Grid Computing Security by Anirban Chakrabarti , Springer

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: Software Reliability

Course Code: - UCS - 483

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT I-INTRODUCTION
Need and Concepts of Software Reliability, Failure and Faults – Prevention, Removal, Tolerance, Forecast, Dependability Concept – Failure Behavior, Characteristics, Maintenance Policy, Reliability and Availability Modeling, Reliability Evaluation

UNIT II-SOFTWARE RELIABILITY MODELS
Introduction (Historical Perspective and Implementation, classification, limitations and issues, Exponential Failure Models – Jelinski(moranda model, Poisson, Musa, Exponential models, Weibull Model, Musa(okumoto Model, Bayseian Model – Littlewood verral Model, Phase Based Model

UNIT III-PREDICTION ANALYSIS
Model Disagreement and Inaccuracy – Short & Long Term Prediction, Model Accuracy, Analyzing Predictive Accuracy – Outcomes, PLR, U & Y Plot, Errors and Inaccuracy, Recalibration – Detecting Bias, Techniques, Power of Recalibration, Limitations in Present Techniques, Improvements.

UNIT IV-THE OPERATIONAL PROFILE
Concepts and Development Procedures – Customer Type, User Type, System Mode, Functional and Operational Profile, Test Selection (Selecting Operations, Regression Test, Special Issues – Indirect Input Variables, Updating, Distributed system, CASE STUDY Application of DEFINITY & FASTAR, Power Quality Resource System

TESTING FOR RELIABILITY MEASUREMENT
Software Testing – Types, White and Black Box, Operational Profiles – Difficulties, Eatimating Reliability, Time/Structure based software reliability – Assumptions, Testing methods, Limits, Starvation , Coverage, Filtering, Microscopic Model of Software Risk.

Reference Books

- Patric D. T.O connor, "Practical Reliability Engineering", 4th Edition, John Wesley & sons, 2003.
- John D. Musa, "Software Reliability Engineering", Tata McGraw Hill, 1999.
- Michael Lyu, "Handbook of Software Reliability Engineering", IEEE Computer Society Press, ISBN: 0(07(039400(8, 1996)

Course Name: E-COMMERCE & ERP

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Code: - UCS - 484

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit 1: Introduction and Concepts:

- Networks and commercial transactions – Internet and other novelties;
- networks and electronic transactions today, Model for commercial transactions;
- Internet environment – internet advantage, worlds wide web and other internet sales venues
- Online commerce solutions.

Security Technologies:

- Insecurity Internet; A brief introduction to Cryptography;
- Public key solution; Key distribution and certification;
- Prominent cryptographic applications.

Electronic Payment Methods:

- Updating traditional transactions; secure online transaction models;
- Online commercial environments; digital currencies and payment systems;
- Offline secure processing; private data networks.

Protocols for Public Transport of Private Information:

- Security protocols; secure protocols; Secure hypertext transfer protocols;
- Secure sockets layers; Integrating security protocols into the web;
- Non technical provide.

Unit 2: Electronic Commerce Providers:

- On-line Commerce options: Company profiles.
- **Electronic Payment Systems:** Digital payment systems;
- First virtual internet payment system; cyber cash model.

On-line Commerce Environments:

- Servers and commercial environments; Netscape product line;
- Netscape commerce server; Microsoft internet explorer and servers;
- open market.

Digital Currencies:

- Optional process of Digicash, Ecash Trail; Using Ecash; Smart cards,
- Electronic Data Interchange; Its basics;
- EDI versus Internet and EDI over Internet.

Strategies, Techniques and Tools:

- Internet Strategies: Internet Techniques,
- Shopping techniques and online selling techniques;
- Internet tools. Electronic Commerce Online Resources and Guide to

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- the CD-ROM.

Unit 3: ERP –

- An Enterprise Perspective; Production Finance,
- Personnel disciplines and their relationship, Transiting environment,
- MIS Integration for disciplines, Case Study, Information / Workflow,
- Network Structure, Client Server Integrator System, Virtual Enterprise.
- ERP –Resource Management Perspective; Functional and Process of Resource Management,
- Basic Modules of ERP System-HRD, Personnel Management,
- Training and Development, Skill Inventory,
- Material Planning and Control, Inventory, Forecasting, Manufacturing,
- Production Planning, Production Scheduling,
- Production Control, Sales and Distribution,
- Finance, Resource Management in global scenario,
- dynamic data management in complex global scenario.

Unit 4: ERP – Information System Perspective:

- Evolution of Application Software Technology Management,
- EDP, MIS, DBMS, DSS OLAP (Online Analysis and Processing),
- TP, OAS, KBS, MRP, BPR, SCM, REP, CRM,
- Information Communication Technology, E-Business, E-Commerce, EDI

4. ERP-Key Managerial Issues:

- Concept Selling, IT Infrastructure, Implication,
- ERP Systems on Business Organization, Critical success factors in ERP System,
- ERP Culture Implementation Issues, Resistance to change,
- Public Service and Organizations (PSO) Project,
- ERP Selection issues, Return on Investment, Pre and Post Implementation Issues

Reference Books:

- Frontiers of Electronics Commerce by Ravi lalakota, Andrew Whinston
- Enterprise Resource Planning – Concepts and practice by K. Garg and N.K. Venkita Krishna
- The SAP/3 Handbook by John Antonio, Fernandz

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: DATA WAREHOUSING & DATA MINING
Course Code: - UCS - 485

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit 1: **Introduction to Data Warehousing**

- Data Warehousing
  - Definition and characteristics
  - Need for data warehousing
  - DBMS vs. data warehouse
- OLAP
  - Overall Architecture
- Data Warehouse Database
- Sourcing
- Acquisition
- Cleanup and Transformation Tools
- Metadata Access Tools, Data Marts

Introduction to Data Mining

- Data mining
  - Data mining functionalities
  - Kinds of patterns can be mined
  - Classification
  - Major issues
  - Functionalities
  - Classification data mining systems
- Multidimensional data model
  - Data cubes
  - Schemas for multidimensional databases
- OLAP operations
- Metadata

Unit 2: **Data Pre-Processing**

- Data cleaning
- Data Integration and Transformation
- Data Reduction, Discretization and concept hierarchy generation
- Data mining primitives
  - Data mining Task
  - A data mining query language

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Architecture of Data mining systems
- Characterization and comparison

- **Concept Description**
- Data mining techniques
  - Concept description attribute oriented induction
  - Analytical characterization
  - Mining class comparisons
  - Mining descriptive statistical measures

Unit 3: **Association Rule Mining**

- Mining single dimensional
- Boolean association rules from transactional databases
- Apriori algorithm, efficiency
- Mining rules without candidate generation
  - Mining multilevel association rules from transaction databases mining multidimensional association rules from Relational databases and Data warehouses
  - From association mining to correlation analysis
  - Constraint based association mining

Unit 4: **Applications and Trends in Data Mining**

- Data mining system products and Research prototypes
- Additional themes on Data mining
- Social Impacts of Data Mining
  - Trends in Data mining
  - Realization to data mining using SQL Server
- Case studies in building
  - business environment
- Application of data ware housing
- Data mining in Government
- National Data ware houses and case studies
- Commercial Importance of DW
- Applications of data mining
  - data mining in business process embedded data mining

Reference Books:

- Jiawei Han & Micheline Kamber: Data Mining –Concepts & Techniques
- Alex Berson : Data Warehousing, Data Mining and OLTP
- Sam Anahory & Dennis Murray: Data Warehouseing in the Real World Pieter Adrians, Dolf Zantinge: Data Mining

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: BIOMEDICAL INSTRUMENTATION
Course Code: - UEC - 462

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1:
Introduction to Biomedical Signals Tasks in Biomedical Signal Processing, Computer Aided Diagnosis, Examples of Biomedical signals: ECG, EEG, EMG etc., Review of linear systems, Fourier Transform and Time Frequency Analysis (Wavelet) of biomedical signals, Processing of Random & Stochastic signals, spectral estimation, Properties and effects of noise in biomedical instruments, Filtering in biomedical instruments

Unit-II
Cardio-logical Signal Processing Pre-processing, QRS Detection Methods, Rhythm analysis, Arrhythmia Detection Algorithms, Automated ECG Analysis, ECG Pattern Recognition, Heart rate variability analysis.

