NEW HORIZON COLLEGE OF ENGINEERING

Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade, Accredited by NBA

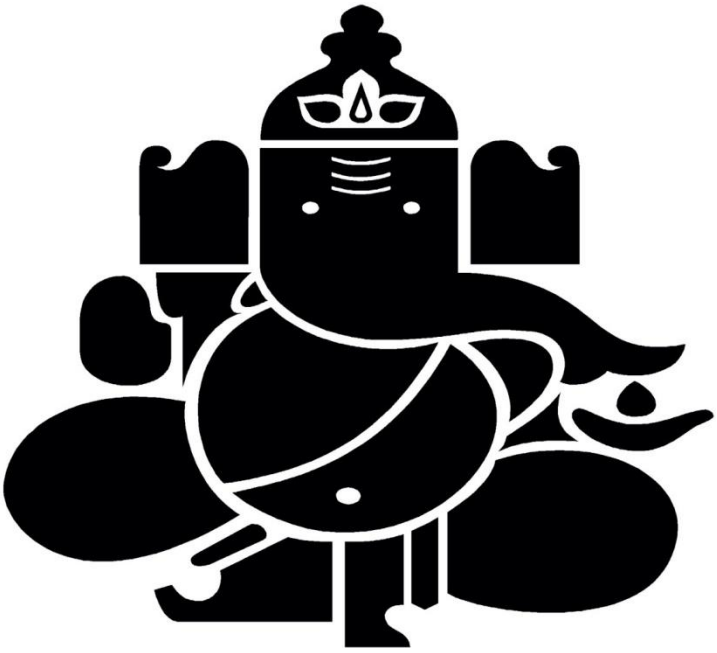
The Trust is a Recipient of Prestigious Rajyotsava State Award 2012 Conferred by the Government of Karnataka
Awarded Outstanding Technical Education Institute in Karnataka-2016
Ring Road, Bellandur Post, Near Marathalli, Bangalore -560 103, INDIA

Academic year 2018-19

Civil Engineering

Fifth and Sixth Semesters

Scheme and Syllabus



CONTENTS

VISION

To contribute to society by imparting quality education encompassing Technical, Managerial and Entrepreneurial skills

MISSION

1. To create an environment wherein Faculty and Students engage in cutting edge research.
2. To undertake Collaborative projects in order to develop a partnership between Institute and Industry
3. To motivate Entrepreneurship and to imbibe Professional Ethics
4. To promote participation in activities which help in holistic development of students

Program Education objectives (PEOs)

PEO1	Graduates will be able to conceptualize, analyze, design and propose feasible solutions to civil Engineering problems by applying basic principles of mathematics, science and engineering
PEO2	Graduates will be inculcated with necessary professional skills and ethics, effective communication skills and holistic personality traits in becoming efficient and effective engineers.
PEO3	Graduates will be able to work as a team in intra and interdisciplinary endeavors for the development of new ideas and products for the betterment of the society.
PEO4	Graduates will be able to face challenges of the world economic order by incorporating expertise involving modern tools and techniques in the field of infrastructural development
PEO5	Graduates will acquire a high level of competence to achieve excellence and outstanding leadership to succeed as engineering professionals, innovators and entrepreneurs.
PEO6	Graduates will also be able to pursue career paths in teaching or research.

PEO to Mission Statement Mapping

Mission Statements	**PEO1**	**PEO2**	**PEO3**	**PEO4**	**PEO5**	**PEO6**
To create an environment wherein Faculty and Students engage in cutting edge research.	3	3	3	2	2	1
To undertake Collaborative projects in order to develop a partnership between Institute and Industry	3	2	3	3	3	3

To motivate Entrepreneurship and to imbibe Professional Ethics	3	3	2	2	3	1
To promote participation in activities which help in holistic development of students.	1	1	2	3	3	3

Correlation: 3- High, 2-Medium, 1-Low

Program Outcomes (PO) with Graduate Attributes

	Graduate Attributes	Program Outcomes (POs)
1	Engineering Knowledge	**PO1:**Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	Problem analysis	**PO2:**Identity, formulate, research literature and analyze complex engineering problems reaching substantiated conclusion using first principles of mathematics and engineering sciences.
3	Design and Development of Solutions	**PO3:**The ability to make analysis and design study of the complexities of the various elements.
4	Investigation of Problem	**PO4:**Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
5	Modern Tool usage	**PO5:**Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	Engineer and society	**PO6:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7	Environment and sustainability	**PO7:**Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of need for sustainable development.
8	Ethics	**PO8:**Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual & team work	**PO9:**Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	Communication	**PO10:**Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	Lifelong learning	**PO11:**Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
12	Project management and finance	**PO12:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Mapping of POs TO PEOs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
PEO1	3	3	3	3	2	1	1	2	2	2	2	2
PEO2	2	2	2	2	3	3	1	3	2	2	2	2
PEO3	1	2	2	2	2	3	3	3	2	2	3	3
PEO4	3	3	2	3	2	2	2	2	1	1	2	3
PEO5	3	3	3	2	3	2	2	2	2	2	1	2
PEO6	3	3	3	2	2	3	3	3	2	2	2	2

Correlation: 3- High, 2-Medium, 1-Low

New Horizon College of Engineering
Department of Civil Engineering Scheme
of Third Semester B.E Program

	THIRD SEMESTER												
Sl No	**Course Code**	**Course**	**BOS**	**Credit Distribution**				**Overall Credits**	**Contact Hours Theory**	**Contact Hours Lab**	**Marks**		
				L	**P**	**T**	**S**				**CIE**	**SEE**	**Total**
1	MAT31	Engineering Mathematics-III	MAT	4	0	1	0	5	6	0	50	50	100
2	HSS321	Economics for Engineers	HSS	2	0	0	1	3	2	0	50	50	100
3	CIV33	Building Materials & Construction	ES	3	0	0	1	4	3	0	50	50	100
4	CIV34	Strength of Materials	CIV	3	2	0	0	5	3	4	75	75	150
5	CIV35	Plane Surveying	CIV	2	2	0	0	4	3	4	75	75	150
6	CIV36	Mechanics of Fluids	CIV	3	2	0	0	5	3	4	75	75	150
Total								**26**	**20**	**12**	**375**	**375**	**750**

New Horizon College of Engineering
Department of Civil Engineering
Scheme of Fourth Semester B.E Program

FOURTH SEMESTER													
Sl No	**Course Code**	**Course**	**BOS**	**Credit Distribution**				**Overall Credits**	**Contact Hours Theory**	**Contact Hours Lab**	**Marks**		
				L	**P**	**T**	**S**				**CIE**	**SEE**	**Total**
1	MAT41	Engineering Mathematics-IV	MAT	4	0	1	0	5	6	0	50	50	100
2	HSS422	Life Skills for Engineers	HSS	2	0	0	1	3	2	0	50	50	100
3	CIV43	Earth Science Engineering	CIV	3	0	0	0	3	3	0	50	50	100
4	CIV44	Analysis of Determinate Structures	CIV	3	0	0	0	3	3	0	50	50	100
5	CIV45	Higher Surveying	CIV	3	2	0	0	5	3	4	75	75	150
6	CIV46	Applied Hydraulics and Machinery	CIV	3	2	0	0	5	3	4	75	75	150
7	CIV47	Building Planning & Drawing	CIV	0	2	0	0	2	0	4	25	25	50
Total								**26**	20	16	375	375	750

THIRD SEMESTER
SYLLABUS

ENGINEERING MATHEMATICS – III

Course Code : MAT31 **Credits : 05**
L:P:T:S : 4:0:1:0 **CIE Marks : 50**
Exam Hours : 03 **SEE Marks : 50**

Course Outcomes: At the end of the Course, the Student will be able to do the following:

CO1	Solve the Fourier series expansion of a functions analytically and numerically
CO2	Solve the Continuous model problems using Fourier transforms
CO3	Solve the discrete model problems using Z-transforms and Fast Fourier transform
CO4	Fit a suitable curve by the method of least squares and determine the lines of regression for a set of statistical data
CO5	Use appropriate numerical methods to solve algebraic and transcendental equations and also Evaluate a definite integral numerically
CO6	Use appropriate numerical methods to solve Boundary Value Problems in Partial differential equations

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	-	-	-	1	1	-	2
CO2	3	3	3	2	2	-	-	-	1	1	-	2
CO3	3	3	3	2	2	-	-	-	1	1	-	2
CO4	3	3	3	2	2	-	-	-	1	1	-	2
CO5	3	3	3	2	2	-	-	-	1	1	-	2
CO6	3	3	3	2	2	-	-	-	1	1	-	2

Course Syllabus			
Module No.	**Contents of the Module**	**Hours**	**CO'S**
1	**Fourier series:** Periodic function, Dirichlet's conditions, Fourier series of periodic functions of period 2π and arbitrary period $2l$, half range series. Fourier series and half Range Fourier series of periodic square wave, half wave rectifier, full wave rectifier, Saw-tooth wave with graphical representation, practical harmonic analysis.	**9**	**CO1**
2	**Fourier Transforms:** Infinite Fourier transforms, Fourier Sine and Cosine transforms, Inverse Fourier transform. **Z - Transform**: Definition, Z-transforms of some standard functions, properties, damping rule, shifting rule(without proof), initial and final value theorems, inverse Z- transforms. **Applications:** Solving difference equations using Z-transform.	**9**	**CO1, CO2**

3	**Statistical Methods:** Fitting of the curves of the form $y = a + b\,x$, $y = a + b\,x + c\,x^2$, $y = ae^{bx}$, $y = a\,x^b$, and $y = ab^x$ by the method of least square**,** Correlation and Regression, Regression coefficients, line of regression – problems. **Discrete Fourier Transform and Fast Fourier Transform**: Definition of N-Point DFT, problems for 4-Points and inverse DFT for four points only. FFT algorithm to compute the Fourier transforms 4-Point only.	**9**	**CO3, CO4**
4	**Numerical Methods-1:** Numerical solution of algebraic and transcendental equations; Rugula- falsi method and Newton Raphson's method. Solution of a system of equations using Gauss-seidel and Relaxation method. Interpolation and extrapolation – Newton's forward and backward formulae for equal intervals, Newton divided difference and Lagrange's formulae for unequal intervals.	**9**	**CO5**
5	**Numerical Methods-2**: Numerical integration - Simpson's $1/3^{rd}$ rule, Simpson's $3/8^{th}$ rule,Weddle's rule (without proof)- Problems. Numerical solution of Boundary value problems-Solution of one dimensional wave equation and heat equation, Numerical solution of two dimensional Laplace's equation and Poisson's equation.	**9**	**CO5, CO6**

Text Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 10th edition,2014, Wiley-India publishers
2. Higher Engineering Mathematics, B.S.Grewal, 43rd edition, 2014, Khanna Publishers .

