Annexure – I

CREDIT FRAMEWORK STRUCTURE

Semester		I	II	III	IV	V	VI	VII	VIII	Total Credits
Basic Science Course	BSC/ESC	7	7							14
Engineering Science Course		6	6							12
Program Core Course (PCC)	Program Courses	2	2	13	10	7	4	6		44
Program Elective Course (PEC)						4	6	6	4	20
Multidisciplinary Minor (MDM)	Multidisciplinary Courses			2	3	3	3	3		14
Open Elective (OE) Other than a particular program						2	3	3		8
Vocational and Skill Enhancement Course (VSEC)	Skill Courses	2		1	1	2	2			8
Ability Enhancement Course (AEC -01, AEC-02)	Humanities Social Science and Management (HSSM)	1	1			2				4
Entrepreneurship/Economics/Management Courses				2	2					4
Indian Knowledge System (IKS)			2							2
Value Education Course (VEC)				2	2					4
Research Methodology	Experiential Learning Courses								4	4
Comm. Engg. Project (CEP)/ Field Project (FP)					2					2
Project							2	2		4
Internship/OJT									12	12
Co-curricular Courses (CC)	Liberal Learning Courses	2	2							4
Total Credits (Major)		**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**160**

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Group-II (Civil Engineering)

GROUP II : SEMESTER I

Sr. No.	Course Category	CourseCode	Course Title	Hours per Week			Credits	Mid-Sem Examination	Maximum Marks			Minimum Passing marks	No of Hours for ESE
				L	T	P			Continual Assessment	End Sem Examination	Total		
1	BSC	25CV101T	Applied Physics	2	-	-	2	10	10	30	50	23	1.5
2	BSC	25CV101P	Applied Physics Lab	-	-	2	1	-	25	25	50	25	-
3	BSC	25CV102T	Linear Algebra & Calculus	3	-	-	3	20	20	60	100	45	3
4	BSC	25CV102P	Linear Algebra & Calculus Lab	-	-	2	1	-	25	25	50	25	-
5	ESC	25CV103T	Engineering Mechanics	3	-	-	3	20	20	60	100	45	3
6	ESC	25CV103P	Engineering Mechanics Lab	-	-	2	1	-	25	25	50	25	-
7	ESC	25CV104P	Logic building with C Lab	-	-	4	2	-	25	25	50	25	-
8	PCC	25CV105T	Building Materials	2	-	-	2	10	10	30	50	23	1.5
9	AEC	25CV106P	Business Communication Skills I Lab	-	-	2	1	-	25	25	50	25	-
10	SEC	25CV207T	Design Thinking#	2	-	-	2	10	10	30	50	23	1.5
11	CC	25CV108T	Co-curricular Courses - I	2	-	-	2	-	50	-	50	-	-
Total				**14**	**-**	**12**	**20**	**70**	**245**	**335**	**650**	**-**	**-**

 # Course to be mapped with NPTEL/SWAYAM/MOOC offered course in that semester. Exam will be conducted by NPTEL/Institute

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Group-II (Civil Engineering)

GROUP II : SEMESTER II

Sr. No.	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1	BSC	25CV201T	Engineering Chemistry	2	-	-	2	10	10	30	50	23	1.5
2	BSC	25CV201P	Engineering Chemistry Lab	-	-	2	1	-	25	25	50	25	-
3	BSC	25CV202T	Statistics and Transforms	3	-	-	3	20	20	60	100	45	3
4	BSC	25CV202P	Statistics and Transforms Lab	-	-	2	1	-	25	25	50	25	-
5	ESC	25CV203T	Engineering Graphics	2	-	-	2	10	10	30	50	23	1.5
6	ESC	25CV203P	Engineering Graphics Lab	-	-	2	1	-	25	25	50	25	-
7	ESC	25CV204T	Basics of Electrical & Electronics Engineering	2	-	-	2	10	10	30	50	23	1.5
8	ESC	25CV204P	Basics of Electrical & Electronics Engineering Lab	-	-	2	1	-	25	25	50	25	-
9	PCC	25CV205T	Building Construction	2	-	-	2	10	10	30	50	23	1.5
10	AEC	25CV206P	Business Communication Skills – II Lab	-	-	2	1	-	25	25	50	25	-
11	IKS	25CV107T	Indian Knowledge Systems#	2	-	-	2	10	10	30	50	23	1.5
12	CC	25CV208T	Co-curricular Courses – II	2	-	-	2	-	50	-	50	-	-
Total				**15**	**-**	**10**	**20**	**70**	**245**	**335**	**650**	**-**	**-**