Unit-III
Adaptive Noise Canceling Principles of Adaptive Noise Canceling, Adaptive Noise Canceling with the LMS adaptation, Algorithm, Noise Canceling Method to Enhance ECG Monitoring, Fetal ECG Monitoring.

Unit-IV
Neurological Signal Processing Modeling of EEG Signals, Detection of spikes and spindles, Detection of Alpha, Beta and Gamma Waves, Auto Regressive (A.R.) modeling of seizure EEG, Sleep Stage analysis, Inverse Filtering, Least squares and polynomial modeling.

Reference Books:

- D.C.Reddy,―Biomedical Signal Processing: Principles and techniques‖, Tata McGraw Hill, New Delhi, 2005.
- Willis J Tompkins, Biomedical Signal Processing, Prentice Hall, 1993
- R. Rangayan, ―Biomedical Signal Analysis‖, Wiley 2002.
- Bruce, ―Biomedical Signal Processing & Signal Modeling,‖ Wiley, 2001.
- K. Najarian and R. Splinter, ―Biomedical Signal and Image Processing‖, Second Edition, The CRC Press

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:-TELEVISION ENGINEERING
Course Code:- UEC - 463

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT I
PRINCIPLES OF TV:
Picture elements, Theory of line, frame and field frequencies Blanking, Synchronization, interfacing, resolution, vertical resolution, horizontal resolution and video bandwidth, Use of AM in video and FM in audio, Block Diagram of TV Transmitter and Receiver, Construction of composite video signal.

UNIT II
TELEVISION CAMERAS AND PICTURE TUBES:
Spectrum of light and eye response, Image orthicon, plumbicon, vidicon (Principles of operation, Construction and working),TV picture tube details, Modulation system used for sound and picture, VSB working, TV transmitter.

UNIT III
TV RECEIVER:
Block Diagram of TV Receiver, Tuner Circuits, Choice of IF amplifier, A.M. & F.M. detectors, Receiver sweep circuits, Video Frequency amplifier, synch. Pulse representation, deflection circuits.

UNIT IV
COLOUR TV:
Hue, Saturation and luminance, Luminance and colour signal generation, Types of colour picture tubes (Basic principles and construction), colour subcarrier and colour triangle, NTPC, PAL, SECAM systems, Colour TV transmission & reception, Block Diagram of digital TV with merits.

Reference Books:

- 1 Monochrome & Colour TV : R.R Gulati :New Age Pub.
- Basic Television : G.M Grob : McGraw Hills
- T.V. Engg : Dhake : Tata McGraw Hills.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:-SATELLITE COMMUNICATION
Course Code: - UEC - 464

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT I
Introduction to Satellite Communication Origin, Brief History, Current state and advantages of Satellite Communication, Active & Passive satellite, Orbital aspects of Satellite Communication, Angle of Evaluation, Propagation Delay, Orbital Spacing, System Performance.

Unit-II
Satellite Link Design Link design equation, system noise temperature, C/N & G/T ratio, atmospheric & econospheric effects on link design, complete link design, interference effects on complete link design, earth station parameters, Earth space propagation effects, Frequency window, Free space loss, Atmospheric absorption, Rainfall Attenuation, Ionospheric scintillation, Telemetry, Tracking and command of satellites.

Unit-III
Satellite Multiple Access System FDMA techniques, SCPC & CSSB systems, TDMA frame structure, burst structure, frame efficiency, super-frame, frame acquisition & synchronization, TDMA vs FDMA, burst time plan, beam hopping, satellite switched, Erlang call congestion formula, DA-FDMA, DA-TDMA.

Unit-IV
Satellite Services INTELSAT, INSAT Series, VSAT, Weather forecasting, Remote sensing, LANDSAT, Satellite Navigation, Mobile satellite Service.
Laser & Satellite Communication Link analysis, optical satellite link Tx & Rx, Satellite, beam acquisition, tracking & pointing, cable channel frequency, head end equation, distribution of signal, n/w specifications and architecture, optical fibre CATV system.

Reference Books:
1. Trimothy Pratt, Charles W. Bostian, ―Satellite Communications‖, John Wiley & Sons, 1986.
2. Dr. D.C. Aggarwal, ―Satellite Communications‖, Khanna Publishers, 2001.
3. Dennis Roddy, ―Satellite Communications‖, McGraw Hill, 1996.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- DIGITAL SIGNAL PROCESSING & APPLICATIONS
Course Code: - UEC - 464

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT I
Classification of signals, singularity functions, classification of system, manipulation of Discrete time signals: Signal analysis, signal characteristics, typical discrete time signals, operation on signals, properties of linear time-invariant digital systems, sampling of analog signals and sampling rate conversion. Z-transform; Properties of Z-transform. Inverse Z-transform – analysis of discrete time systems, convolution.

Unit – II
System function, difference equation, IIR filter design: Analog filter approximation, Butter worth, Chebyshev and Elliptic filters, Bilinear transformations, Impulse invariance technique, Digital frequency band transformations. FIR filter design: Window technique, Equiripple approximation technique, Frequency sampling technique.

Unit – III
Discrete Fourier Transform (DFT) and Inverse Discrete time Fourier Transform: properties of DFT (circular convolution). Fast Fourier Transform (FFT): Decimation-in-time (DIT) algorithm-decimation-in-frequency algorithm-FFT, Radix-2 DIT and DIF implementation.

Unit – IV
Applications of DSP in Voice, RADAR and Image Processing.*TMS320CXX*SERIES PROCESSORS: Architecture, Memory, Interrupts, Addressing modes, Assembly language programming.

Reference Books:

- Digital Signal Processing David.K.Defatta, Joseph G, Lucas & William S.Hodgkiss : John Wiley & sons.
- Digital Signal Processing Sanjit K and Mitra : Tata McGraw Hill.
- Digital Signal Processing- Principles, Algorithms & Applications John G. Proakis &
- Dimitris Manolakis : Pearson Education

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- OPTICAL COMMUNICATION
Course Code: - UEC - 466

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT I
Need for Fiber Optic Communications System, Role of Fiber Optic communication technology, Basic Block Diagram, Advantages & Disadvantages of Optical Fiber Communication, structure of optical wave guide, lightpropagation in optical fiber using ray theory, Electromagnetic Mode Theory, Step Index Fiber, Graded Index Fiber, Attenuation- Bending Loses, Scattering, Absorption, Dispersion – Intermodal, Chromatic, limitations & remedies.

UNIT II
Light sources & Transmitters – Light Emitting Diodes,Hetero junction& DH structure, laser diodes, Principle of action, characteristics, efficiency, Block Diagram and typical circuits of Transmitter.

UNIT III
Receivers, Photodiodes -Working, Power relationship, PIN photodiodes, Avalanche photodiode, Block Diagram & typical circuits of receiver.