Reference Books:

1. Advanced Modern Engineering Mathematics, Glyn James, 4th edition, 2015, Pearson Education.
2. Advanced Engineering Mathematics, Dennis G. Zill, Michael R. Cullen, 4th edition, 2015, Jones and Barlett Publishers Inc.
3. Engineering Mathematics, B. V. Ramana, 4th edition, 2005, Tata McGraw Hill Publications.
4. Engineering Mathematics, Anthony Craft, 4th edition, 2013, Pearson Education

Assessment Pattern:

1. CIE- Continuous Internal Evaluation (50 Marks).

Bloom's Category	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	Curricular/Co-Curricular Activities (10 Marks)
Remember	5	5	--	--
Understand	5	5	--	--
Apply	5	--	5	10
Analyze	5	--	--	--
Evaluate	5	--	--	--
Create	--	--	--	--

2. SEE- Semester End Examination (50 Marks).

Bloom's Category	Questions (50 Marks)
Remember	10
Understand	10
Apply	20
Analyze	5
Evaluate	5
Create	--

ECONOMICS FOR ENGINEERS

Course Code : 17HSS321/421 **Credits: 03**

L:P:T:S : 2:0:0:1 **CIE : 50**

Exam Hours : 03 **SEE: 50**

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

CO1	Gain knowledge about importance of economics in decision making processes in day to day life.
CO2	Analyze business environment at micro and macroeconomic level and its impact o n industries in country's economy.
CO3	Acquire knowledge about costing and estimation of projects for profit making.
CO4	Apply principles of budgeting and finance for entrepreneurial success.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	-	1	-	1	2	2	-	2	2
CO2	2	2	1	-	1	-	1	2	2	-	2	2
CO3	2	2	1	-	1	-	1	2	2	-	2	2
CO4	2	2	1	-	1	-	1	2	2	-	2	2

Module	Contents of Module	Hours	COs
I	**Introduction to Economics**: Role of Engineer as an Economist, Types and problem of economies, Basics of economics (GDP, National income, inflation, business cycle, fiscal and monetary policies, balance of payment).	**4**	**1,3**
II	**Basic concepts of Microeconomics**: concept of Demand & Elasticity of Demand. Concept of Supply & Elasticity of Supply, Meaning of Production and factors of production, Production Possibility Curve, Law of variable proportions and returns to scale. Relevance of Depreciation towards	**5**	**2,3**

	industry, Depreciation computing methods.		
III	**Concepts of cost of production**: different types of cost; accounting cost, sunk cost, marginal cost and opportunity cost. Break even analysis, Make or Buy decision. Cost estimation, Elements of cost as Direct Material Costs, Direct Labor Costs, Fixed Over-Heads, Factory cost, Administrative Over-Heads.	**4**	**3,4**
IV	**Capital budgeting**: Traditional and modern methods,	**4**	**1,3,4**
	Payback period method, IRR, ARR, NPV, PI. . Interest and Interest factors: Interest rate, Simple interest, Compound interest, Cash - flow diagrams, Personal loansand EMI Payment. Present worth, Future worth.		
V	**Book Keeping and Accounts**: Journal, Ledger, Trial balance, asset Types, profit & loss account, balance sheet.	**5**	**1,2,3,4**

TEXT BOOKS:

1. Riggs J.L, Engineering Economy, TMH, 2012 edition
2. Jain T.R., Economics for Engineers, VK Publications
3. IM PANDEY,Finacial Management, Vikas Pub. House
4. D N Dwivedi, Mangerial Economics , Vikas Pub. House

REFERENCE BOOKS:

1. Thuesen H.G, Engineering Economy. PHI
2. Prasanna Chandra, Financial Mangement,TMH
3. Singh Seema, Economics for Engineers, IK International
4. Chopra P. N, Principle of Economics, Kalyani Publishers
5. Dewett K K, Modern Economic Theory, S. Chand
6. H. L. Ahuja, Modern Economic Theory, S. Chand
7. Mishra S. K, Modern Micro Economics, Pragathi Publications
8. Gupta Shasi K, Management Accounting, Kalyani Publications

Assessment pattern

CIE –Continuous Internal Evaluation (50 Marks, Theory)

Bloom's category	**Test**	**Assignments**	**SSR**
Marks (out of 50)	**20**	**15**	**15**
Remember	5		
Understand	5		
Apply	5		
Analyze	5	5	5
Evaluate		5	5
Create		5	5

SEE –Semester Ending Examination (50 Marks)

Bloom's category	**SEE Theory(50)**
Remember	20
Understand	10
Apply	10
Analyze	10
Evaluate	
Create	

BUILDING MATERIALS AND CONSTRUCTION

Course Code : CIV33	**Credits 04**
L: P: T: S : 3:0:0:1	**CIE Marks : 50**
Exam Hours : 3 Hours	**SEE Marks : 50**

Course Outcomes: At the end of the Course, the student will be able to:

CO1	Understanding of various elements of structure and their specifications.
CO2	In supervision of different types of masonry.
CO3	Able to decide different types of roofs, floors, doors and windows**.**
CO4	Study of different type of stairs and knowledge on scaffolding and shoring.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	POI0	POII	PO12
CO1	2	2	1	-	2	-	1	1	-	2	-	3
CO2	2	2	-	-	2	-	1	1	-	2	-	3
CO3	2	2	-	-	2	-	1	1	-	2	-	3
CO4	2	2	1	1	2	2	1	1	-	2	-	3

Module No	Content of Module	Hrs	COs
1	**A. INTRODUCTION TO BUILDING CONSTRUCTION** Definition, Types of Building as per National Building Code, Components of building, Requirement of parts of building, Types of loads. **B. FOUNDATION:** Foundation, Foundation Types (Shallow/Deep) And Their Suitability, Failure of Foundation and its causes, Site exploration, purpose of site exploration	09	CO 1
2	**A. STONES:** types of rocks, Requirements of good structural stone, Properties and uses of principal building stones **BRICKS:** Constituents of good brick earth, Manufacturing process of bricks, Testing of bricks **CONCRETE BLOCKS:** Introduction, types of blocks. **PAVERS:** Introduction, types and uses. **B. OTHER MATERIALS:** Timber: Properties and defects in timber, seasoning and advantages of seasoning. Properties, types and uses of following materials- Paints and Varnishes, Steel, Glass, fire resistant materials	09	CO1
3	**A. MASONRY:** Introduction, Various terms used, Classification of masonry. **STONE MASONRY**- Classifications of stone masonry: Rubble masonry, Ashlars masonry, Dressing of stones. **B. BRICK MASONRY**-Types of bricks, Bonds in brick work, Laying brick work, Introduction to load bearing , cavity and partition walls, Reinforced brick work	09	CO1 & CO2
4	**A. ROOFS AND FLOORS:** Types of roofs, Various terms used, Types of pitched roofs -King post truss, Queen post truss, Roofing Materials, Various types of floorings: timber flooring, cement concrete flooring, mosaic flooring, ceramic flooring, tile flooring RCC flooring, Industrial flooring. **B. DOORS AND WINDOWS:** Technical terms used, Locations of doors and windows. Types of Doors: glazed or sash doors, flush doors, louvered doors, collapsible doors, revolving doors, rolling steel doors, sliding doors, and swing doors. Types of Windows: Casement Window, Double Hung Window, Pivoted Window, Sliding Windows,	09	CO3

	Louvered Window, Metal Window, Sash Or Glazed Window, Bay Window, Corner Window, Dormer Window, Gable Window, Skylight Window, Circular Window, Fixtures And Fasteners For Doors And Windows.		
5	**A. STAIRS:** Definition of technical terms, Requirements of good stair, Types of Stairs, Geometrical design of RCC Dog legged (Plan and sectional elevation). **ARCHES, LINTEL AND BALCONY**: "Elements of an arch, Classification of arches, Definition and classification of Lintels, Definition and functions of Chejja, Canopy & Balcony **B. MISCELLANEOUS** :Form work, scaffolding, shoring and underpinning, thermal insulation, Sound proof, water proofing and termite treatment techniques.	09	CO4

Text Books:

1. Building Construction by Sushil Kumar, Standard Publishers, New Delhi.20th Edition 2010((ISBN13 -
9788180141683)

2. Engineering Materials by S.*R. Rangwala,* Charotar Publications, Anand.2012 (ISBN10 - 9380358792)

3. Building Construction by B.C. Punmia, Laxmi Publications Pvt. Ltd, New Delhi. 10th Edition 2008 (ISBN10-8131804283)

Reference Books:

1. Building Construction by S. P. Bindra and S. P. Arora, Dhanpat Rai and Sons, New Delhi Edition 2010(ISBN 10 – 8189928805)

2. Civil Engineering Materials by Neil Jackson & Ravindra K. Dhir Palgrave Macmillan, Bangalore (**ISBN- 13:** 9780333636831)

3. Building Materials by S. K. Duggal by New Age International Publishers, New Delhi 4th Edition 2010(**ISBN-13:** 9788122433791)

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	**Tests**	**Assignments**	**Quizzes**	**Self Study**
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember	10		5	5
Understand	10	5		5
Apply	5	5		
Analyze				
Evaluate				
Create				

SEE – Semester End Examination (50 Marks)

Bloom's Category	**Tests**
Remember	15
Understand	15
Apply	20
Analyze	
Evaluate	
Create	

Percentage Evaluation of Various Bloom's levels

Bloom's Category	**CIE**	**SEE**	**TOTAL**	%
Remember	20	15	35	35
Understand	20	20	40	40
Apply	10	15	25	25
Analyze	-	-	-	-
Evaluate	-	-	-	-
Create	-	-	-	-
TOTAL	**50**	**50**	**100**	**100**