 # Course to be mapped with NPTEL/SWAYAM/MOOC offered course in that semester. Exam will be conducted by NPTEL/Institute

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Group-II (Civil Engineering)

SEMESTER III

Sr. No.	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1	PCC	25CV301T	Solid Mechanics	3	-	-	3	20	20	60	100	45	3
2	PCC	25CV301P	Solid Mechanics Lab	-	-	2	1	-	25	25	50	25	-
3	PCC	25CV302T	Concrete Technology	3	-	-	3	20	20	60	100	45	3
4	PCC	25CV302P	Concrete Technology Lab	-	-	2	1	-	25	25	50	25	-
5	PCC	25CV303T	Environmental Engineering	3	-	-	3	20	20	60	100	45	3
6	PCC	25CV303P	Environmental Engineering Lab	-	-	2	1	-	25	25	50	25	-
7	PCC	25CV304P	Computer Aided Civil Engineering Drawing	-	-	2	1	-	25	25	50	25	-
8	VEC	25ES401T	Environmental Science	2	-	-	2	10	10	30	50	23	1.5
9	HSSM	25ES402T	Fundamentals of Economics and Management	2	-	-	2	10	10	30	50	23	1.5
10	SEC	25CV341P	Career Development I	-	-	2	1	-	50	-	50	-	-
11	MDM	25CV331M	MDM-I (Refer MDM basket)	2	-	-	2	10	10	30	50	23	1.5
Total				**15**	**0**	**10**	**20**	**90**	**240**	**370**	**700**	**-**	**-**

From above any one PCC course to be mapped with NPTEL/SWAYAM/MOOC offered course in that Session. Exam will be conducted by NPTEL/Institute. The course will be notified one month prior to commencement of semester.

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Group-II (Civil Engineering)

SEMESTER IV

Sr. No.	Course Category	CourseCode	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1	PCC	25CV401T	Structural Analysis	3	-	-	3	20	20	60	100	45	3
2	PCC	25CV401P	Structural Analysis Lab	-	-	2	1	-	25	25	50	25	-
3	PCC	25CV402T	Fluid Mechanics	3	-	-	3	20	20	60	100	45	3
4	PCC	25CV402P	Fluid Mechanics Lab	-	-	2	1	-	25	25	50	25	-
5	PCC	25CV403P	Surveying & Geomatics Lab	-	-	4	2	-	50	50	100	50	-
6	VEC	25ES301T	Constitution of India	2	-	-	2	10	10	30	50	23	1.5
7	HSSM	25ES302T	Fundamentals of Entrepreneurship	2	-	-	2	10	10	30	50	23	1.5
8	SEC	25CV441P	Career Development - II	-	-	2	1	-	50	-	50	-	-
9	CEP	25CV404P	Mini Project*	-	-	4	2	-	50	-	50	-	-
10	MDM	25CV431M	MDM-II (Refer MDM basket)	3	-	-	3	20	20	60	100	45	3
Total				**13**	**0**	**14**	**20**	**80**	**280**	**340**	**700**	**-**	**-**

From above any one PCC course to be mapped with NPTEL/SWAYAM/MOOC offered course in that Session. Exam will be conducted by NPTEL/Institute. The course will be notified one month prior to commencement of semester.

* **Field Project or Community engagement project in the major discipline**

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Group-II (Civil Engineering)

SEMESTER V

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1	PCC	25CV501T	Transportation Engineering	2	-	-	2	10	10	30	50	23	1.5
2	PCC	25CV501P	Transportation Engineering Lab	-	-	2	1	-	25	25	50	25	-
3	PCC	25CV502T	Reinforced Cement Concrete Structures	3	-	-	3	20	20	60	100	45	3
4	PCC	25CV502P	Reinforced Cement Concrete Structures Lab	-	-	2	1	-	25	25	50	25	-
5	PEC	25CV503T	Professional Elective - I (Refer PE basket)	3	-	-	3	20	20	60	100	45	3
6	PEC	25CV503P	Professional Elective - I Lab (Refer PE basket)	-	-	2	1	-	25	25	50	25	-
7	VSC	25CV504P	Technical Skill Development - I	-	-	4	2	-	50	-	50	-	-
8	AEC	25CV541P	English for Engineers	-	-	4	2	-	50	-	50	-	-
9	MDM	25CV531M	MDM – III (Refer MDM basket)	3	-	-	3	20	20	60	100	45	3
10	OE	25CV561O	Open Elective – I (Refer OE basket)	2	-	-	2	10	10	30	50	23	1.5
Total				**13**	**0**	**14**	**20**	**80**	**255**	**315**	**650**	**-**	**-**

From above any one PCC/PEC course to be mapped with NPTEL/SWAYAM/MOOC offered course in that Session. Exam will be conducted by NPTEL/Institute. The course will be notified one month prior to commencement of semester.