UNIT IV
Fiber Cable Connection– Splicing, Connectors, components of Fiber Optic Networks, Transceivers, Semiconductor, optical amplifiers - Principle of operation, Gain, Bandwidth, Cross talk, Noise, Applications, Advantages & Disadvantages. Erbium Doped Fiber Amplifiers (EDFAs) - Operation, gain, noise, Components of EDFA module

Reference Books:

- Fiber Optic Comm. Systems D.K.Mynbaev : Pearson Edu.
- Optical Fiber Comm. John M.Senior : PHI Publications
- Optical Fiber Comm. G.Keiser : TMH

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- OPTICAL COMMUNICATION
Course Code: - UEC - 467

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT I

PULSE MODULATION:- Sampling process, pulse – amplitude modulation , other forms of pulse modulation, Bandwidth – noise trade off, quantization process, pulse code modulation, noise considerations in PCM system, ISI & Eye pattern in PCM, Time- division multiplexing, digital multiplexers, differential pulse code modulation , delta modulation, Adaptive Delta Modulation.

UNIT-II
DIGITAL MODULATION TECHNIQUES: - Binary phase – shift keying, differential phase shift keying, differentially – encoding PSK (DEPSK), Quadrature phase shift keying (QPSK), M-ary PSK, Amplitude shift keying(ASK), Quadrature amplitude shift keying (QASK). Binary frequency shift keying, similarity of BFSK and BPSK, M-ary FSK, Minimum shift keying (MSK)

UNIT-III
DATA TRANSMISSION: - A base band signal receiver, probability of error, the optimum filter, white noise: the matched filter, probability of error of the matched filter, coherent reception: correlation, phase shift keying (PSK), frequency shift keying (FSK), Non coherent detection of FSK, differential PSK,).

UNIT-I V
SPREAD SPECTRUM MODULATION: - Pseudo-noise sequences, direct sequence spread spectrum, processing gain, frequency HOP spread spectrum, Linear Block Codes, Convolution codes.

Reference Books:

- Communication System : Simon Haykins : John Wiley
- Principles of Communication System : Taub and Schilling : TMH
- Electronics Communication System : Wayne Tomasi : Pearson Edu.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- ENERGY MANAGEMENT
Course Code: - UEE - 403

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1:
INTRODUCTION
Review of different Energy Sources Concept of Energy Management, supply side management, demand side management, Energy crisis, Energy Efficiency, Energy Scenario in India andits Conservation program, Computer Aided Energy Management System
ENERGY CONSERVATION
Energy Conservation needs and Objectives, Energy Conservation in Domestic sector, Energy Conservation in Industrial sector.

Unit-II
ENERGY AUDIT
Need for Energy Audit, Types of Energy Audits, National Energy Plan and its impact on Energy Conservation, Energy audit team, Energy Audit Reporting format, Energy Audit Instruments.

Unit-III
ENERGY EFFICIENT TECHNOLOGY
Life cycle assessment, Energy efficient Motors, BIS Specifications for Energy Efficient Motors, Energy Efficient lighting sources, Power Quality

Unit-IV
ENERGY AUDITS PRACTICE
Energy Audits of building systems, electrical systems, maintenance and Energy Audits.

Reference Books:

- Handbook of Energy Audits by Albert Thuman – Fairman Press Inc.
- Energy basis for man and nature by Howard T.Odum & Elisbeth C.Odum.
- Energy Management by Umesh Rathore, Kataria Publications

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- ILLUMINATION ENGINEERING
Course Code: - UEE - 408

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1:
Introduction: Laws of illumination - Inverse Square law and Lambert‟s Cosine law, their application in lighting calculations.brief idea of methods of Lighting calculations. General Principles Of Illumination: Definitions, units of light, definitions of flux, solid angles, luminous intensity and brightness, glare, polar curves.

Unit-II
COLOUR: Nomenclature of colour, production of colored light and mixing colours, colours contrast, colour matching. Electric Light Sources: Brief description of characteristics of starting and application of the following lamps:a) Incandescent lamp. b) Sodium Vapour lamp.
c) Mercury Vapour lamp d) Flourescent lamp e) Neon lamp

Unit-III
General Illumination Design (LUMEN METHOD): Room index and Utilization factor, Maintenance factor, types of lighting schemes, design of lighting schemes with practical examples. Minimum level of illumination required for:
(i) Domestic. (ii) Commercial (iii) Educational. (iv) Health (v) Industrial buildings. flood lighting of building, road lighting factory lighting.

Unit-IV
Maintenance and Economics: Maintenance of luminaire, luminaire depreciation caused by dust and dirt, Efficient light production, lighting economics. Instruments used in photometric measurements. **Reference**

Reference Books:

- Utilization Of Electric Power and Electric Traction by: J.B.GUPTA

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- DIRECT ENERGY CONVERSION
Course Code: - UEE - 411

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

COURSE DESCRIPTION

UNIT - 1:

INTRODUCTION: Conventional generation (Thermal, Hydro etc) alternative generation processes

THERMIONIC GENERATION: The basic thermionic diode generator and its analysis, Cross held devices, Anode and cathode materials, Experimental thermionic generator.

Unit-II:

MHD GENERATION: Principles of MHD generation, electrical conditions, Faraday generator, Hall generator, comparison of generators, choice of generator parameters, other generator configurations.

EXPERIMENTAL MHD GENERATION: Open cycle working, closed cycle operation, Liquid metal systems.

Unit III :

THERMOELECTRIC GENERATION: Seeback effect, Peltier effect, Thomson effect, EMF relationship, Generator analysis, Material selection, Experimental thermoelectric generation.

Unit IV :

FUEL CELLS: Principles of fuel cells, Thermodynamics of the fuel cell, Choice of fuels and operating condition, Polarization and its effect, Redox cell, Overall efficiency, Practical Fuel cells – various types..

Reference Books:

- Direct Energy Conversion by R.A.Coombe.
- Non-Conventional Energy Sources By –S.Rao.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- NON CONVENTIONAL ELECTRICAL POWER GENERATION
Course Code: - UEE - 452

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

COURSE DESCRIPTION

UNIT - 1:
Energy situation and renewable energy sources: Global Energy scenario, World Energy consumption, Energy in developing countries, fire wood crisis, Indian energy scene, Non-conventional renewable energy sources, potential of renewable energy sources.

Unit-II
Wind Energy: Origin of wind, Basic principle of wind energy, conversion, component of wind energy conversion system, type of windmills, Wind electrical Generations in India.
Solar Energy: Introduction, solar radiation, solar energy collector, solar thermal power generation, low temperature application of solar energy.

Unit-III
Geo-thermal Power Plants: Introduction, Geothermal sources, comparison of Geo thermal energy with other energy forms, development of Geothermal power in India. Physical and thermochemical methods of bioconversion: Introduction, biomass definition and potential, physical method of bio conversion, thermo chemical methods.

Unit-IV
Wave, Tidal and OTEC: Introduction, Basic principle of tidal power, Wave energy, component of Tidal power plant, Ocean Thermal Energy Conversions, advantages and disadvantages of tidal power generation. Small and Mini Hydro power System: Introduction, site development, generation and electrical equipment, system of regulation of Hydroelectric Power in India.

Reference Books:

- Renewable Energy Sources by Maheshwar Dyal.
- Small and mini Hydropower system by Tata Mc Graw Hill.
- An Introduction to power plant technology by G.D.Rai.
- Solar Energy by Suhas.P.Sukhatma, Tata Mc Graw Hill.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -HYDRO POWER STATION DESIGN
Course Code: - UEE - 452

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

COURSE DESCRIPTION

UNIT - 1:
Introduction, Hydrology, Stream flow, Hydrographs, Flow duration curves, Mass curve, Storage, Investigation of site.