STRENGTH OF MATERIALS

Course Code : CIV34 **Credits 5**
L: P: T: S :3:2:0:0 **CIE Marks : 50 +25**
Exam Hours : 03 **SEE Marks : 50 +25**

Course Outcomes: At the end of the Course, the student will be able to:

CO1	Evaluate the strength of various structural elements for internal forces
CO2	Understand the basic concept of analysis and design of various types of structural
CO3	members.
CO4	Understand basic concept of analysis and design of members subjected to torsion & cylinders
CO5	Evaluate the behavior and strength of structural elements under the action of compound stresses

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	POI0	POII	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	1
CO2	3	3	2	-	-	-	-	-	-	-	-	1
CO3	3	3	2	-	-	-	-	-	-	-	-	1
CO4	3	3	2	-	-	-	-	-	-	-	-	1

Module No	Content of Module	Hrs	COs
1	**A. SIMPLE STRESS AND STRAIN** Introduction, Properties of Materials, Stress, Strain, Hook's law, Poisson's Ratio, Stress – Strain Diagram for structural steel and non ferrous materials, Principles of superposition, Total elongation of tapering bars of circular and rectangular cross sections. Elongation due to self – weight. **B. ELASTIC CONSTANTS AND THERMAL STRESSES** Composite section, Volumetric strain, expression for volumetric strain, Elastic constants, relationship among elastic constants, Thermal stresses (including thermal stresses in compound bars).	09	CO1
	List of Experiments	08	
	1. Tension Test on Mild steel /HYSD Bars 2. Compression test of Mild steel, Cast iron and Wood 3. Impact Test on Mild Steel (Charpy & Izod)		

2	**BENDING MOMENT AND SHEAR FORCE** Introduction, Types of beams loadings and supports, Shearing force in beam, Bending moment, Sign convention, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, SFD and BMD with salient values for, simply supported beams and considering point loads, UDL, UVL and Couple. SFD and BMD with salient values for cantilever beams, and overhanging beams considering point loads, UDL, UVL and Couple	09	CO2, CO4
	List of Experiments 1. Shear test on Mild Steel/HYSD Bars 2. Hardness tests on ferrous and non-ferrous metals- Brinell's Rockwell's	08	
3	**A. BENDING STRESS IN BEAMS** Introduction – Bending stress in beam, Assumptions in simple bending theory, Pure bending derivation of Bernoulli's equation, Modulus of rupture, section modulus, Flexural rigidity. **B. SHEAR STRESS IN BEAMS** Expression for horizontal shear stress in beam Shear stress diagram for rectangular, symmetrical 'I' and 'T' section (Flitched beams not included).	09	CO3
	List of Experiments 1. Bending test on Wood and/ Steel under single point loading 2. Test on Bricks/Blocks and Tiles	08	

4	**A. TORSION OF CIRCULAR SHAFTS** Introduction – Pure torsion-torsion equation of circular shafts, Strength and stiffness, Torsional rigidity and polar modulus, Power transmitted by shaft of solid and hollow circular sections. B. **THIN AND THICK CYLINDERS**: Stresses in thin cylinder subjected to pressure, hoop, longitudinal and volumetric strains, Thick cylinders-Lame's equations, radial and hoop stresses (excluding compound cylinders)	09	CO2, CO4
	List of Experiments 1. Torsion Test on Mild steel Circular sections 2. Demonstration of strain gauges and strain indicators	08	
5	**A. COLUMNS AND STRUTS** Introduction – Short and long columns, Euler's theory on columns, Effective length slenderness ration, radius of gyration, buckling load, Assumptions, derivations of Euler's Buckling load for different end conditions, Limitations of Euler's theory, Rankine's formula and problems. **B. COMPOUND STRESSES (SIMPLE PROBLEMS)** Introduction, Stress components on inclined planes, General two dimensional stress system, Principal planes and stresses.	09	CO2, CO3

TEXT BOOKS:

1. B.S. Basavarajaiah, P Mahadevappa "Strength of Materials" in SI Units, University Press (India) Pvt. Ltd., (ISBN 978-1439854198)3rd Edition (2010)
2. Punmia .B.C, Ashok Jain, Arun Jain, "Mechanics of Materials", Lakshmi Publications, New Delhi , (ISBN: 9788131806463) Edition: Revised, 2016
3. Bansal, R.K., "Strength of Materials", Laxmi Publications, (ISBN: 9788131808146), 6th Edition, 2015.

REFERENCE BOOKS:

1. Timoshenko and Young, "Elements of Strength of Materials", Affiliated East-West Press, 5th Edition, 2010
2. Chakarborty, "Strength of Materials", S K Kataria and Sons, (ISBN:978-93-5014-375-9), 2nd Edition, 2001.
3. Bhavikatti S.S., "Strength of Materials", Vikas Publishing House Pvt. Ltd., New Delhi, (ISBN: 9789325971578), 4th Edition,2013.
4. Ramamrutham. S., "Strength of Materials", New Delhi Dhanpat Rai and Sons, (ISBN: 978-93- 84378-26-4), 2015
5. Sadhu Singh, "Strengths of Materials", Khanna Publishers, New Delhi, (ISBN : 978-81-7409-048-7) , 11th Edition, 2014
6. Rajput R.K., "Strengths of Materials", S. Chand Publishers, (ISBN: 9789385401367), 6th Edition, 2015.

CIE- Continuous Internal Evaluation (50 Marks +25 Marks)

Bloom's Category	Tests	Assignments	Quizzes	**Curricular/Co-Curricular Activities**	Practical
Marks (out of 50)	**25**	**10**	**5**	**10**	**25**
Remember	2	1		5	5
Understand	8	2	3	5	10
Apply	10	5	2		5
Analyze	5	2			5
Evaluate					
Create					

SEE – Semester End Examination (50 Marks +25 Marks)

Bloom's Category	Tests(Theory)	Test (Practical)
Remember	5	5
Understand	15	10
Apply	15	5
Analyze	15	5
Evaluate		
Create		

Percentage Evaluation of Various Bloom's levels (50+25)

	Theory		Practical			
Bloom's Category	**CIE**	**SEE**	**CIE**	**SEE**	**Total**	**%**
Remember	8	5	5	5	23	15
Understand	18	15	10	10	53	35
Apply	17	15	5	5	42	28
Analyze	7	15	5	5	32	22
Evaluate						
Create						
Total	**50**	**50**	**25**	**25**	**150**	**100**

PLANE SURVEYING

Course Code : CIV35 | **Credits : 04**

L:P:T:S:2:2:0:0 | **CIE Marks : 50+25**

Exam Hours. : 03+03 | **SEE Marks : 50+25**

Course Outcomes: At the end of the Course, the student will be able to:

CO1	Understand the basic principles, type of surveying and applications of surveying instruments.
CO2	Understand the necessity for data collection of Civil Engineering projects
CO3	Acquaint with methodology and various surveying instruments to execute the various surveying projects as required by the construction industries.
CO4	Acquaint with the horizontal and vertical components of measurements as required by the present day construction industry.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	POI0	POII	PO12
CO1	3	2	-	-	-	-	-	2	2	2	3	-
CO2	3	2	3	-	-	2	-	2	2	2	3	-
CO3	3	2	-	-	2	2	-	2	2	2	3	-
CO4	3	2	3	2	2	2	1	2	2	2	3	-

Module No	Content of Module	Hrs	COs
1	**INTRODUCTION** **A.** Definition of Surveying, Classification of Surveys, Uses of Surveying modes of Measurements, Map & Classification, Survey of India topographical Maps and their numbering., Basic principles of surveying, Chain and types, Tape and types, **B.** EDM devices, Ranging of lines Direct and Indirect, Measurement of distances over sloping grounds, Chain and Tape corrections - Numerical problems, precision and accuracy.	09	CO1
	LIST OF EXPERIMENTS 1. Set out perpendiculars at various points on given line using cross staff, optical square and tape. Setting out of rectangle, hexagon using tape/chain and other accessories.	08	
2	**COMPASS SURVEYING** **A.** Meridians and bearings, Principle working and use of – Prismatic compass, Surveyor's compass, Magnetic bearing, true bearings, WCB and Reduced bearing. Traverse - closed and open traverse, Computation of bearings of legs of closed traverse given the bearing of one of the legs, Computation of included angles given the bearings of legs of a closed traverse. **B.** Dip and Declination Local attraction, determination and corrections, Dependent and independent co-ordinates, Omitted measurements	09	CO1,CO2

	(Only Length and corresponding bearing of one line).		
	LIST OF EXPERIMENTS 1. To set out rectangles, pentagon, 2. To set out hexagon, using tape /chain and compass.	08	
3	**INTRODUCTION TO LEVELLING** **A.** Principles and basic definitions, Fundamental axes and part of a dumpy level, Types of adjustments and objectives, Temporary adjustments of a dumpy level, Curvature and refraction correction, **B.**Type of leveling, Simple leveling, Reciprocal leveling, Profile leveling, Cross sectioning, Fly leveling, Booking of levels Rise and fall method and Height of instrument method comparison Arithmetic checks Fly back leveling., Errors and precautions.	09	CO1, CO2, CO3
	LIST OF EXPERIMENTS 1. To determine difference in elevation between two points using fly leveling technique & to conduct fly back leveling. Booking of levels using both HI and Rise & Fall methods. 2. To determine difference in elevation between two points using reciprocal leveling and to determine the collimation error.	08	
4	**CONTOURING & PLANE TABLE SURVEYING** **A.** Contours and their characteristics, Methods of contouring, direct and indirect methods, Interpolation techniques, Uses of contours Numerical problems on determining indivisibility, Grade contours and uses. **B.** Plane table and accessories, Advantages and limitations of plane table survey, Orientation and methods of orientation, Methods of plotting – Radiation, Intersection, Traversing, Resection method, Two point and three point problems, Solution to two point problem by graphical method, Solution to three point problem Bessel's graphical	09	CO1,CO4

	method, Errors in plane table survey.		
	LIST OF EXPERIMENTS 1. To conduct profile leveling for water supply /sewage line and to draw the longitudinal section to determine the depth of cut and depth of filling for a given formation level	04	
5	**AREAS AND VOLUMES** Calculation of area from cross staff surveying, Calculation of area of a closed traverse by coordinates method. Planimeter – principle of working and use of planimeter to measure areas, digital planimter, Computations of areas and volumes by trapezoidal and prismoidal rule, Capacity contours	09	CO1,CO2
	LIST OF EXPERIMENTS 1. To determine the distance between two inaccessible points using chain/tape & compass. 2. To locate points using radiation and intersection method of plane tabling. 3. To solve 3-point problem in plane tabling using Bessel's graphical solution.	08	