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SEMESTER VI

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1	PCC	25CV601T	Steel Structures	3	-	-	3	20	20	60	100	45	3
2	PCC	25CV602P	Building Design & Drawing Lab	-	-	2	1	-	25	25	50	25	-
3	PEC	25CV603T	Professional Elective - II (Refer PE basket)	3	-	-	3	20	20	60	100	45	3
4	PEC	25CV604T	Professional Elective - III (Refer PE basket)	3	-	-	3	20	20	60	100	45	3
5	VSC	25CV605P	Technical Skill Development -II	-	-	4	2	-	50	-	50	-	-
6	PROJ	25CV606P	Project - I	-	-	4	2	-	50	50	100	50	-
7	MDM	25CV631M	MDM – IV (Refer MDM basket)	3	-	-	3	20	20	60	100	45	3
8	OE	25CV661O	Open Elective – II (Refer OE basket)	3	-	-	3	20	20	60	100	45	3
Total				**15**	**0**	**10**	**20**	**100**	**225**	**375**	**700**	**-**	**-**

From above any one PCC/PEC course to be mapped with NPTEL/SWAYAM/MOOC offered course in that Session. Exam will be conducted by NPTEL/Institute. The course will be notified one month prior to commencement of semester.

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SEMESTER VII

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing marks	No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total		
1	PCC	25CV701T	Estimation & Costing	3	-	-	3	20	20	60	100	45	3
2	PCC	25CV702T	Construction Management & Law	3	-	-	3	20	20	60	100	45	3
3	PEC	25CV703T	Professional Elective - IV (Refer PE basket)	3	-	-	3	20	20	60	100	45	3
4	PEC	25CV704T	Professional Elective - V (Refer PE basket)	2	-	-	3	20	20	60	100	45	3
5	PROJ	25CV705P	Project - II	-	-	4	2	-	50	50	100	50	-
6	MDM	25CV731M	MDM - V (Refer MDM basket)	3	-	-	3	20	20	60	100	45	3
7	OE	25CV761O	Open Elective - III (Refer OE basket)	3	-	-	3	20	20	60	100	45	3
Total				**17**	**0**	**4**	**20**	**120**	**170**	**410**	**700**	**-**	**-**

From above any one PCC/PEC course to be mapped with NPTEL/SWAYAM/MOOC offered course in that Session. Exam will be conducted by NPTEL/Institute. The course will be notified one month prior to commencement of semester.

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SEMESTER VIII

Option A

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				No of Hours for ESE
				L	T	P		Continual Assessment	Mid-Sem Examination	End Sem Examination	Total	
1	RM	25ES801T	Research Methodology#	2	-	-	2	10	10	30	50	1.5
2	RM	25ES801P	Research Methodology Lab#	-	-	4	2	-	-	-	50	-
3	PEC	25CV801T	Professional Elective - VI#	3	-	-	3	20	20	60	100	4
5	PEC	25CV801P	Professional Elective – VI Lab#	-	-	2	1	-	-	-	50	-
4	OJT	25CV803P(i)	Industry/Research Internship*	-	-	24	12	300	-	100	400	-
Total				**5**	**-**	**30**	**20**	**360**		**190**	**650**	**-**

Option B

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				No of Hours for ESE
				L	T	P		Continual Assessment	Mid Sem Examination	End Sem Examination	Total	
1	ELC	25ES801T	Research Methodology#	2	-	-	2	10	10	30	50	1.5
2	ELC	25ES801P	Research Tools#	-	-	2	2	-	-	50	50	-
3	PEC	25CV802T	Professional Elective - VI#	3	-	-	3	20	20	60	100	4
3	PEC	25CV802P	Professional Elective – VI Lab#	-	-	1	1	-	-	50	50	-
4	OJT	25CV804P(i)	Institutional Internship$ & Project III	-	-	25	12	300	-	100	400	-
		Total		**5**	**0**	**28**	**20**	**330**	**30**	**290**	**650**	**-**

Option B is available to students only after recommendation of the concerned Head of the department. The project and internship should contribute towards career development plan of the students.

 # Courses to be mapped with NPTEL/SWAYAM/MOOC offered course in that semester. Exam will be conducted by NPTEL/Institute

*** Minimum one semester internship in any industry is to be carried out.**

$ Two NPTEL courses (as per choice of student) or Institutional Internship by IEDC, SVPCET.