Unit-II
Types of dams, arrangement and location of hydro-electric station, types of hydroelectric plants and their fields of use, principle of working of a hydroelectric plant.

Unit-III
Power to be developed, size of plant and choice of units, Types of turbines and their characteristics, Design of main dimensions of turbines.

Unit-IV
Draft tubes, Turbine setting, penstock dimensions, scroll case, preliminary design of penstock, characteristics of generators. Various design aspects of mini and micro hydel plants

Reference Books:

- Power Station Design by M.V.Deshpande.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- TRANSFORMER ENGINEERING
Course Code: - UEE - 452

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT - 1:

Introduction to Transformers

Transformer Types, Transformer Losses, Operating Principles, Instrument Transformers, Transformer Construction, Auto -Transformer, Transformer connections.

Transformer Maintenance

Insulation Testing, High Potential Testing, Turns Ratio Testing, Polarity Testing, Power Factor, Excitation Current, DC Winding Resistance, Polarization Recovery, Insulating Fluid, Dielectric, Dissolved Gas Analysis.

Unit 2

Materials for Transformers

Insulating oil, insulating paper, pressboard, and wood, insulated copper conductor for windings,crepe paper, sealing materials, and cold – rolled grain oriented electrical steel sheet.

Winding and Insulation

Types of windings, surge voltage, heat transfer, insulation design.

Unit 3

CoolingAir Cooled Oil-Immersed,Water-Cooled, Forced-Oil Cooling,Self-Cooling with Air Blast Temperature Limits, Transformer loading.

Magnetic Circuit Materials, design of magnetic circuit, optimum design of core.

Unit 4

Tap Changers

Off - circuit tap changer, on load tap changer, automatic control of tap changer.

Transformer Auxiliaries

Buchholz relay, temperature indicators, oil level indicators, oil preservation systems.

Reference Books:

- Transformers by BHEL, Bhopal, Tata McGraw Hill.
- Transformer Engineering by SV Kulkarni and SA Khaparde Marcel & Dekks Inc.
- Transformer Engineering design and practices, SV Kulkarni, SA Khaparde, Marcel Dekker IncNew york.
- Electrical Machines byJ. Nagrath&D.P.Kothari, Tata McGraw Hill
- Electrical Machines by Husain Ashfaq ,DhanpatRai& Sons

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Electric Machine and Tranformers by Irving L.Kosow, Prentice Hall of India.
- Fundamentals of Electrical Machines by B.R. Gupta &VandanaSinghal, New Age International
- Electric Machinery by A.E. Fitggerald, C.KingsleyJr and Alexander Kusko, McGraw Hill, International Student Edition.
- The Performance and Design of DC machines by A.E. Clayton, Pitman &Sons
- The Performance and Design of AC machines by M.G. Say, Pitman & Sons
- Theory of Alternating Current Machinery by Langsdorf , Tata McGraw Hill..

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- BASIC MANUFACTURING TECHNOLOGY
Course Code: - UME – 410

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit – I

Metal Casting Processes: Advantage and limitations, sand mold making procedure, Patterns and Cores. Pattern materials, pattern allowances, types of pattern, colour coding, Molding material, Molding sand composition, and preparation, sand properties and testing type of sand molds.

Cores: Types of cores, core prints, chaplets, chills, Gating systems, Gates and gaiting systems risers, Melting practice, Cupola, charge calculations. Casting cleaning and casting defects Fettling, defects in castings and their remedies, methods of testing of castings fore their

Unit – II

Special Casting Processes: Shell molding, precision investment casting, permanent mold casting, die casting, centrifugal casting, continuous casting.

Metal forming Processes: Nature of plastic deformation, hot working and cold working. Principles of rolling, rolling mills Forging: Forging operations, smith forging, drop forging, press forging, forging defects.

Unit – III

Extursion and other processes : Extrusion principle, hot extrusion, cold extrusion, wire drawing, swaging, tube making, Sheet metal operation, shearing action, drawing dies, spinning, bending, strech forming, embossing and coining.

Gas and Arc Welding: Classification: Oxy-acetylene welding equipment and techniques. Electric arc welding: Electrodes, manual metal arc welding, inert gas shielding arc welding, tungsten inert gas welding (TIG), metal inert gas wedling (MIG), submerged arc welding (SAW)

Unit – IV

Resistance Welding: Principles, resistance sopt welding, resistance seam welding, upset welding, flash welding.

Other Welding Processes : Introduction thermit welding, electro slag welding, electron beam welding . electronic beam soldering forge welding, friction welding, diffusion welding, brazing and soldering.

Reference Books:

- Principles of Manufacturing Materials & Processes – Campbell J.S.Publisher – Mc Graw Hill.
- Manufacturing Science – Ghosh A.Malik, A.K.Affiliated East-West Press Pvt. Ltd., New Delhi.
- Foundary Technology – K.P.Sinha, D.B.Goel, Roorkee Publishing House.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Welding and Welding Technology, Richard L.Little Tata McGraw Hill Ltd.
- Principle of Metal casting- Rosenthal, Tata Mc Graw hill, New Delhi.
- Production Technology – R.K.Jain, Khanna Publication Ltd., N D.
- Manufacturing Processes and Systems : Ostwald Phillip F., Munoz Jairo, John Wiley & Sons (Asia) Pvt. Ltd.
- Welding Technology – O.P.Khanna, Dhanpat Rai & Sons, Delhi.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- MEASUREMENT TECHNIQUES
Course Code: - UME – 411

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit – I

Standards of Measurements : Line standards, imperial standard yard, standard meter, sub-standards and standards, end bars, slip gauges, angular slip gauges, wave length standard**.**

Measuring Principles : Principle for mechanical measuring instruments – Lever method, Vernier method, screw & screw nut method. Compound gearing method, helical strip method. Principles of optical measuring instruments. Reflection, refraction interference, optical prism, lenses, optical systems. Principle of electrical measuring instruments. Transformation of energy, variation of electric parameters,- Principles of pneumatic measuring instruments. Construction details of measuring instruments. Abbe principle, graduation lines and scale division, pivot & bearings. Measuring accuracy – dimensional & geometrical accuracy. Types of error, systematic error, compound error, random error.

Unit – II

Interchangeability : Concept and need of interchangeability. Systems of tolerances, system of fits. Limit gauges, Standardisation. Design standardisation. Manufacturing standardisation.

Linear and Angular Measurement : Use of slip gauges, dial indicators. Mechanical, optical andelectrical comparators, pneumatic gauges, measuring machines, sinebars & angle, gauges, levels, clinometer, auto-collimator, tapper gauges

Unit-III

Straightness, Flatness and Squareness testing : Straight edges, surface plates straightness testing,straight edge methods, level or auto-collimator method. Flatness testing – level or auto – collimator method, optical flatness testing, squareness testing, indicator method, auto – collimator methods, engineer‟s squares

Screw Thread Measurement : Errors in threads, screw thread gauges, measurement of element of the external and internal threads, thread caliper gauges

Unit-IV

Spur Gear Measurement : Geometry of spur gear, measurement of spur gea parameters, ram out, pitch, profile, lead, backlash, tooth thickness, composite elements.