TEXT BOOKS:

1. '**Surveying'** Vol 1 - B.C. Punmia , Er. Ashok Kr. Jain, Dr.Arun Kumar Jain, Laxmi Publications, New Delhi. Edition: 16th (2016), ISBN: 8170088836
2. **'Surveying' Volume 1** S. K. Duggal, Tata McGraw-Hill Education India,4th Edition (2013),ISBN 9781259028991
3. **'Plane Surveying'** A. M. Chandra – New age international (P) Ltd,3rd Edition (Reprint 2015), ISBN 978-81-224-3880-2
4. **'Higher Surveying'** A.M. Chandra New age international (P) Ltd, 3rd Edition (2015), ISBN 978-81-224-3812-3

REFERENCE BOOKS:

1. **Fundamentals of Surveying -** Milton O. Schimidt – Wong, Thomson Learning.
2. **Fundamentals of Surveying -** S.K. Roy – Prentice Hall of India, 2nd Edition, ISBN 978-81-203-4198**.**
3. **Surveying**, Arther Bannister et al., Pearson Education, India, 7th Edition (2006), ISBN 9788131700662

CIE- Continuous Internal Evaluation (50 + 25 Marks)

Bloom's Category	Tests	Assignments	Quizzes	**Curricular/Co -Curricular Activities**	Practical's
Marks (out of 50) +25 for Lab)	**25**	**10**	**5**	**10**	**25**
Remember	5		5	5	5
Understand	10	5		5	5
Apply	10	5			15
Analyze					
Evaluate					
Create					

SEE: Semester End Examination (50 + 25 Marks)		
Bloom's Category (Theory)	**Tests**	**Tests (Practical)**
Remember	10	5
Understand	10	5
Apply	30	15
Analyze		
Evaluate		
Create		

Percentage Evaluation of Various Bloom's levels (50 +25)

	Theory		Practical			
Bloom's Category	**CIE**	**SEE**	**CIE**	**SEE**	**TOTAL**	**%**
Remember	15	10	5	5	35	23
Understand	20	10	5	5	40	27
Apply	15	30	15	15	75	50
Analyze						
Evaluate						
Create						
TOTAL	**50**	**50**	**25**	**25**	**150**	**100**

MECHANICS OF FLUIDS

Course Code : CIV36 **Credits : 5**

L: P: T: S : 3:2:0:0 **CIE Mark: 50+25**

Exam Hours : 03+03 **SEE Mark: 50+2**

Course Outcomes: At the end of the Course, the student will be able to:

CO1	Understand the properties of fluids and fluid statics.
CO2	Solve kinematic and dynamics of fluid flow problems
CO3	Analyze laminar and turbulent fluid flows
CO4	Understanding of the basic concepts of fluid measurement and dimensional analysis

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	POI0	POII	PO12
CO1	**3**	**3**	**3**	**-**	**2**	**2**	**2**	**2**	**-**	**-**	**-**	**1**
CO2	**3**	**3**	**3**	**-**	**2**	**2**	**-**	**-**	**-**	**-**	**1**	**1**
CO3	**3**	**3**	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**-**	**1**	**1**
CO4	**3**	**3**	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**1**	**1**	**1**

Module No	Content of Module	Hrs	Cos
1	**A. Introduction:** Definition of fluid, , Fluid Properties: mass density, Specific Volume, Specific Weight, Specific Gravity- Definitions, Units and Dimensions, Viscosity, Newton's Law of Viscosity, compressibility and bulk modulus, Newtonian & Non-Newtonian Fluids, Ideal & Real Fluids, Surface Tension, Capillarity rise in a vertical tube and between	09	C01

	surface, Problems on Fluid Properties. **B. Hydrostatics :** Definition of Total Pressure, centre of pressure, Total pressure &centre of pressure on Vertical and Inclined plane surfaces, Buoyancy and flotation, stability of floating and submerged bodies, Meta centric height and its determination.		
	List of Experiments 1. To determine the coefficient of discharge of collecting tank. 2. To determine the coefficients of orifices	08	
2	**A. Kinematics of Fluid Flow:** Description of Fluid Flow, Classification of fluid flow, Stream line, Streak Line, Path Line, Stream tube, Acceleration of Flow in one dimensional flow, types of accelerations, Continuity Equation in differential form, definition of velocity potential, stream potential, equipotential line, Line of constant stream line, Problems. **B. Dynamics of Fluid Flow:** Concept of Inertia force and other forces causing Motion, Derivation of Euler's & Bernoulli's Equation (Both for Ideal Fluids).	09	C02
	List of Experiments 1. Verification of Bernoulli's theorem 2. Lab Experiment assignment I	08	
3	**A. Measurement of depth**- Point and hook gauge, Staff gauge, weight gauge, floating gauge. Flow Measurement:- Measurement of velocity- Pitot tubes, current meter. **B. Fluid Pressure & Its Measurement:** Definition of Pressure, Units & Dimensions, Pressure at a point in a static fluid, Hydrostatic pressure law, Absolute, Gauge & Vacuum Pressure, Measurement of Pressure- Simple & Differential Manometers- Theory & Problems.	09	C04, C01
	List of Experiments 1. To find the coefficient of discharge over rectangular and trapezoidal notch 2. To find the coefficient of discharge in venture flume 3. To find the coefficient of discharge over broad crested and ogee weir	08	
4	**A. Laminar and turbulent flow** - Reynold's number - shear stress and pressure gradient - Laminar flow between parallel plates - Couette flow - Hagen Poiseuille equation for flow through circular pipes. Turbulence -	09	C03

	semi empirical theories . **B. Major losses** - Darcy-Weisbach equation for flow through circular pipe - Friction factor - Smooth and rough pipes, Minor losses - pipes in series and parallel - Equivalent length - Introduction to water hammer phenomena.		
	List of Experiments 1. To determine the coefficient of friction of pipes of different diameters. 2. To determine the coefficient of discharge of venturimeter	08	
5	**A. Dimensional Analysis:** Introduction, Dimension, Dimensional Homogeneity, Methods- Rayleigh & Buckingham Pi Method, Dimensionless numbers-Reynold's number, Froude number, Euler number, Weber number, mach number, Problems. **B. Measurement of discharge**-venturimeter and orifice meters, venturiflume, orifices, notches (Rectangular and V-notches) and weirs (Sharp crested Weirs)	09	C04
	List of Experiments 1. To study the flow over V notch and to find the coefficient of discharge. 2. To determine the coefficients of mouth piece 3. Lab Experiment assignment II	08	

Text Books

1. P.N.Modi & S.M.Seth , "Hydraulics & Fluid Mechanics", Standard Book House, New Delhi, (ISBN: 8190089374),15th edition.

2. R.K.Bansal, "A text book of Fluid Mechanics", Laxmi Publications, New Delhi,(ISBN-13: 978-8131808153), 9th edition.

3. K.L.Kumar, S, "Fluid Mechanics". Chand & Company Ltd, New Delhi,ISBN: 8121901006, 9788121901000),8th edition.

Reference Books

1. Fluid Mechanics- Victor L Streeter & E. Benjamin Wylie, Mc-Graw Hill publications.
2. Fluid Mechanics- Frank M White, Sixth Edition, the Mc-Graw Hill Companies.
3. Fundamentals of Fluid Mechanics- Bruce R Munson & Donald F Young, John Wiley & Sons, Inc.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes	**Curricular/Co-Curricular Activities**	Practical
Marks (out of 50 for Theory +25 for Lab)	**25**	**10**	**5**	10	**25**
Remember	10	02	2	5	5
Understand	10	2	3	5	10
Apply	5	6			10
Analyze	-	-	-		-
Evaluate	-	-	-		-
Create	-	-	-		-

SEE: Semester End Examination (50 Marks)

Bloom's Category	**Tests (Theory)**	**Test (Practical)**
Remember	10	5
Understand	20	10
Apply	20	10
Analyze		
Evaluate		
Create		

Evaluation of various Blooms levels (50+25)

	Theory		Practical			
Blooms category	**CIE**	**SEE**	**CIE**	**SEE**	**TOTAL**	**%**
Remember	19	15	5	5	44	29
Understand	20	20	10	10	60	40
Apply	11	15	10	10	46	31
Analyze						
Evaluate						
Create						
Total	**50**	**50**	**25**	**25**	**150**	**100**

BASIC ENGINEERING MATHEMATICS-I

Course Code : DMAT31 **Credits : 00**
L:P:T:S : 0:0:0:0 **CIE Marks : 25**
Exam Hours : 02 **SEE Marks : 25**

Course Outcomes: At the end of the Course, the Student will be able to do the following:

CO1	Learn the principles of engineering mathematics through calculus
CO2	Determine the power series expansion of a function
CO3	Find the definite integrals with standard limits
CO4	Develop the ability to construct mathematical models involving differential equations
CO5	Apply ideas from linear algebra in solving systems of linear equations
CO6	Determine Eigen values and Eigen vectors of a matrix

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	3	2	2	-	-	-	1	1	-	1
CO2	3	2	3	2	2	-	-	-	1	1	-	1
CO3	3	2	3	2	2	-	-	-	1	1	-	1
CO4	3	2	3	2	2	-	-	-	1	1	-	1
CO5	3	2	3	2	2	-	-	-	1	1	-	1
CO6	3	2	3	2	2	-	-	-	1	1	-	1

Course Syllabus			
Module No.	**Contents of the Module**	**Hours**	**CO'S**
1	**Differential Calculus:** Polar curves-Problems on angle between the radius vector and tangent, Angle between two curves-Problems, Pedal equation for polar curves-Problems. Taylor's and Macluren's theorems f function of one variable (statement only)-Problems.	**5**	**CO1, CO2**
2	**Partial differentiation:** Definition and Simple problems, Euler's theore for Homogeneous function (NO Derivation & NO extended theorem)-Problems, Partial differentiation of composite functions (chain rule)-Problems, Jacobians - definition and problems.	**5**	**CO1, CO2**
3	**Integral Calculus:** Problems on reduction formulae for functions $\sin^n x$, $\cos^n x$, $\sin^n x \cos^n x$, Problems on evaluation of these integrals with standard limits (0 to $\pi/2$). **Differential Equations:** Solution of first order and first degree differential equations-Variable separable, Linear Bernoulli's and Exact differential equations.	**5**	**CO3, CO4**
4	**Linear Algebra-1:** Problems on rank of a matrix by elementary transformations, consistency of a system of linear equations and solution (homogeneous and non-homogeneous)-Problems. Solution of system of linear equations by Gauss elimination method-Problems.	**5**	**CO5**
5	**Linear Algebra-2:** Linear transformation, Eigen values and Eigen vectors, diagonalisation of a square matrix, Quadratic forms, Reduction to canonical form by orthogonal transformation-Problems.	**5**	**CO6**

Text Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 10^{tH} edition,2014, Wiley-India Publishers.