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Basket for Multi-Disciplinary Minor Courses (MDM)

A. Civil Engineering

Semester	Course Category	Course Code	Name of Course	Credits
III	MDM-I	25CV331M	MDM - I Basics of Civil Engineering	**2**
IV	MDM-II	25CV431M	MDM - II Basic Construction Materials	**3**
V	MDM-III	25CV531M	MDM - III Building Planning & Construction	**3**
VI	MDM-IV	25CV631M	MDM - IV Building Services	**3**
VII	MDM-V	25CV731M	MDM - V Smart Transit System	**3**

Basket for Program Elective Courses (PEC)

B. Civil Engineering

Semester	Course Category	Course Code	Name of Course	Credits
V	PEC	25CV503T(i) 25CV503T(ii)	PE - I Geotechnical Engineering PE - I Advanced Surveying	3
V	PEC	25CV503P(i) 25CV503P(ii)	PE - I Geotechnical Engineering Lab PE - I Advanced Surveying Lab	1
VI	PEC	25CV603T(i) 25CV603T(ii) 25CV603T(iii)	PE - II Advanced Structural Analysis PE - II Mass Rapid Transit System PE - II Advanced Fluid Mechanics	3
VI	PEC	25CV604T(i) 25CV604T(ii) 25CV604T(iii)	PE - III Air Pollution & Control PE - III Foundation Engineering PE - III Advanced Traffic Engineering	3
VII	PEC	25CV703T(i) 25CV703T(ii) 25CV703T(iii)	PE - IV Advanced Steel Design PE - IV Advanced Reinforced Cement Concrete Structures PE - IV Irrigation Engineering	3
VII	PEC	25CV704T(i) 25CV704T(ii) 25CV704T(iii) 25CV704T(iv)	PE - V Earthquake Resistant Design of Concrete Structures PE - V Solid Waste Management PE - V Ground Improvement Techniques PE - V Disaster Management	3

Basket for Open Elective Courses (OE)

C. Civil Engineering

Semester	Course Category	Course Code	Name of Course	Credits
V	V	25CV561O	OE - I Public Health Engineering	**2**
VI	VI	25CV661O	OE - II Green Buildings	**3**
VII	VII	25CV761O	OE - III Air Pollution and Control	**3**

EXIT OPTIONS

Award of UG Certificate in Major with 40 credits and an additional 8 credits (After First Year)

EXIT COURSES			
S.N.	**Course name**	**Mode of conduction**	**Credits**
1.			
2.			
3.			

Award of UG Diploma in Major with 80 credits and an additional 8 credits (After Second Year)

EXIT COURSES			
S.N.	**Course name**	**Mode of conduction**	**Credits**
1.			
2.			
3.			

Award of UG Degree in Major with 120 credits and an additional 8 credits (After Third Year)

EXIT COURSES			
S.N.	**Course name**	**Mode of conduction**	**Credits**
1.			
2.			
3.			

FIRST SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25CV101T	Applied Physics	2	--	--	2	10	10	30	50

Course Objectives	Course Outcomes
This course is intended 1. To understand the basic laws of physics and types of materials and their application in engineering and technology. 2. To develop scientific temper and analytical capability.	Students will be able to **1.** Explain the fundamental concepts of crystal structure, unit cells, Miller indices, and apply Bragg's law to analyze X-ray diffraction in crystalline solids. **2.** Classify different types of magnetic materials and analyze their properties (diamagnetic, paramagnetic, ferromagnetic) along with their practical applications. **3.** Illustrate the band theory of solids, differentiate between conductors, insulators, and semiconductors, and calculate Fermi energy for given systems. **4.** Distinguish between intrinsic and extrinsic semiconductors and evaluate the working principle and applications of p–n junction diodes in electronic devices.

Unit I CRYSTAL STRUCTURE	**[10 Hrs]**
Space lattice, Crystal structure, Unit cell, Types of unit cell, Characteristics of SC, BCC and FCC unit cell, Miller Indices, Interplanar distance and its derivation, Diffraction of X-rays - Braggs' Law and its applications.	
Unit II MAGNETIC MATERIALS	**[10 Hrs]**
Terms and definitions, Types of magnetic materials, characteristics of Diamagnetic, Paramagnetic and Ferromagnetic Materials, Applications of soft and hard magnetic materials.	
Unit III SEMICONDUCTORS	**[10 Hrs]**
Free electron Theory (qualitative idea) and its features; Idea of band formation in solids, Classification of solids: Metal, Insulator, Semiconductor; Fermi Energy, Types - Intrinsic and Extrinsic Semiconductors, Application of Extrinsic Semiconductors - p-n junction diode	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Fundamentals of Physics	David Halliday, Robert Resnick and Jerle Walker	8th extended	John-Wiley India
2	Engineering Physics	M. N. Avadhanulu	Latest edition	S. Chand & Co.