Surface Finish Measurement : Definition measurement of surface, finishtaly surf, profilometer, tomilson recorder, compariscope, microscope interference methods

Miscellaneous : Acceptance tests for a lathe. Alignment of bearings

Reference Books:

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- Gupta, I.C., "Engineering Metrology", Dhanpat Rai & Sons, New Delhi, 1994.
- Hume, K.J., "Engineering Metrology", Mac Donald & Co. 1963.
- R. K. Jain "Engineering Metrology", Khanna publisher, Delhi
- Kumar, D.S., "Mechanical Measurements and Control", Metropolitan, New Delhi.
- Doeblein, E.O., "Measurement Systems, Application Design", Mc Graw Hill, 1990.
- Beckwith Thomas G., "Mechanical Measurements", Narosa Publishing House, NewDelhi.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: RENEWABLE ENERGY SOURCES
Course Code: - UME – 464

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

COURSE DESCRIPTION

UNIT-I

Scenario of Renewable Energy (RE) Sources: Needs of renewable energy, advantages and limitations of RE, present energy scenario of conventional and RE sources

Wind Energy: Energy available from wind, basics of lift and drag, basics of wind energy conversion system, effect of density, angle of attack and wind speed, windmill rotors, horizontal and vertical axes rotors, drag, lift, torque and power coefficients, tip speed ratio, solidity of turbine, wind turbine performance curves, wind energy potential and site selection, basics of wind farm

UNIT-II

Bio Energy : Types of biogas plants, biogas generation, factors affecting biogas generation, advantages and disadvantages, biomass energy, energy plantation, gasification, types and applications of gasifiers

Ocean Energy: OTEC principle, open, closed and hybrid cycle OTEC system, Energy from tides, estimation of tidal power, tidal power plants, single and double basin plants, site requirements, advantages and limitations,

UNIT-III

Solar Energy: Energy available from the sun, spectral distribution, solar radiation outside the earth‟s atmosphere and at the earth‟s surface, solar radiation geometry, Instruments for solar radiation measurements, empirical equations for prediction of availability of solar radiation, radiation on tilted surface solar energy conversion into heat, types of solar collectors, evacuated and non-evacuated solar air heater, concentrated collectors, thermal analysis of liquid flat plate collector, air heater and cylindrical parabolic collector, solar energy thermal storage, heating and cooling of buildings, solar pumping, solar cooker, solar still, solar drier, solar refrigeration and air conditioning, solar pond, heliostat, solar furnace photovoltaic system for power generation, solar cell modules and arrays, solar cell types, material, applications, advantages and disadvantages

UNIT-IV

Economic Analysis: Initial and annual cost, basic definitions, present worth calculations, repayment of loan in equal annual installments, annual savings, cumulative saving and life cycle cost, economic analysis of add on solar system, payback period, clean development mechanism.

Demonstration of following equipment should be given to the students.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

(a) Solar water heater (b) Solar air heater (c) Pyranometer (d) Pyrhelioemeter (e) Solar PV system (f) Wind mill (g) Biogas plant (h) Gasifier (i) Solar cooker

Reference Books:

- Solar Energy: Principles of Thermal Collection and Storage, S. P. Sukhatme and J. K. Nayak, McGraw-Hill Education
- Solar Engineering of Thermal Processes, John A. Duffie, William A. Beckman, John Wiley, New York
- Non-conventional energy resources, Shobh Nath Singh, Pearson India
- Solar Energy Engineering, Soteris Kalogirou, Elsevier/Academic Press.
- Principles of Solar Energy, Frank Krieth & John F Kreider, John Wiley, New York

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- AUTOMATION & ROBOTICS
Course Code: - UME – 466

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT-I

Introduction to Automation: Concept of Automation, reasons for Automating, Arguments for and against Automation, Automation Strategies, Economical Considerations, Low cost Automation, Advantages of Automation**.**

Unit-II

Transfer Device, Feeders & Material Handling: Detriot- Type Automation, Analysis of Automated flow lines, Automated assembly System &Automated Material Handling.

Automated Inspection & Testing: Automated Inspection, Principles and Methods, sensor technologies for automated inspection, co-ordinate measuring machines, other contact inspection methods, machine vision, optical inspection methods, Non-Contact Inspection Methods.

UNIT-III

Robotics*:* Basic Concepts

Definition and origin of robotics – different types of robotics – various generation of robots – degrees of freedom – Asimov‟s laws of robotics – dynamic stabilization of robots

Power Sources and Sensors

Hydraulic, pneumatic and electric drives – determination of HP of motor and gearing ratio – variable speed arrangements – path determination – micro machines in robotics – machine vision – ranging – laser – acoustic – magnetic, fiber optic and tactile sensors

UNIT-IV

Manipulators, Actuators and Grippers : Construction of manipulators – manipulator dynamics and force control – electronic and pneumatic manipulator control circuits – end effectors – Û various types of grippers – design
considerations.

Industrial Applications

Applications of Robots: Welding, parts handling / transfer, assembly operations, parts sorting, parts inspection, future applications

Reference Books:

- Automation Production System & Computer Integrated Manufacturing. Mikell P. Grover
- Robotics & Flexible Automation S.R. Deb
- Pneumatic Control and Hydraulic Control S.R. Majundar
- Ghosh, Control in Robotics and Automation: Sensor Based Integration, Allied Publishers, Chennai, 1998.

Course Name:- ENGINEERING IN INDUSTRY & ENTREPRENEURSHIP

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Code: - UME – 459

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT-I

Introduction and its Development:

Industrial Engineering: Concept; Functions; Fields of application; origin and development of factory system; Effects of Industrial Revolution; Principles of scientific management. Pioneers of Scientific Management- F.W.Taylor, Henry L.Gantt, Frank B. Gilberth, Henri Fayol etc. Administration and Organistion; Organisation Structure; Authority and Responsibility; Types of organization:-Line, **Wage Incentive Plans:** Concept; Characteristics of good wage incentive plan; Methods ofWage Payment; Classification of Wage Incentive Plans, Factors influencing wage rates**.**

Unit-II

Plant Location & Plant Layout: Factors effecting plant location, selection of plant site,quantitative techniques of plant location decision, plant layout, principles of layout design.

Product Development and Design: Product and its classification, Product design considerations, Product Simplification and Diversification; value engineering and its role in product design and cost rationalization. Ergonomics:Role of ergonomics in industry, effect of physical environment on performance.

Production, Planning and Control:

Concept; Objectives, Need and functions of P.P.C., Functions of planning routing, scheduling, dispatching and follow up and progress report. Production control charts. Route and process charts. Operation charts, machine load charts, Gantt charts, Progress charts; Bar chart.

Unit-III

Inspection and Quality Control: Defintion and functions of Inspection; Inspection methods; Definition, objectives and principles of Control. Introduction to statistical methods of quality control. Numericals Quality control; Statistical Quality Control (SQC) Economics of Quality Control. Introduction to statistical methods of quality control. Numericals.

Time and Method Study (Work Study): Their importance in scientific management. Definition and objectives ; various time estimates, level of performance; Allowances ; time recording techniques, Procedure of method study, Various charts and diagrams, Classification of motion, Therbligs, principles of motion economy.

Introduction to MRP,JIT and TQM: Definitions, objectives and benefits.

Unit-IV

Entrepreneurship Development:

Entrepreneurship, Role of entrepreneurship in Indian economy, Characteristics of entrepreneur, Types of entrepreneurs, some myths and realities about entrepreneurship. Role and scope of small scale industries, concept of small scale and ancillary industries undertaking, How to start a small scale industry, Steps in launching own venture. Infrastructure facilities available for

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

entrepreneurship development in India. Preparation of feasibility Project Report: Tools for evolution of techno economic feasibility project report, SWOT analysis.