2. Higher Engineering Mathematics, B.S.Grewal, 43nd edition, 2014, Khanna Publishers .

Reference Books:

1. Modern Engineering Mathematics, Glyn James, 4th edition, 2015, Pearson Education.
2. Advanced Engineering Mathematics, Dennis G. Zill, Michael R. Cullen, 4th edition, 2015, Jones and
   Barlett Publishers Inc.
3. Engineering Mathematics, B. V. Ramana, 4th edition, 2005, Tata McGraw Hill Publications.

Assessment Pattern:

1. CIE- Continuous Internal Evaluation (25 Marks).

Bloom's Category	Tests (20 Marks)	Assignments (5 Marks)
Remember	5	--
Understand	5	5
Apply	5	--
Analyze	2.5	--
Evaluate	2.5	--
Create	--	--

2. SEE- Semester End Examination (50 Marks)

Bloom's Category	Questions (50 Marks)
Remember	10
Understand	20
Apply	10
Analyze	5
Evaluate	5
Create	--

FOURTH SEMESTER
SYLLABUS

ENGINEERING MATHEMATICS – IV

Course Code : MAT41 **Credits : 05**
L:P:T:S : 4:0:1:0 **CIE Marks : 50**
Exam Hours : 03 **SEE Marks : 50**

Course Outcomes: At the end of the Course, the Student will be able to do the following:

CO1	Solve initial value problems using appropriate numerical methods
CO2	Understand the concepts of Complex variables and transformation for solving Engineering Problems
CO3	Understand the concepts of complex integration, Poles and Residuals in the stability analysis of engineering problems
CO4	Gain ability to use probability distributions to analyze and solve real time problems
CO5	Apply the stochastic process and Markov Chain in prediction of future events
CO6	Analyze, interpret and evaluate scientific hypothesis and theories using rigorous probability and statistical methods.

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	3	2	2	-	-	-	1	1	-	1
CO2	3	2	3	2	2	-	-	-	1	1	-	1
CO3	3	2	3	2	2	-	-	-	1	1	-	1
CO4	3	2	3	2	2	-	-	-	1	1	-	1
CO5	3	2	3	2	2	-	-	-	1	1	-	1
CO6	3	2	3	2	2	-	-	-	1	1	-	1

Course Syllabus			
Module No.	**Contents of the Module**	**Hours**	**CO'S**
1.	**Numerical Methods:** Numerical solution of ordinary differential equations of first order and of first degree: single step methods- Picard's Method, Taylor's series method, modified Euler's method and Runge - Kutta method of fourth-order. Multi step methods- Milne's and Adams-Bashforth predictor and corrector methods. Numerical solution of simultaneous first order differential equations ; Picard's Method and Runge - Kutta Method of fourth-order(no derivation of formulae)	**9**	**CO1**
2.	**Complex Variables**: Functions of Complex Variables, Analytical functions, Cauchy's Riemann Equations in Cartesian and Polar forms, Harmonic functions and Construction of analytic functions. Discussion of Transformations: $w = z^2$, $w = e^z$ and $w = z + (1/z)$ and Bilinear Transformations.	**9**	**CO2**

3.	**Complex Integrations:** Complex line integrals–Cauchy's theorem and Cauchy's Integral formula. Power Series, Laurent's series. Singularities, Poles and Residuals, Residual Theorem-Problems (without proof).	**9**	**CO3**
4.	**Probability distributions:** Random variables (discrete and continuous), probability density function, cumulative density function. Discrete Probability distributions: Binomial and Poisson distributions. Continuous Probability distributions: Exponential and Normal distributions. **Joint Probability distributions:** Mathematical expectation, correlation, covariance (discrete random variables only).	**9**	**CO4**
5.	**Sampling Theory:** Sampling, Sampling distributions, standard error, test of hypothesis for means and proportions, confidence limits for means, student's t-distribution and Chi-square distribution for test of goodness of fit. **Stochastic Processes:** Stochastic processes, Probability Vectors, Stochastic matrix, Regular stochastic matrix, Markov chains, Higher transition probabilities, Stationary distribution of regular Markov chains and absorbing states.	**9**	**CO5** **CO6**

Text Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 10th edition,2014, Wiley-India publishers
2. Higher Engineering Mathematics, B.S.Grewal, 43rd edition, 2014, Khanna Publishers .

Reference Books:

1. Advanced Modern Engineering Mathematics, Glyn James, 4th edition, 2015, Pearson Education.
2. Advanced Engineering Mathematics, Dennis G. Zill, Michael R. Cullen, 4th edition, 2015, Jones and
Barlett Publishers Inc.
3. Engineering Mathematics, B. V. Ramana, 4th edition, 2005, Tata McGraw Hill Publications.
4. Engineering Mathematics, Anthony Craft, 4th edition, 2013, Pearson Education

Assessment Pattern:

1. CIE- Continuous Internal Evaluation (50 Marks).

Bloom's Category	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	Curricular/Co-Curricula Activities (10 Marks)
Remember	5	5	--	--
Understand	5	5	--	--
Apply	5	--	5	10
Analyze	5	--	--	--
Evaluate	5	--	--	--
Create	--	--	--	--

2. SEE- Semester End Examination (50 Marks).

Bloom's Category	Questions (50 Marks)
Remember	10
Understand	10
Apply	20
Analyze	5
Evaluate	5
Create	--

LIFE SKILLS FOR ENGINEERS

Course Code : HSS322/ HSS422 **Credits 03**

L:P:T:S : 2:0:0:1 **CIE Marks : 50**

Exam Hours : 03 **SEE Marks: 50**

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	To transform as stronger individuals to handle life challenges of professional life.
CO2	To apply the concept of Personality development & Grooming in real life.
CO3	Understand the concept of self and Creativity so that they can align with their life better.
CO4	To understand the role of motivation and leadership on behavior
CO5	To enhance holistic development of personality to equip the student with employability skills.
CO6	Determine the significance of goal setting & decision making in their professional life

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	3	3	3	3	2	3	3	3
CO2	2	3	3	2	3	3	3	3	2	3	3	3
CO3	2	3	3	2	3	3	3	3	2	3	3	3
CO4	2	3	3	2	3	3	3	3	2	3	3	3
CO5	2	3	3	2	3	3	3	3	2	3	3	3
CO6	2	3	3	2	3	3	3	3	2	3	3	3

Module No	Module Contents	Hours	COs
1	**Personality development & Grooming:** Expectations from the industry & Career Planning / Reality Check; Building personal presence; Corporate grooming; Corporate etiquettes; Developing personal work code.	6	CO1
2	Self Analysis & Creativity: SWOC analysis, Who am I attributes, Importance of Self Confidence, Self Awareness, Self Management, Social Awareness, Emotional Intelligence, out of box thinking, lateral Thinking & Johari windows.	4	CO2, CO3
3	Motivation & Leadership: Basic concepts & theories, factor, types of Motivation, Good Leadership skill, Traits of a leader & Assessment of Leadership Skill.	4	CO4, CO5
4	Interpersonal Skill: Assessment of interpersonal skills, situation detail of interpersonal skill, Team Working, leading a team, and Strategies for influencing people. Understanding the relationship among motivation, leadership and team work	4	CO5
5	Goal Setting and Decision Making: identifying goals like (short term, long term, lifetime goals), Time management, importance of work scheduling, importance and necessity of decision making.	4	CO6

Text Books:

1) Soft Skill, 2015, Career development Centre, Green Pearl Publication.

Reference Books:

1) The 7 – Habits of Highly Effective People, Stephen R Covey, Neha Publishers.
2) Seven Habits of Highly Effective Teens, Convey Sean, New York, Fireside Publishers, 1998.
3) Emotional Intelligence, Daniel Coleman, Bantam Book, 2006.