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Solid State Physics	Charles Kittel	Eighth edition	John Wiley & Sons, Inc
2	Solid State Physics	R.L. Singhal	Eighth edition	Kedarnath Ramnath

Online Resources

1	https://www.britannica.com/science/semiconductor#ref233890
2	https://www.geeksforgeeks.org/semiconductors/
3	https://www.sciencedirect.com/topics/chemistry/magnetic-material
4	https://www.livescience.com/33816-quantum-mechanics-explanation.html

FIRST SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25CV101P	Applied Physics Lab	--	--	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended 1. To understand the basic laws of physics and types of materials and their application in engineering and technology. 2. To develop scientific temper and analytical capability.	Students will be able to 1. Illustrate principles/ laws by selecting and using proper measuring instruments, interpret result and draw conclusions. 2. Find various parameters using various properties of light. 3. Demonstrate the concept and working of Semiconductor devices.

Expt. No.	Title of the experiment
1	Study of semiconductor diodes
2	Study of Phenomenon of Diffraction
3	Study of Interference
4	Study of Birefringence
5	Guoy's Balance Method a) Determination of Magnetic Susceptibility of different magnetic materials. b) Identification of different types of Magnetic Materials
6	Study of Planck's Constant by means of LED
7	Determination of Curie Temperature of Ferromagnetic Material.
8	Study of Transistors.
9	Study of Hall Effect.
10	Experiment on 'Quantum Eraser'.
11	Demonstration of phenomena of Optics using Laser.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Fundamentals of Physics	David Halliday, Robert Resnick and Jerle Walker	8e extended	John-Wiley India
2	A Textbook of Engineering Physics	Dr. M. N. Avadhanulu, Dr. P. G. Kshirsagar	Latest edition	S. Chand Publication.

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Solid State Physics	Charles Kittel	Eighth edition	John Wiley & Sons, Inc
2	Solid State Physics	R.L. Singhal	Eighth edition	Kedarnath Ramnath

Online Resources

1	https://www.britannica.com/science/semiconductor#ref233890
2	https://www.geeksforgeeks.org/semiconductors/
3	https://www.sciencedirect.com/topics/chemistry/magnetic-material

SEMESTER-I

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25CV102T	Linear Algebra & Calculus	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended to 1. Develop students' conceptual understanding and computational skills in Matrix Algebra and Differential Equations for solving mathematical problems. 2. Enable learners to apply Multivariate and Vector Calculus for analyzing functions of several variables and modeling physical phenomena.	**Students will be able to** 1. Apply matrix concepts to solve and analyze linear systems. 2. Analyze and solve engineering problems involving eigenvalues, eigenvectors, and functions of matrices. 3. Solve multivariate calculus problems involving partial derivatives, Jacobians, and optimization. 4. Apply first order and higher order differential equations to solve problems in engineering. 5. Evaluate vector calculus operations and their physical applications.

Unit I **[9Hrs]**

Matrix Algebra : Introduction to matrices, , Rank of a matrix, Consistency of system of linear equations, Linear and orthogonal transformations, Linear dependence of vectors.

Unit II **[9Hrs]**

Matrices: Characteristics equation, Cayley- Hamilton Theorem**,** Eigen values and Eigen vectors, Reduction to diagonal form, Reduction of quadratic form to canonical form by orthogonal transformation, Sylvester's theorem.

Unit III **[9Hrs]**

Multivariate Calculus: Functions of several variables and their partial derivatives, Chain rule and total differential coefficient, Jacobians and its properties, Maxima –Minima of functions of two variables, Lagrange's method of undetermined multipliers.

Unit IV **[9Hrs]**

Differential Equations: First order and first degree differential equations: Linear, Higher order differential equations with constant coefficients, Method of variation of parameters, Cauchy's homogeneous linear equation, Applications of differential equations.