Reference Books:

- Industrial Management: Spregiel. John Wiley & Sons. N.York, 1961.
- Industrial Organisation: Kimball and Kimball. Vakils Feffer & Simsons Pvt. Ltd. Bombay, 1971.
- Industrial Engineering & Operations Management by Dr. S K Sharma & Mrs Savita Sharma, S.K.Katarial & Sons, New Delhi

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:- EMERGING AUTOMOTIVE TECHNOLOGIES

Course Code: - UME – 458

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT-I

Fuel Cell Technology for Vehicles: What is fuel cell, Type of fuel cell, Advantage of fuel cell.Current state of the technology. Potential and challenges. Advantages and disadvantages of hydrogen fuel.

Unit-II

Latest Engine Technology Features: Advances in diesel engine technology, Direct fuelinjection Gasoline engine. Diesel particular emission control. Throttling by wire. Variable Valve Timing, Method used to effect variable Valve Timing. Electromagnetic Valves. Camless engine actuation.
42 Volt System: Need, benefits, potentials and challenges. Technology Implications for theAutomotive Industry. Technological evolution that will occur as a result of the adoption of 42 volt systems.

Unit-III

Electrical and Hybrid Vehicles: Types of hybrid systems, Objective and Advantages of hybrid systems. Current status, Future developments and prospects of Hybrid Vehicles.
Integrated Starter Alternator: Starts stop operation, Power Assist. Regenerative braking.Advanced lead acid batteries, Alkaline batteries, Lithium batteries, Development of new energy storage systems. Deep discharge and rapid charging ultra capacitors.

Unit-IV

X-By Wire Technology: What is X-By Wire, Advantage over hydraulic systems, Use of Automotive micro controllers, Types of censors. Use of actuators in an automobile environment.
Vehicle Systems: Constantly Variable Transmission, benefits, Brake by wire, Advantages overpower Braking systems. Electrical assist.Steering, Steering by wire, Advantages of steering by wire. Semi-active and fully active suspension system. Advantages of fully active suspension system

Reference Books:

- Advanced Vehicle technologies by Heinz Heisler – SAE International Publication.
- Electric and Hybrid Electric Vehicles by Ronald K.Jurgen – SAE International Publication.
- Batteries for Electric Vehicles by DAJ Rand, R.Woods and R.M.Dell – SAE International Publication.
- Electronics Braking, Traction and Stability Control – SAE Hardboud papers.
- Electronics steering and suspension systems – SAE Hardboud papers.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

- 42 Volt systems by Daniel J. Holt – SAE International Publication.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: -ENTREPRENEURSHIP DEVELOPMENT & ENTERPRISE MANAGEMENT
Course Code: - UMG – 450

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT-I

Developing Entrepreneurship: Element for a program,

Developing Entrepreneurship competencies: Need & process of development, social determinants of Entrepreneurship growth. Entrepreneurship development programs, Entrepreneurship orientation & awareness programme, New enterprise creation programme.

UNIT-II

Existing Entrepreneurship programmes for existing enterprising for survival & growth. Evolution of various EDP programme in India, Managing growth & transition, the organization life cycle, chasing Entrepreneurship roles.

UNIT-III

Entrepreneurship & new venture opportunities,Planning for new ventures.
Concept of planning paradigm – pre-startup, early growth & later growth stage.

UNIT-IV

Incentive & subsidies available for Entrepreneurship growth.Guidance for project report preparation, Location, Environmental and managerial problems of new enterprise management, Managing family business. Some case studies of family run business in India.

Reference Books:

- Entrepreneurship Development and Enterprise management by K.C.Arora.
- Entrepreneurship Development and Enterprise management by Armand V. Feigenbaum.
- Entrepreneurship Development and Enterprise management by Joseph.A.Patrick, Diana.S.Furr.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name:-Total Quality Management
Course Code: - UMG– 475

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

Unit-I
Introduction to TQM & ISO 9000, Total Quality Control, Customer Focus & Total waste Elimination (TWE), Quality Assurance.
Quality of Design & Development, Inspection & Measurement workforce Teams, Benchmarking, TQM for Sales Marketing Management.

Unit-II
Business Process Re-engineering & Information Technology, Quality control SQC/ SPC, Technology & Product Quality, Quality for After Sales Services Technology & Product Quality.

Unit-III
Organization for Quality, Reliability as quality characteristics, Quality leadership, Quality linked productivity, Total Quality, Culture, Quality and environment, Cost of Quality.

Unit-IV
Cost of Quality, Quality Control for Export Units, Quality Maturity and Discipline, Total commitment for Quality, TQM Implementation, ISOm 9000 series of standards, ISO 9000-1, ISO 9000-2, ISO 9000-3.

Reference Books:

- TQM & ISO 14000: K.C.Arora.
- Total Quality Control: Armand V. Feigenbaum.
- Total Quality Management: Joseph.A.Patrick, Diana.S.Furr.
- Total Quality Management – Text: Joel E. Ross Cases &Readin
- Total Quality Control Essentials: Sarv Singh Soin

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Course Name: HUMAN VALUES AND PROFESSIONAL ETHICS

Course Code: - UMG – 476

Assessment and Evaluation Components	
Quizzes /Assignments/ Presentation/Class Test/ Open Book Test/ Case Study	25
Mid Term Tests (MTE)	20
Attendance Marks	05
End Term Examination	50
Total	**100**

L T P Cr
3 1 0 3.5

UNIT – I

Introduction –Need, Basic Guidelines and Content:

Understanding the need , basic guidelines, content and process for value Education Self Exploration – What is it? – its content and process: „Natural Acceptance‟ and Experiential Validation – as the mechanism for self explanation Continuous Happiness and Prosperity – A look at basic Human Aspirations

UNIT – II

Process for Value Education:

Right Understanding, Relationship and Physical Facilities – basic requirements for fulfillment of aspirations of every human being with their correct priority Understanding Happiness and prosperity correctly – A critical appraisal of the current scenario Method to fulfill the above human aspirations; understanding and living in harmony at various levels

UNIT – III

Understanding Harmony in the Human Being:

Understanding human being as a co-existence of the sentient „I‟ and the material „Body‟ Understanding the needs of Self („I‟) and „Body‟ – Sukh and Suvidha Understanding the Body as an instrument of „I‟ (I being the doer, seer and enjoyer)

UNIT – IV

Harmony in Myself:

Understanding the characteristics and activities of „I‟ and harmony in "I‟ Understanding the harmony of I with the Body: Sanyam and Swasthya: correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya – practice exercises and Case Studies will be taken up in Practice Sessions relationship.

Reference Books:

- R R Gaur, R,Sangal, G.P Bagaria, 2009, A Foundation Course in value Education
- Pradeep Kumar Ramancharla, 2013, A foundation course in value education (Telugu)
- R R Gaur, R Sangal G P Bagaria, 2009, Teacher‟s Manual (English)
- Pradeep Kumar Ramancharla, 2013, Teacher‟s Manual (Telugu)

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

3. Appendix A

Calculation of CGPA

The CGPA (calculated on a 10 point scale) would be used to describe the overall performance of a student (from the semester of admission till the point of reckoning) in all courses for which LETTER GRADES will be awarded. GPA will indicate the performance of student for any particular semester. Formulas for calculation of GPA and CGPA have been provided as below:

$$CGPA = (\sum C_i G_i) / (\sum C_i)$$

Where C_i is the number of credits assigned to i^{th} course and Gi is the grade point equivalent to the letter grade obtained by the student in the i^{th} course. When a student repeats a course, the new grade will replace the earlier one in the calculation of the CGPA.