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes
Marks (out of 50)	30	10	10

Analyze	5	-	-
Evaluate	5	-	-
Create	5	5	-
Remember	-	-	5
Understand	5	-	5
Apply	10	5	-

SEE- Semester End Examination (50 Marks)

Bloom's Category	Tests
Marks (Out of 50)	
Remember	5
Understand	10
Apply	15
Analyze	10
Evaluate	5
Create	5

EARTH SCIENCE
ENGINEERING

Course Code: CIV43 **Credits 03**

L: P: T: S: 3: 0: 0: 0 **CIE Marks: 50**

Exam Hours: 03 **SEE Marks: 50**

Course Outcomes: At the end of the Course, the student will be able to:

CO1	Understand the internal structure of Earth, Earth Science and its applications.
CO2	Demonstrate the classification & identification of Minerals, Rocks and Geologic structures.
CO3	Get acquainted with the basic concepts of Stratigraphy, Geomorphology, Geodynamic processes and Rock Mechanics.
CO4	Apply the knowledge of Geological investigation techniques, Hydrology, GIS & Remote sensing in the selection of site for civil engineering projects.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3	-	2	2	-	-	-	-	2
CO2	3	2	2	-	-	2	2	-	-	-	-	2
CO3	3	2	2	3	-	2	2	-	-	-	2	2
CO4	3	2	2	3	3	2	2	-	-	-	2	2

Module No	Module Content	Hrs	Cos
1	**A. INTRODUCTION**: Earth – Introduction, internal structure and its composition; Earth science - Branches of Earth science, importance of Earth science in the field of civil engineering, few case studies of failure of some Civil Engineering constructions	09	

	due to geological draw backs. **B. GEOMORPHOLOGY AND STRATIGRAPHY:** Geological agents – epigene and hypogene; Weathering - physical, chemical and biological; Soil - formation, classification, Soil profile, Soil erosion and its conservation; Geological action of rivers with different drainage patterns, Geological action of wind. Introduction to geological time scale and stratigraphy, Laws of stratigraphy.		CO1 CO3
2	**A. MINERALOGY:** Definition of mineral and its classification, Physical properties of Minerals. Description, chemical composition and engineering uses of the following minerals:- *Quartz group*: Rock crystal, Rose quartz, Amethyst, Agate, Flint, Jasper, Blood Stone, Opal; *Feldspar group*: Orthoclase, Microcline, Plagioclase; *Mica group*: Muscovite, Biotite; *Amphibole group:* Asbestos; *Carbonate group*: Calcite, Magnesite, Dolomite; *Clay group of mineral*: Kaolin; *Sulphate group*: Gypsum, Ore minerals: *Oxides* - Magnetite, Hematite, Chromite, Pyrolusite, *Hydroxides* - Limonite, Bauxite, Psilomalane, *Sulphides* - Pyrite, Chalcopyrite, Galena. **B. PETROLOGY**: Definition of rock and its threefold classification. Igneous rocks - Forms, classification, structures and textures; Sedimentary rocks - Classification, primary structures; Metamorphic rocks: Agents and types of metamorphism, structures; description and engineering uses of Granite, Gabbro, Pegmatite, Dolerite and Basalt, Sandstones, Conglomerate, Shale, Limestones and Laterite, Gneiss, Quartzite, Marble, Slate, Charnockite and Schists. Rock as construction material, concrete aggregate, railway ballast, roofing, flooring, cladding and foundation	09	CO2
3	**A. GEODYNAMICS**: Elementary idea about continental drift, Plate Tectonics, neo-tectonics and sea floor spreading; Earthquakes - introduction, classification, causes, effects and remedial measures, locating epic centre, seismic zones of India, seismic resisting structures. Tsunamis & Landslides: causes, effects and remedial measures. **B. STRUCTURAL GEOLOGY**:		

	Description of out crop, bedding plane, vertical thickness and true thickness - problems, dip and strike - surface and sub-surface method problems; Clinometer-compass; Terminologies, causes and Classification of Fold, Fault and Joints, their identification in the field & their effects on civil engineering structures.	09	CO2 CO3
4	**A. GEOLOGICAL INVESTIGATIONS:** Study of toposheets and geological maps, Geological considerations in the civil Engineering projects like dams, reservoirs, tunnels, roads and bridges. Dams and reservoirs: Preliminary and detailed geological investigations for a dam site, important international and Indian examples of failures of dams and their causes, factors affecting the seepage and leakage of the reservoirs and the remedial measures, silting of reservoirs. Tunnel, roads and bridges: Purposes of tunneling and geological problems connected with tunneling, geological considerations in road alignment, roads in complicated regions, problems after road construction, geology of bridge sites. **B. HYDRO GEOLOGY**: Hydrological cycle, vertical distribution of ground water in the earth crust, Aquifers and their types, aquifer parameters - Porosity, Permeability, Specific yield, Specific retention, Transmissibility and Storage Coefficient. Ground water exploration – Electrical resistivity method; artificial recharge of groundwater, Sea water intrusion and remedies.	09	CO4
5	**A. REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM**: Remote Sensing – Concept, Application and its Limitations; Geographic Information System (GIS) and Global Positioning System (GPS) – Concept, components and its applications; Aerial photographs and satellite imageries - LANDSAT Imagery. **B. ROCK MECHANICS:** Definition, importance and status of rock mechanics in civil engineering, Rock mass Classification Systems: Q-system, RMR, Modified RMR and their applications. Rock Quality Designation (RQD), Physico-Mechanical Properties	09	CO3 CO4
	Rocks: Specific gravity, hardness, porosity, moisture content, permeability, thermal conductivity, compressive, tensile and shear strengths.		

Text Books:

1. Text of Engineering and General Geology by Parbin Singh, Published by S. K. Kataria and Sons, New Delhi., 8th Edition: 2008. Reprint-2015. ISBN 978-93-5014-267-7

2. Engineering Geology for Civil Engineering by D. Venkata Reddy, Vikas Publishing House Pvt Ltd, Published 2014. ISBN 9788125919032.

3. Text book of Geology by P.K. Mukerjee, World Press Pvt. Ltd. Kolkatta., Published 2015. ISBN 978-81-8756-754-7.

Reference Books:

1. Remote sensing and GIS by M. Anji Reddy, B. S. *Publications*, Hyderabad., Published 2012. ISBN 978-93-8107-597-5.
2. Ground water geology by Todd D.K. John Wiley and Sons, New York. 2nd Edition: 2010. ISBN 978-81-265-0836-5.

3. Introduction to Rock Mechanics by Goodman, Wiley International (1989). ISBN 9780471812005), 6th Edition, 2015.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	**Tests**	**Assignments**	**Quiz**	**Curricular/Co-Curricular Activities**
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember	5	-	-	5
Understand	10	5	-	5
Apply	5	-	5	
Analyze	5	5	-	
Evaluate	-	-	-	
Create	-	-	-	

SEE – Semester End Examination (50 Marks)

Bloom's Category	**Tests (Theory)**
Remember	15
Understand	15
Apply	10
Analyze	10
Evaluate	-
Create	-

Percentage Evaluation of Various Bloom's levels

Bloom's Category	**CIE**	**SEE**	**TOTAL**	**%**
Remember	10	15	25	25
Understand	20	15	35	35
Apply	10	10	20	20
Analyze	10	10	20	20
Evaluate				
Create				
TOTAL	**50**	**50**	**100**	**100**

ANALYSIS OF DETERMINATE STRUCTURES

Course Code: CIV44 **Credits 4**

L: P: T: S : 3:0:0:0 **CIE Marks: 50**

Exam Hours: 03 **SEE Marks: 50**

Course Outcomes: At the end of the Course, the student will be able to:

CO1	Apply principles of statics to determine reactions & internal forces in statically determinate structures
CO2	Calculate deflection of beams and trusses using energy concepts
CO3	Calculate the internal forces and resultant stresses in cable and arch type structures.
CO4	Understand the concept of influence line diagram

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	1
CO2	3	3	2	-	-	-	-	-	-	-	-	1
CO3	3	3	2	-	-	-	-	-	-	-	-	1
CO4	3	3	2	-	-	-	-	-	-	-	-	1

Module	Content of Module	Hrs	COs
1	**INTRODUCTION TO STRUCTURAL SYSTEMS: Classification of structures,** Forms of structures, Conditions of equilibrium, Degree of freedom, Linear and Non linear structures, one, two, three dimensional structural systems, Determinate and indeterminate structures [Static and Kinematics]**.** Types of trusses, Assumptions in analysis-Analysis of determinate trusses by method of joints and method of sections.	07	CO1

2	**DEFLECTION BY ENERGY CONCEPT AND THEOREMS** Strain energy and complimentary strain energy, Strain energy due to axial load, bending moment and shear force, Theorem of minimum potential energy, principle of virtual work, Deflection of determinate beams and trusses using total strain energy, Castigliano's theorems and their applications in the analysis of beams, bent frames and trusses. Application of Unit load methods to beams and trusses.	11	CO1,CO 2
3	**DEFLECTION OF BEAMS** Introduction – Definitions of slope, deflection, Elastic curve derivation of differential equation of flexure, Sign convention Slope and deflection for standard loading classes using Macaulay's method for prismatic beams and overhanging beams subjected to point loads, UDL and Couple. Deflection of determinate beams by Moment area method and Conjugate beam method.	09	CO2
4	**ARCHES AND CABLES STRUCTURES** Three hinged circular and parabolic arches with supports at same levels and different levels, Determination of thrust, shear and bending moment. Analysis of cables under point loads and UDL, length of cables. (Supports at same levels and at different levels).	09	CO3
5	**ROLLING LOAD AND INFLUENCE LINES:** Concept of influence lines- ILD for reactions, SF and BM for determinate beams- ILD for axial forces in determinate trusses- BM, SF and axial forces in determinate systems using ILD- Maximum BM and SF in determinate beams using rolling loads concepts.	09	CO4

TEXT BOOKS:

1. Bhavikatti, S S "Structural Analysis" Vol. I & II, Vikas Publishing House Pvt.(ISBN: 9788125942696), 4th Edition, 2010
2. Vaidyanathan.R & Perumal. P, "Structural Analysis" Vol. I & II", Laxmi Publications, (ISBN: 978 - 81-318-0781-1), 3rd Edition, 2007.
3. Pandit G. S, and Guta S.P., "Theory of Structures", Vol. – I, Tata McGraw Hill, New Delhi,(ISBN: 9780074634936) , 10th Edition, 2014

REFERENCE BOOKS:

1. Reddy C. S., "Basic Structural Analysis", Tata McGraw Hill, New Delhi, (ISBN: 9780070702769), 4th Edition ,2011.
2. Thandavamoorthy, " Structural Analysis", Oxford University Press Higher Education,(ISBN: 9780198069188), 3rd Edition, 2012.
3. Devdas Menon, "Structural Analysis", Narosa Publishing House, (ISBN: 978-81-7319-750-5), 2014
4. Vazrani V.N., Ratwani M.M., "Structural Analysis" Vol. I & II, Khanna Publishers, (ISBN: 978-81- 7409-140-8), 13th Edition, 2013.
5. Negi L.S and Jangid R.S, "Structural Analysis", Tata McGraw Hill, New Delhi, 6th Edition, 2003.
6. Gambir.M.L.," Fundamentals of Structural Mechanics and Analysis", PHI Learning Pvt. Ltd, New Delhi, (ISBN: 9788120342361), 2011.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes	**Curricular/Co-Curricular Activities**
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember		1		5
Understand	5	2	2	5
Apply	10	4	3	
Analyze	10	3		
Evaluate				
Create				