Unit V **[9Hrs]**

Vector Calculus: Vector differentiation, Gradient, Directional derivatives, Divergence and Curl with their physical interpretation Solenoidal and Irrotational motions, Scalar potential, Line integral & Work done.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Higher Engineering Mathematics	B. S. Grewal	38th	Khanna Publishers, New Delhi.
2	Higher Engineering Mathematics	H. K. Das & Er. Rajnish Verma	1st	S. Chand & CO. Pvt. Ltd., New Delhi

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Higher Engineering Mathematics	B.V. Ramana,	11th reprint, 2010.	Tata McGraw Hill New Delhi
2	A Text Book of Engineering Mathematics	Peter O' Neil	8th	Thomson Asia Pvt. Ltd., Singapore.

SEMESTER-I

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25CV102P	Linear Algebra & Calculus Lab	--	--	2	1	25	25	50

Course Objectives	Course Outcomes
This Course is intended to: 1. To develop students' computational proficiency in solving problems related to linear algebra, calculus, and differential equations using SageMath with an emphasis on symbolic computation and numerical methods. 2. To enable students to apply SageMath for solving and visualizing problems in vector calculus through effective use of graphical and analytical tools.	**Students will be able to:** 1. Apply fundamental matrix operations and solve systems of linear equations using SageMath. 2. Apply concepts of linear algebra to compute eigenvalues and eigenvectors of matrices using SageMath. 3. Evaluate partial derivatives of multivariable functions and solve first and higher-order ordinary differential equations using SageMath. 4. Analyze and visualize vector calculus operations including gradient, divergence, curl, and evaluate line and surface integrals using SageMath.

List of Experiments:-

Experiment No.	List of Experiment
1	To Implement basic matrix operations using SageMath's symbolic computation tools.
2	To check the consistency of a system of linear equations using augmented matrices and SageMath.
3	To solve systems of linear equations using various within the SageMath environment.
4	To determine eigenvalues and eigenvectors of matrices using built-in SageMath functions.
5	To implement and validate the Cayley-Hamilton Theorem with the aid of SageMath.
6	To compute partial derivatives of various orders for multivariable functions using SageMath.
7	To solve first-order and higher-order differential using SageMath's differential equation solvers.
8	To find maxima and minima of functions of two variables using partial derivatives and the second derivative test implemented in SageMath.
9	To compute and visualize vector differential operations using SageMath.
10	To compute vector integrals in SageMath.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Computational Mathematics with SageMath	Paul Zimmermann	1st	SIAM Publications Library.
2	Basics of SageMath : Mathematics(Practicals)	Varun Kumar	1st	Amazon KDP

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Mathematics-SageMath Software System	Indrajeet Varhadpande & Dr. Kirti Sahu	1st	Himalaya Publication
2	Applied Mathematics Using SageMath	Dr. Kirti Sahu & Dr. Sajid Anwar	1st	Himalaya Publication

FIRST SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25CV103T	Engineering Mechanics	3	1	-	4	20	20	60	100

Course Objectives	Course Outcomes
1. To develop students' ability to analyze the problems involving forces, moments with their applications. 2. To analyse the member forces in trusses 3. To make students to learn the effect of friction on different planes 4. To develop the student's ability to find out the centre of gravity and moment of inertia and their applications. 5. To make the students learn about kinetics and their applications.	1. Compute the resultant of a force system and resolution of a force 2. Comprehend the action for forces, moments, and other types of loads on rigid bodies and compute the reactive forces. 3. Analyse the statically determinate trusses and Compute frictional resistance offered by different planes 4. Locate the centroid and compute the area moment of inertia of sections 5. Analyze the bodies in motion

Unit I **[8 Hrs]**

Resultant of coplanar force system: Basic dimensions and units, Classification of force system, principle of transmissibility of a force, composition of forces, resolution of a force, moment, Principle of moments, couple, Resultant of coplanar concurrent force

Unit II **[8 Hrs]**

Equilibrium of coplanar force system:
Free body diagrams, Equilibrium of coplanar concurrent force system, Lami's theorem, Equilibrium of coplanar parallel force system, types of beams, types of loadings, types of supports, Equilibrium of coplanar non-concurrent force system, support reactions of statically determinate beams subjected to various types of loads, Numerical examples.

Unit III **[7 Hrs]**

Analysis of Trusses: Introduction, Classification of trusses, analysis of plane perfect trusses by the method of joints, Numerical examples**.**
Friction: Introduction, laws of Coulomb friction, equilibrium of blocks on horizontal plane, equilibrium of blocks on inclined plane, ladder friction, wedge friction Numerical examples.

Unit IV **[7 Hrs]**

Centroid of Plane areas: Introduction, centroids standard shapes and simple built up sections, Numerical examples**.**
Area Moment of inertia of plane areas: Introduction, Rectangular moment of inertia, polar moment of inertia, product of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, Area moment of inertia of standard shapes, Area moment of inertia of simple built up sections, Numerical examples.