Table below shows the grade point for every valid grade that may be awarded to a student pursuing a particular course:

Letter Grade	Percentage Marks	Grade Point	Performance
A+	≥ 85%	10	Excellent
A	≥ 80% &< 85%	9	Very Good
B+	≥ 70% &< 80%	8	Good
B	≥ 55% &< 70%	7	Fair
C	≥ 45% &< 55%	6	Average
D	≥ 35% &< 45%	4	Marginal
E	< 35%	2	Exposed
F	Short Attendance	0	Poor

Sample Calculation of SGPA and CGPA: I Semester

Course No.	Course Credits	Grade Awarded	Earned Credits	Grade Points	Points Secured (Column 2x Column 5)
(1)	(2)	(3)	(4)	(5)	(6)
MAXXXN	5	A	5	9	45
CSXXXM	4	C	4	6	24
PHXXXP	4	A+	4	10	40
PHXXXP	1.5	B+	1.5	8	12
MEXXXN	4	E	0	2	8
AMXXXN	4	B	4	7	28

Credits registered in the Isemester (total of column 2)	=	22.5
Earned Credits in the Isemester (total of column 4)	=	18.5
Points secured in the I semester (total of column 6)	=	157.0
SGPA (I semester) = (157.0/22.5)	=	6.98
CGPA (At the end of I semester)	=	SGPA

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

II Semester

Course No.	Course Credits	Grade Awarded	Earned Credits	Grade Points	Points Secured (Column 2x Column 5)
(1)	(2)	(3)	(4)	(5)	(6)
MAXXXN	5	D	5	4	20
EEXXXN	5	F	0	0	00
CYXXXN	4	B	4	7	28
CYXXXP	1.5	B+	1.5	8	12
MEXXXN	4	A	4	9	36

Credits registered in the IIsemester (total of column 2) = 19.5
Earned Credits in the IIsemester (total of column 4) = 14.5
Points secured in the II semester (total of column 6) = 96.0
SGPA (II semester) = (96.0/19.5) = 4.92
CGPA (At the end of I Year) = (157.0+96.0)/22.5+19.5) = 6.02

CGPA Improvement

(i) A student gets a chance to improve her/his CGPA for courses in which she/he have obtained E or F grades in the summer term.

(ii) There will B.Tech two modes of improvement of CGPA in summer term i.e Study mode and the Exam mode. At most a student may register for six subjects out of which at max three courses may B.Tech taken in Study Mode.

(iii) In the study mode the student will have to attend the classes, take the Mid Semester and End Semester exams during the summer term as per the policies.

(iv) A student‟s registration in a course of her/his choice does not mean that the course will B.Tech offered, the right stands with the Academic Department to run/scrap the course on the basis of the numB.Techr of registrations. The policies in this context would B.Tech issued by the Academic Department.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Appendix-B

Evaluation Pattern for Academic Project/Seminar

1. Each project group will be having monthly evaluations coordinated by their guide. Evaluation will be carried out in the presence of Guide and at least two more evaluators to be appointed.
2. Students have to submit their project diary at the time of weekly evaluations. Project leader should record the proceedings and comments of the evaluations in the project diary and is expected to act on the suggestions prescribed.
3. Each project group will be having monthly presentation in the first week of every month. The schedule of monthly presentations will be published in the notice board by the respective HODs. Each project group is advised to be ready for the monthly presentations on the first working day of every month.
4. Slides and materials for monthly presentation should be submitted before the evaluation panel in a weekly evaluation before the presentation and modifications should be made in accordance to the comments received. The same should be approved by the guide.
5. Students have to face questions, related to the topic, after the presentation, or even in between, from the evaluators as well as from the students present.
6. No complaints and claims will be entertained under any circumstances, including those of comparisons with the seminar proceedings in other departments of the university.
7. No duty leave will be granted for any student for any matters related to their project presentations, However duty leave for project related activities should be requested, with the recommendation of respective guides followed through HODs, and obtained from the Dean of the respective schools prior to the execution of the activity. The same should be submitted to the faculty engaging the respective sessions before the commencement of sessions. Late submissions or requests in this regard will not be entertained. All statutory requirements regarding attendance should be met even though duty leaves are sanctioned.

GUIDELINES FOR PRESENTATION

1. The schedule for the presentation will be published and the students have to strictly adhere to the schedule published. Changes will be allowed only for **relevant** cases under the combined recommendations of the respective guides and the HOD. In that cases too, the group leader must exchange their slot with that of another group and must be affirmed by the concerned faculty in charge of the presentations.
2. Students of the same group shall be seated together for the presentations and should initiate logical and technical discussions based on the abstract provided and the presentation. Leaders of the group, or any other member entrusted, should note down the proceeding for the same.
3. The students, turning up for the presentation must have a presentation using Microsoft PowerPoint or a compatible software (***2003*** or ***2007 versions only***) detailing the aspects related to the topic. The Presentation slides must strictly adhere to the following requirements or as directed by the respective guides:

a. The slide design must be simple with white background, text color **Black** and ***Times New Roman*** font. The minimum font size shall be 24 and the same shall be approved by the guide.

b. The size of the text can vary depending upon the contents to be included in a single slide. But it should be readable when projected onto a white screen.

c. The contents of each slide should be given as points and must be properly aligned.

d. Computer systems for presentation and LCD projectors will be provided by the department.

e. The PowerPoint file must be saved as a **".ppt"** file or **".pps"** file or a compatible format readable using Microsoft Power Point on a CD or DVD. Use of removable drives, of any sort, will not be permitted.

f. The file should contain a ***minimum*** of **10 slides** including the opening slides (slides showing the project group number, topic of project, name of students, name of guide etc.) and the closing slides (conclusion, reference, *thank you, questions* etc.).

g. Medium of communication will only be English. Presentation should be audible.

h. The content and time of presentation should be evenly shared among the members of the group.

4. The project leader must also distribute copies of the abstract of the topic to all the staff members present at the venue and to leaders of other groups. However the maximum number of abstracts to be distributed is limited to 10.
5. The time allotted for the presentation for each group will be **15 *minutes*** in which *10 minutes* will be for presenting the contents in the slides, *5 minutes* for the question session and discussions. The time must be managed properly by the group.
6. It is the duty of the group leader to make sure that the respective guides and evaluators are present for their presentation. If in case their guides and/or evaluators cannot turn up for their, then it is the sole responsibility of the project leader to bring it to the notice of the HOD at the earliest.
7. The students are ***strictly directed*** to contact their respective guides for any clarifications and are also intimated to report the progress of their works frequently.
8. Reading out of study/prepared materials as such will not be entertained during the presentationof topics. However the students can make quick and short references if necessary.

REPORT: -

The students must submit ***sufficient* copies*** *of fair report, signed by their guides,* ***on the date notified by the coordinator.*** The fair reports should strictly adhere to the fonts and formats as prescribed by the HOD

ATTTENDANCE

1. **Attendance will be taken before/after each presentation.**
2. Any act of indiscipline will lead to the expulsion of the student from the sessions thereby leading to the cancellation of his/ her project for the semester.

DRESS CODE FOR THE STUDENTS

1. The students must be well dressed and *should be in proper dress code* while presenting the project.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

2. The students must have a clean appearance while presenting the project.
3. Students without proper dress code will not be allowed to present the topics or attend the presentations.