SEE – Semester End Examination (50 Marks)

Bloom's Category	Tests(Theory)
Remember	5
Understand	10
Apply	20
Analyze	15
Evaluate	
Create	

Percentage Evaluation of Various Bloom's levels (100 Marks)

Bloom's Category	CIE	SEE	Total	%
Remember	6	5	11	11
Understand	14	10	24	24
Apply	17	20	37	37
Analyze	13	15	28	28
Evaluate				
Create				
Total	**50**	**50**	**100**	**100**

HIGHER SURVEYING

Course Code : CIV45 **Credits : 05**

L: P: T: S : 3:2:0:0 **CIE Marks : 50+25**

Exam Hours. : 03 **SEE Marks : 50+25**

Course Outcomes: At the end of the Course, the student will be able to:

CO1	Understand the principles and working of basic instruments like Theodolite, Total station.
CO2	Acquire the concepts of setting out the curves by linear and angular methods.
CO3	Familiarize methodologies involving chainless survey using trigonometrical surveying and total station.
CO4	Understand the application of GPS and GIS

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	POI0	POII	PO12
CO1	3	3	-	-	-	-	-	2	2	2	3	-
CO2	3	3	2	-	-	2	-	2	2	2	3	-
CO3	3	3	2	2	2	2	1	2	2	2	3	-
CO4	3	3	2	2	3	2	1	2	2	2	3	-

Module No	Content of Module	Hrs	COs
1	**THEODOLITE SURVEY** Theodolite and types, Fundamental axes, Interrelationship between fundamental axes, parts of a transit theodolite, Uses of theodolite, Temporary adjustments of a transit theodolite, Measurement of horizontal angles – Method of repetitions and reiterations, Measurements of vertical angles, Prolonging a straight line by a theodolite in adjustment and theodolite not in adjustment	09	CO1
	List of Experiments 1. Measurement of horizontal angles with method of repetition and reiteration using theodolite, Measurement of vertical angles using theodolite. 2. To determine the elevation of an object using single plane method when base is accessible and inaccessible.		
2	**TRIGONOMETRICALLY LEVELLING** A. Determination of elevation of objects when the base is accessible and inaccessible by single plane and double plane	09	CO1,CO2,CO3

	method, Distance and difference in elevation between two inaccessible objects by double plane method. Salient features of Total Station, Advantages of Total Station over conventional instruments, Application of Total Station.		
	List of Experiments 1. To determine the distance and difference in elevation between two inaccessible points using double plane method. 2. To determine the tachemetric constants using horizontal and inclined line of sight.		
3	**CURVE SETTING (Simple Curve and Compound Curve)** Curves – Necessity – Types, Simple curves, Elements, Designation of curves, Setting out simple curves by linear methods, Setting out curves by Rankines deflection angle method.	09	CO1,CO2,
	List of Experiments 1. To set out simple curves using linear methods – perpendicular offsets from long chord and offsets from chords produced. 2. To set out simple curves using Rankine's deflection angles method.		
4	**CURVE SETTING (Compound Curve and Reverse curves,** **curves)** Compound curves Elements Design of compound curves Setting out of compound curves,Reverse curve between two parallel straights (Equal radius and unequal radius).	09	CO1,CO2,
	1. To set out compound curve with angular methods with using theodolite only.		
	(**Transition and Vertical Curves)** Transition curves Characteristics Length of Transition curve Setting out cubic	09	CO1,CO3,CO4

5	Parabola and Bernoulli's Lemniscates, Vertical curves – Types – Simple numerical problems. Introduction to Photogrammetric, GIS and GPS, and its application.		
	List of Experiments 1. To set out the center line of a simple rectangular room suing offset from base line 2. To set out center lines of columns of a building using two base lines at right angles 3. Demonstration Exposure to use of Total Station. Traversing, Longitudinal sections, Block levelling, Usage of relevant softwares for preparation of the contour drawings.		

TEXT BOOKS:

1. '**Surveying'** Vol 2 and Vol 3 - B.C. Punmia , Er. Ashok Kr. Jain, Dr.Arun Kumar Jain, Laxmi Publications, New Delhi. Edition: 16th (2016), ISBN: 8170088836.
2. **'Plane Surveying'** A. M. Chandra – New age international (P) Ltd,3rd Edition (Reprint 2015), ISBN 978-81-224-3880-2
3. **'Higher Surveying'** A.M. Chandra New age international (P) Ltd, 3rd Edition (2015), ISBN 978-81-224-3812-3
4. 'GIS ' Bemhardsen, Wiley Publications

REFERENCE BOOKS:

1. **Fundamentals of Surveying -** Milton O. Schimidt – Wong, Thomson Learning.
2. **Fundamentals of Surveying -** S.K. Roy – Prentice Hall of India, 2nd Edition, ISBN 978-81-203-4198**.**
3. **Surveying**, Arther Bannister et al., Pearson Education, India, 7th Edition (2006), ISBN 9788131700662

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes	**Curricular/Co-Curricular Activities**
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember	5			5
Understand	10		5	5
Apply	10	10		
Analyze				
Evaluate				
Create				

SEE: Semester End Examination (50 Marks)

Bloom's Category	**Tests (Theory)**	**Test (Practical)**
Remember	10	5
Understand	15	10
Apply	25	10
Analyze		
Evaluate		
Create		

Percentage Evaluation of Various Bloom's levels (50 +25)

	Theory		Practical			
Bloom's Category	**CIE**	**SEE**	**CIE**	**SEE**	**TOTAL**	**%**
Remember	10	10	5	5	30	20
Understand	20	15	5	5	45	30
Apply	20	25	15	15	75	50
Analyze	-	-	-	-	-	-
Evaluate	-	-	-	-	-	-
Create	-	-	-	-	-	-
TOTAL	**50**	**50**	**25**	**25**	**150**	**100**

APPLIED HYDRAULICS AND MACHINERY

Course Code: CIV46 **Credits : 5**

L: P: T: S : 3:2:0:0 **CIE Marks : 50+25**

Exam Hours: 03+03 **SEE Marks : 50+25**

Course Outcomes : At the end of the Course, the student will be able to:

CO1	Visualize fluid flow phenomena observed in open channel flow and design of most economical sections
CO2	Understand the basics of impulse momentum
CO3	Understand the working of basic hydraulic machines and Design of turbines
CO4	Understand the basics of pumps and working of fluid systems

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	1	2	2	1	1	1	3	1
CO2	3	3	3	3	1	2	-	1	-	1	3	-
CO3	3	3	3	3	1	2	-	1	1	1	3	1
CO4	3	3	3	3	1	2	2	1	1	1	3	-

Module No	Content of Module	Hrs	COs
1	**FLOW IN OPEN CHANNELS:** Definition of channel, difference between pipe and open channel flow, classification, types of flows, geometric properties of open channels, Uniform flow in open channels, Chezy's& Manning's formula. **Most economical open sections**- rectangular, trapezoidal, circular sections- derivations & problems. Specific Energy, definitions, Specific Energy curve, condition for Maximum discharge & Minimum specific energy, critical flow in rectangular sections, ro l s	09	C01
	List of Experiments 1. To study of hydraulic jump.	08	
	2. To determine the metacentric height of a ship model.		
2	**FLOW IN OPEN CHANNELS (NON-UNIFORM FLOW):** Definition, Types of Non- Uniform flows, Gradually Varied flow- derivation & Problems, Classification of channel bottom slopes, hydraulic jump, and hydraulic jump in a rectangular channel, types & applications.	09	C01
	List of Experiments 1. To find the coefficients of vertical orifice 2. Calibration of Dead weight pressure gauge 3. Lab Experiment assignment I	08	
3	**IMPACT OF JET ON FLAT VANES:** Introduction to Impulse – momentum equation and its applications, Force exerted by a jet on a fixed target, Derivations, Force exerted by a Jet on a moving target, Derivations. **IMPACT OF JET ON CURVED VANES:** Force exerted by a jet on a series of curved vanes, Concept of velocity triangles, Equation for work done & efficiency, Problems o force exerted by a Jet on a series of curved vanes.	09	C02

	List of Experiments 1. To determine the coefficient of impact of jet on flat vanes 2. To determine the coefficient of impact of jet on inclined and curved vanes	08	
4	**TURBINES:** Definition, classification, Pelton turbine, theory, equation for work done & efficiency, problems, Kaplan turbine, Introduction, Components, Working and Velocity triangles, Properties of the Turbine, Discharge of the Turbines, Number of Blades-Problems. Draft Tube: Types, efficiency of a Draft tube. Introduction	09	C03
	Cavitation in Turbines		
	List of Experiments 1. To study the efficiency of Pelton turbine 2. To study the efficiency of Kaplan turbine.	08	
5	**PUMPS:** Definition,classification general principle, Centrifugal pumps- priming, work done minimum starting speed, problem **FLUID SYSTEM**: Working of Hydraulic press, Hydraulic ram, Hydraulic lift, Hydraulic crane.	09	C04
	List of Experiments 1. To study the efficiency of Centrifugal pumps. 2. To determine the minor losses in a pipe line. 3. Lab Experiment assignment II	08	

Text Books

1. P.N.Modi & S.M.Seth , "Hydraulics & Fluid Mechanics", Standard Book House, New Delhi, (ISBN:
8190089374),15th edition.

2. R.K.Bansal, "A text book of Fluid Mechanics", Laxmi Publications, New Delhi,(ISBN-13: 978-
8131808153), 9th edition.

3. K.L.Kumar, S, "Fluid Mechanics". Chand & Company Ltd, New Delhi,(ISBN: 8121901006,
9788121901000).8th edition.

Reference Books

1. Fluid Mechanics- Victor L Streeter & E. Benjamin Wylie, Mc-Graw Hill Publications.
2. Fluid Mechanics- Frank M White, Sixth Edition, the Mc-Graw Hill Companies.
3. Fundamentals of Fluid Mechanics- Bruce R Munson & Donald F Young, John Wiley & Sons, Inc.