Unit V **[8 Hrs]**

Kinetics: Introduction, D 'Alembert's principle of dynamic equilibrium and its application in-plane motion and connected bodies including pulleys & surfaces, Numerical examples.
Impact of Elastic Bodies: Impulse momentum theorem, Work Energy expression, Numerical examples

Text Books

S.N	Title	Authors	Edition	Publisher
1	Engineering Mechanics	Timoshenko S, Young D. H., Rao J. V	-	McGraw Hill
2	Engineering Mechanics	Bhavikatti S S	-	New Age International
3	Engineering Mechanics (Statics & Dynamics)	P. B. Kulkarni & M. P. Singh	-	

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Mechanics for Engineers, Statics and Dynamics	Beer F.P. and Johnston E. R.	-	Pearson Press
2	Engineering Mechanics	Bhavikatti S S	-	New Age International

FIRST SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25CV103P	Engineering Mechanics Lab	-	-	2	1	-	25	25	50

Course Objectives	Course Outcomes
-	At the end of the course, students will be able to- 1. Apply the basic concepts of applied mechanics for solution of problems on planar force system. 2. Analyze pin jointed truss frame structure and beam structure analytically and graphically. 3. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

Minimum EIGHT experiments to be performed from the list as below

Expt. No.	Title of the experiment
1	To find determine the support reactions of a Simply Supported Beam experimentally and analytically.
2	To determine the forces in the members of a Jib Crane Apparatus experimentally and graphically.
3	To determine the coefficient of friction between two surfaces of different material on Plane Friction Apparatus.
4	To determine the coefficient of friction of Coil Friction Apparatus.
5	To determine the forces in members of a Shear Leg Apparatus experimentally and manually.
6	To determine the mass moment of inertia of a fly wheel using Fly Wheel Apparatus
7	To determine efficiency and law of machine of Differential Axel & Wheel machine.
8	To determine efficiency and Law of machine of Single Purchase Crab machine.
9	To determine efficiency and Law of machine of Double Purchase Crab machine.
10	To find support reactions of a simply supported beam using graphical method and hand calculation.

FIRST SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25CV104P	Logic Building With C Lab	-	-	2	1	-	25	25	50

Course Objectives	Course Outcomes
This course is intended ● To make the student learn a programming language. ● To learn problem solving techniques. ● To teach the student to write programs in C and to solve the problems	**Students will be able to** ● Understand Fundamentals of Computers and C programming language ● Implement basic programs of decision making and loop control structure ● Implement programs using functions and pointers ● Understand fundamentals of arrays and strings ● Understand concept of structures and various operations on files

Expt. No.	List of Experiments
1	To study Fundamentals of Computer and Introduction to Programming Languages
2	To study Control Statements (Conditional): if and its Variants, switch
3	To study Control Statements (Looping): while, do While, for Loop, continue & break
4	To study Arrays, One Dimensional Array: Declaration and Initialization, Accessing Array Elements
5	To study Two Dimensional Array: Declaration and Initialization, Accessing Array Elements, Matrix operations
6	To study Strings: Read & Write, "String.h" Predefined Functions
7	To study Functions: Definition, Syntax, Terminology, Function Declaration, Classification (Arguments and Return Type)
8	To study Pointers: Declarations, Types, Parameter passing techniques
9	To study structures: declaration, initialization, accessing structure members
10	To study Files: Definition, Opening, Closing of Files, Reading andWriting of Files

Text Books

S.N	Title	Authors	Edition	Publisher
1	Programming in ANSI C	E. Balguruswamy	2nd	Tata Mc-Graw Hill
2	Programming Techniques Through 'C'	M. G. Venkateshmurthy	2nd	Pearson
3	LET US 'C'	Yashwant P. Kanetkar	1st	BPB
4	Programming With C	Byron S. Gottfried	2nd	Schaum Series
5	How to solve it by Computer	R.G. Dromey	1st	Pearson Education

Reference Books

S.N	Title	Authors	Edition	Publisher
1	The Complete Reference C	Herbert Schildt	4th	Tata Mc-Graw Hill
2	The 'C' programming language	Kernighan and Ritchie	1st	Prentice Hall
3	Programming and Problem Solving	M. Sprankle	2nd	Pearson Education

FIRST SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25CV105T	Building Materials	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
1. To develop an understanding of the properties, uses, and classification of traditional and modern construction materials. 2. To provide knowledge of material selection based on strength, durability, sustainability, and economy. 3. To familiarize students with testing methods for assessing construction materials.	At the end of the course, students will be able to- 1. Describe about stones, aggregates and bricks their importance in building construction. 2. Understand the composition and manufacturing of various construction materials. 3. Understand of modern trends and innovations in building materials.