REPETITION OF PROJECT PRESENTATION

The students will have to repeat the presentation and/or project work under the following circumstances:

1. The facts and figures collected are not relevant or are insufficient to elaborate the topic.
2. The abstracts have not been submitted with the approval of the guide.
3. Improper presentation style and the use of references for explanations.
4. For any act of indiscipline which affects the conduct of seminar.
5. For any act or practices violating the guidelines of the seminar as felt by the faculty.

EVALUATION PATTERN

Marks for project will be awarded only on submission of the project report, satisfying the requirements, on time. Late submission will attract reduction in marks. Total marks for the subject will be distributed as follows.

1. Fifty Percent weightage to be given to the internal marks comprising of Weekly and monthly evaluation.
2. Fifty percent weightage to be given to Final Viva cum presentation with breakups as under.
    a. Presentation 15 marks
    b. Subject Knowledge 30 marks
    c. Time Management 05 marks

The panel of the Viva will consists of a minimum of 3 members and maximum 5 members including the Guide of the Students & Head of the Department. Other member(s) of the panel shall be nominated by the Head of the Department. The maximum duration for viva presentation per student should be kept as 20 minutes. Mark Distributions for Weekly & Monthly Evaluation will be as follows

1. **Monthly Evaluation : 50 Marks**

a. Slides :	5 Marks	f. Innovation/Quality :	5 Marks
b. Presentation :	5 Marks	g. Subject knowledge :	5 Marks
c. Project Diary :	10 Marks	h. Language skills :	5 Marks
d. Quantum of work done :	5 Marks	i. Time management :	5 Marks
e. Ability to answer questions : 5 Marks			

2. **Weekly Evaluation : 50 Marks**

a. Literature Review :	10 Marks	e. Project Diary :	5 Marks
b. Material Collection :	10 Marks	f. Work done :	10 Marks
c. Punctuality :	5 Marks	g. Presentation :	5 Marks
d. Interaction with Guide : 5 Marks			

** A copy for each member of the group, one for the department library and one for the guide.*

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Appendix-C

Continual Evaluation Guidelines for PDP Courses

For 1st and 2nd Semester PDP Courses

Evaluation Tools: The following are the evaluation tools that used for the assessment of the students;

Assignments which will be basis on understanding our world around and quantitative aptitude along with *Project* that would be based on Body language. *Quiz and Seminar* will be carried too. Quiz would include Verbal and Quantitative Aptitude and Seminar would be based on any topic done in the class. Frequency of Evaluation Tool: The frequencies at which Evaluation Tools will be assigned are as follows:

The number of *Assignments* will be 2 (1 Soft Skills + 1 Aptitude) and 1 *Project* will be assigned. During the semester the students will have go through 1 *Seminar* and 2 *Quizzes.*

Assessment of Marks

Each *Assignment, Project, Quiz and Seminar* will be of 10 marks. All the marks will be combined and zero down to 20%

3rd and 4th Semester

Evaluation Tools: The following are the evaluation tools that used for the assessment of the students; *Assignments* which will be basis on Resume Writing & on Cover Letter and quantitative aptitude along with *Project* that would be based on Leadership Skills. *Quiz and Seminar* will be carried too. Quiz would include Verbal and Quantitative Aptitude and Seminar would be based on any topic done in the class. Frequency of Evaluation Tool: The frequencies at which Evaluation Tools will be assigned are as follows: The number of *Assignments* will be 5 (1 Soft Skills + 4 Aptitude) and 1 *Project* will be assigned. During the semester the students will have go through 1 *Seminar* and 4 *Quizzes* (1 Soft Skills + 3 Aptitude)

Assessment of Marks

Each *Assignment, Project, Quiz and Seminar* will be of 10 marks. All the marks will be combined and zero down to 20%

5th and 6th Semester

Evaluation Tools: The following are the evaluation tools that used for the assessment of the students; *Assignments* which will be basis on Presentation Skills and Quantitative Aptitude and Data Interpretation along with *Project* that would be based on Entrepreneur Skills. *Quiz and*

Seminar will be carried too. Quiz would include Verbal and Quantitative Aptitude and Seminar would be based on any topic done in the class.

Frequency of Evaluation Tool: The frequencies at which Evaluation Tools will be assigned are as follows:

The number of *Assignments* will be 9 (1 Soft Skills + 8 Aptitude) and 1 *Project* will be assigned. During the semester the students will have go through 1 *Seminar* and 5 *Quizzes* (2 Soft Skills + 3 Aptitude).

Assessment of Marks

Each *Assignment, Project, Quiz and Seminar* will be of 10 marks. All the marks will be combined and zero down to 20%

7th and 8th Semester

Evaluation Tools: The following are the evaluation tools that used for the assessment of the students; *Assignments* which will be basis on Decision Making and Quantitative Aptitude, Data Interpretation, Non Verbal Reasoning and Logical Reasoning along with *Project* that would be based on Entrepreneur Skills. *Quiz and Seminar* will be carried too. Quiz would include Verbal and Quantitative Aptitude and Seminar would be based on any topic done in the class.

Frequency of Evaluation Tool: The frequencies at which Evaluation Tools will be assigned are as follows:

The number of *Assignments* will be 11 (1 Soft Skills + 10 Aptitude) and 1 *Project* will be assigned. During the semester the students will have go through 1 *Seminar* and 7 *Quizzes* (2 Soft Skills + 5 Aptitude).

Assessment of Marks

Each *Assignment, Project, Quiz and Seminar* will be of 10 marks. All the marks will be combined and zero down to 20%

Terminal Evaluation

2nd, 4th, 6th and 8th Semester

In each semester the student will go through the following for Assessment Plan as per University Guide lines:

Mid Semester Term (MST): The students will go through MSTs which will include Vocabulary and Quantitative Aptitude.

End Term: The student will go through End Term Assessment which would include PI, GK and Quantitative Aptitude.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Frequency of Assessments

MST will go through 2 MSTs, out which the best „1" will be considered and will further be zero down to 30%. Each MST will be of 50 marks.

End Term Assessment will be of 100 marks, and will be zero down to 50%.

Note for End Term Examination: Attempt five questions in all, selecting one question each from the sections A, B, C and D. Section E is compulsory.

Appendix-D

Evaluation Pattern for Industrial Training

1. Each Industrial Training will be having evaluation of Project Report along with a internal viva presentation after the completion of their Industrial Training.
2. Students have to submit their project Report at the time of after the completion of their Industrial Training.
3. Students have to face questions, related to the topic in their viva.
4. The schedule for the viva will be published and the students have to strictly adhere to the schedule published. *Changes will be allowed only for **relevant** cases under the combined recommendations of the respective guides and the HOD.*
5. **REPORT: -**
6. The students must submit ***sufficient* copies*** *of fair report, signed by their guides,* ***on the date notified by the HOD.*** The fair reports should strictly adhere to the fonts and formats as prescribed by the HOD

DRESS CODE FOR THE STUDENTS

4. The students must be well dressed and *should be in proper dress code* while presenting the viva.
5. The students must have a clean appearance while presenting the Viva.
6. Students without proper dress code will not be allowed to present the topics or attend the viva.

EVALUATION PATTERN

Industrial Training will be having evaluation of Project Report along with a internal viva presentation. Late submission of report will attract reduction in marks. Total marks for the subject will be distributed as follows.

Sixty Percent weightage to be given to the evaluation of Project Report

Forty percent weightage to be given to Final Viva.

The panel of the Viva will consists of a minimum of 3 members and maximum 5 members including the Guide of the Students & Head of the Department. Other member(s) of the panel shall be nominated by the Head of the Department. The maximum duration for viva presentation per student should be kept as 20 minutes.

** A copy for each member of the group, one for the department library and one for the guide.*