Assessment method

Bloom's Category	**Tests**	**Assignments**	**Quizzes**	**Curricular/Co-Curricular Activities**	**Practical**
Marks (out of 50) +25 for Lab)	**25**	**10**	**5**	**10**	**25**
Remember	10	5	3	5	5
Understand	5	-	2	5	5
Apply	5	2			10
Analyze	5	3			5
Evaluate	-	-			-
Create	-	-	-		-

SEE: Semester End Examination (50 Marks)

Bloom's Category	**Tests (Theory)**	**Test (Practical)**
Remember	19	5
Understand	7	10
Apply	9	10
Analyze	15	
Evaluate	-	-
Create	-	-

Evaluation of various Blooms levels (50+25)

	Theory		Practical			
Blooms category	CIE	SEE	CIE	SEE	TOTAL	%
Remember	23	10	5	5	43	29
Understand	12	10	5	10	37	24
Apply	7	15	10	10	42	28
Analyze	8	15	5		28	19
Evaluate						
Create						
Total	**50**	**50**	**25**	**25**	**150**	**100**

BULDING PLANNING AND DRAWING

Course Code : CIV47 **Credits : 02**

L: P:T:S : 0:2:0:0 **CIE Marks : 25**

Exam Hours. : 03 **SEE Marks : 25**

Course Outcomes: At the end of the Course, the student will be able to

CO1	Use basic tools of AUTOCAD and functional requirements of building planning
CO2	Prepare drawings of components of buildings
CO3	Design and Prepare functional drawings of buildings as per specifications.
CO4	Draw interconnectivity of functional components of buildings along with service layouts

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	3	2	3	3	3	-	3
CO2	3	3	3	2	3	3	2	3	3	3	-	3
CO3	3	3	3	2	3	3	2	3	3	3	-	3
CO4	3	3	3	2	3	3	2	3	3	3	-	3

Module No.	Content of Exercise	Hrs	COs
1	**Basics Of AutoCAD:** „Drafting" and „Modify" Tools **Functional Requirements Building Planning**: human functions and their implications for space requirements. Minimum and optimum areas for mono functions. Spatial interpretations of various activities and their relationship with spaces, Concepts Light, Ventilation, Movement, Circulation, hierarchy, Volume, Structure and Skin.	12	C01
2	1. To prepare geometrical drawing of Stepped wall & RCC Isolated footing (Manual and CAD) 2. To prepare geometrical drawing of Fully paneled and flush doors, (Manual and CAD) 3. To prepare geometrical drawing of half paneled and half-glazed window. (Manual and CAD) 4. To prepare geometrical drawings of Doglegged and Open well stairs (Manual and CAD)	15	CO2
3	1. **Specifications for residential and public building** Positioning of various components of buildings, orientation of buildings, building standards, bye laws, set back distances and calculation of carpet area, plinth area and floor area ratio. 2. Functional design of building using inter connectivity diagrams (bubble diagram), development of line diagram for public buildings (Primary health centre, school building, College canteen, Office building). (Manual and CAD)	21	C03, CO4,

4	1. For a given single line diagram, preparation of water supply, sanitary and electrical layouts 2. Development of plan, elevation, section and schedule of openings from the given line diagram of two bed room, single storeyed residential buildings (Manual and CAD) 3. Development of plan, elevation, section and schedule of openings from the given line diagram of two storeyed residential building.	30	CO3 , CO4

TEXT BOOKS:

1. **"Building Drawing"**, Shah M.H and Kale C.M, Tata Mc Graw Hill Publishing co. Ltd.,

   New Delhi.4th Edition, 2007, ISBN 0074638769

2. **"Building Planning Designing and scheduling",** Gurucharan Singh, Standard Publishers & distributors, New Delhi.2006, ISBN 8180140059, 9788180140051

3. **" Building Planning and Drawing"** Dr. H.J Shah **,**Charotar Publishing house PVT Ltd**,(2007),** ISBN 9788185594743, 8185594740

REFERENCE BOOKS:

1. **National Building Code,** BIS, New Delhi.
2. Civil Engineering Drawing and House Planning, B.P Verma

CIE- Continuous Internal Evaluation (25 Marks)

Bloom's Category	Tests	Assignments
Marks (out of 25)	20	05
Remember	2.5	
Understand	2.5	
Apply	2.5	
Analyze	5	
Evaluate	2.5	
Create	5	5

SEE: Semester End Examination (25 Marks)

Bloom's Category	**Test (Practical)**
Remember	2.5
Understand	2.5
Apply	2.5
Analyze	5
Evaluate	5
Create	7.5

Percentage Evaluation of Various Bloom's levels

Bloom's Category	**CIE**	**SEE**	**TOTAL**	**%**
Remember	2.5	2.5	5	10
Understand	2.5	2.5	5	10
Apply	2.5	2.5	5	10
Analyze	5	5	10	20
Evaluate	2.5	5	7.5	15
Create	10	7.5	17.5	35
TOTAL	**25**	**25**	**50**	**100**

BASIC ENGINEERING MATHEMATICS-II

Course Code: DMAT41 **Credits : 00**
L:P:T:S : 0:0:0:0 **CIE Marks : 25**
Exam Hours : 02 **SEE Marks : 25**

Course Outcomes: At the end of the Course, the Student will be able to do the following:

CO1	Gain knowledge of basic operations of vectors
CO2	Use curl and divergence of a vector function in three dimensions
CO3	Understand ordinary differential equations and their application.
CO4	Understand basic concepts of Laplace transform to solve engineering problems
CO5	Solve the Laplace transform of Periodic and step functions
CO6	Solve initial and boundary value problems using Laplace transform method.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	-	-	-	1	3	-	1
CO2	3	2	3	2	2	-	-	-	1	3	-	1
CO3	3	2	3	2	2	-	-	-	1	3	-	1
CO4	3	2	3	2	2	-	-	-	1	3	-	1
CO5	3	2	3	2	2	-	-	-	1	3	-	1
CO6	3	2	3	2	2	-	-	-	1	3	-	1

Course Syllabus			
Module No.	**Contents of the Module**	**Hours**	**CO's**
1	**Vectors:** Definition of scalar and vector, Vector addition , Subtraction and multiplication-dot product, cross product, scalar triple product and vector triple product .Orthogonal ,co-planar and angle between vectors.	**5**	**CO1**
2	**Vector Differentiation:** Velocity and accelerations, Vector differential operator-Gradient of a scalar function, Divergence of a vector function, Curl of a vector function, problems and Vector Identities.	**5**	**CO2**
3	**Linear differential equations with constant coefficients:** Solution of second and higher order differential equations - inverse differenti operator method.	**5**	**CO3**
4	**Laplace Transform:** Definition and Laplace transforms of elementary functions. Properties of Laplace transforms (without proof) ,Periodic functions, Heaviside function – problems	**5**	**CO4, CO5**
5	**Inverse Laplace Transform:** Properties of inverse Laplace Transform, problems, solution of linear differential equations using	**5**	**CO4, CO6**

	Laplace Transforms.		

Text Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 10^{tH} edition,2014, Wiley-India Publishers.

2. Higher Engineering Mathematics, B.S.Grewal, 43nd edition, 2014, Khanna Publishers .

Reference Books:

1. Modern Engineering Mathematics, Glyn James, 4th edition, 2015, Pearson Education.
2. Advanced Engineering Mathematics, Dennis G. Zill, Michael R. Cullen, 4th edition, 2015, Jones and Barlett Publishers Inc.
3. Engineering Mathematics, B. V. Ramana, 4th edition, 2005, Tata McGraw Hill Publications.

Assessment Pattern:

2. CIE- Continuous Internal Evaluation (25 Marks).

Bloom's Category	Tests (20 Marks)	Assignments (5 Marks)
Remember	5	--
Understand	5	5
Apply	5	--
Analyze	2.5	--
Evaluate	2.5	--
Create	--	--

2. SEE- Semester End Examination (50 Marks)

Bloom's Category	Questions (50 Marks)
Remember	10
Understand	20
Apply	10
Analyze	5
Evaluate	5
Create	--

APPENDIX A

Outcome Based Education

Outcome-based education (OBE) is an educational theory that bases each part of an educational system around goals (outcomes). By the end of the educational experience each student should have achieved the goal. There is no specified style of teaching or assessment in OBE; instead classes, opportunities, and assessments should all help students achieve the specified outcomes.

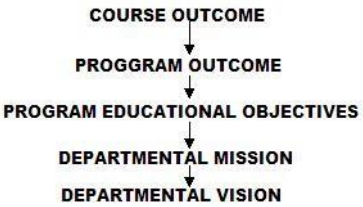
There are three educational Outcomes as defined by the National Board of Accredition:

Program Educational Objectives: The Educational objectives of an engineering degree program are the statements that describe the expected achievements of graduate in their career and also in particular what the graduates are expected to perform and achieve during the first few years after graduation. [nbaindia.org]

Program Outcomes: What the student would demonstrate upon graduation. Graduate attributes are separately listed in Appendix C

Course Outcome: The specific outcome/s of each course/subject that is a part of the program curriculum. Each subject/course is expected to have a set of Course Outcomes

Mapping of Outcomes



APPENDIX B

The Graduate Attributes of NBA

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems.

Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Conduct investigations of complex problems: The problems that cannot be solved by straightforward application of knowledge, theories and techniques applicable to the engineering discipline that may not have a unique solution. For example, a design problem can be solved in many ways and lead to multiple possible solutions that require consideration of appropriate constraints/requirements not explicitly given in the problem statement (like: cost, power requirement, durability, product life, etc.) which need to be defined (modeled) within appropriate mathematical framework that often require use of modern computational concepts and tools.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Life-long learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

APPENDIX C

BLOOM'S TAXONOMY

Bloom's taxonomy is a classification system used to define and distinguish different levels of human cognition—i.e., thinking, learning, and understanding. Educators have typically used Bloom's taxonomy to inform or guide the development of assessments (tests and other evaluations of student learning), curriculum (units, lessons, projects, and other learning activities), and instructional methods such as questioning strategies.
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