Unit I		**[10 Hrs]**
	Stones & Bricks: Properties of building stones - relation to their structural requirements, classification of stones - stone quarrying - precautions in blasting, dressing of stone, properties aggregates, types of aggregates, properties of bricks, type of bricks, composition of bricks, various methods of manufacturing of bricks.	
Unit II		**[10 Hrs]**
	Cement, Concrete and Steel: Composition, types, and manufacturing of cement, Properties and tests of cement. Concrete ingredients, properties of fresh and hardened concrete. Tests on concrete (workability, strength, durability), Steel: Composition, types, and manufacturing.	
Unit III		**[10 Hrs]**
	Advanced Building Materials: Light-generating concrete, Self-Healing Concrete, Bioplastics, Carbon Fiber, Fiber-Reinforced Concrete (FRC), Fiber-Reinforced Polymers (FRP).	

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Building Materials	Varghese, P C	2018	Prentice Hall Of India Learning Private Limited
2.	Building Materials And Construction	Misra Anil Kumar	2017	S. Chand And Company Limited
3.	Building Materials	Bhavikatti S.S.	2025	Vikas Publishing House

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Building Materials	S.K. Duggal	2015	New Age International

		July 2025	3.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

FIRST SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25CV106P	Business Communication Skills I Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
To empower students to develop a career-oriented mindset while harnessing the power of LSRW skills.	**Students will be able to:** 1. apply verbal and non-verbal skills to confidently and effectively deliver presentations. 2. prepare themselves for overall language ability through listening and reading tasks. 3. demonstrate formal writing skills. 4. draft impactful Resumes and Cover Letters. 5. prepare themselves for Personal Interviews.

Expt. No.	Title of the experiment
1	Presentation Skills
2	Poster Making (Product/ Event)
3	Reading Comprehension for Competitive Exams.
4	Writing Skills for Academic Purposes.
5	Listening Skills I
6	Business Correspondence I
7	Resume Writing and Cover Letter
8	Mock Interviews

Reference Books:

S. N	Title	Authors	Edition	Publisher
1	Communication Skills for Engineers	C. Muralikrishna & SunitaMIshra	2nd Edition, 2011	Pearson India Education Services
2	Communication Skills	Dr. L .Bisen, Dr. B. Agrawal & Dr. N. T. Kalyani	1st Edition, 2021	Himalaya Publishing House
3	Barron's IELTS Superpack	Lin Lougheed	2012	Barrons Educational Series

FIRST SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25CV207T	Design Thinking	2	--	--	2	20	30	50

Course Objectives	Course Outcomes
1. Learn design thinking concepts and principles 2. Use design thinking methods in every stage of the problem 3. Learn the different phases of design thinking 4. Apply various methods in design thinking to different problems	Students will be able to 1. Define key concepts of design thinking 2. Practice design thinking in all stages of problem solving 3. Apply design thinking approach to real world problems

Unit I	**[10 Hrs**
INTRODUCTION: Why Design? - Four Questions, Ten Tools - Principles of Design Thinking - The process of Design Thinking - How to plan a Design Thinking project. UNDERSTAND, OBSERVE AND DEFINE THE PROBLEM: Search field determination - Problem clarification - Understanding of the problem – Problem analysis - Reformulation of the problem - Observation Phase - Empathetic design - Tips for observing - Methods for Empathetic Design - Point-of-View Phase - Characterization of the target group - Description of customer needs.	
Unit II	**[10 Hrs**
IDEATION AND PROTOTYPING: Ideate Phase - The creative process and creative principles - Creativity techniques - Evaluation of ideas - Prototype Phase - Lean Startup Method for Prototype Development - Visualization and presentation techniques.	
Unit III	**[10 Hrs**
TESTING AND IMPLEMENTATION: Test Phase - Tips for interviews - Tips for surveys - Kano Model - Desirability Testing - How to conduct workshops - Requirements for the space - Material requirements - Agility for Design Thinking. FUTURE:Design Thinking meets the corporation – The New Social Contract – Design Activism – Designing tomorrow.	

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Handbook of Design Thinking - Tips & Tools for how to design thinking	Christian Mueller-Roterberg	2021	Independently Published
2.	Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation	Tim Brown	2019	HarperCollins

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Design Thinking for Strategic Innovation	Idris Mootee		Wiley