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The National Institute of Engineering

Scheme of Teaching & Examinations - 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the AY 2025-26)

I Semester **(Physics Cycle)**

Sl.No	Course	Course Code	Course Title	Teaching Department	Teaching Hrs/Week				Credits	Examination			
					L	T	P	SAAE		Duration in Hrs	CIE	SEE	Total
1	ASC	1BMAxx101	Applied Mathematics - I (Stream Specific)	Maths	3	2	0	0	4	3	50	50	100
2	ASC	1BPHxx102	Applied Physics (Stream Specific)	Physics	2	2	0	0	3	3	50	50	100
3	ESC	1BCEDxx103	Computer-Aided Engineering Drawing (Stream Specific)	Mechanical	2	0	2	0	3	3	50	50	100
4	ESC	1BESC104x	Engineering Science Course - I	Respective Engg.Dept	3	0	0	0	3	3	50	50	100
5	PSC	1Bxxx105	Programme Specific Course	Respective Engg.Dept	2	2	0	0	3	3	50	50	100
					OR								
					3	0	0	0	3	3	50	50	100
	OR												
	PLC	1BPLC105x	Programming Language Course	Any Dept.	3	0	0	0	3	3	50	50	100
6	AEC (NCMC)	1Bxxx106	Soft Skills	Humanities	0	0	0	2	0	0	50	0	50
7	PSC	1BxxxL107	Program Specific Course Laboratory	Respective Engg Dept	0	0	2	0	1	2	50	50	100
	OR												
	PLC	1BPLCL105x	Programming Language Course Laboratory	Any Dept.	0	0	2	0	1	2	50	50	100
8	ASC	1BPHxxL102	Applied Physics Laboratory (Stream Specific)	Physics	0	0	2	0	1	2	50	50	100
9	AEC/SDC	1BPRJ158	Interdisciplinary Project-Based Learning	Respective Engg Dept	0	0	0	2	1	0	50	0	50
10	HSMS	1BKSK109(BKSK107)/ 1BKBK109(BKBK107)	Samskrutika Kannada / Balake Kannada	Humanities	1	0	0	0	1	0	50	0	50
				TOTAL					20				

AICTE Activity Points (students have to earn 100 activity points between 01 to 08 semester)

Compulsory requirement for the award of a degree

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The National Institute of Engineering

Scheme of Teaching & Examinations - 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the AY 2025-26)

I Semester **(Chemistry Cycle)**

Sl.No	Course	Course Code	Course Title	Teaching Department	Teaching Hrs/Week				Credits	Examination			
					L	T	P	SAAE		Duration in Hrs	CIE	SEE	Total
1	ASC	1BMAxx101	Applied Mathematics - I (Stream Specific)	Maths	3	2	0	0	4	3	50	50	100
2	ASC	1BCHxx102	Applied Chemistry (Stream Specific)	Chemistry	2	2	0	0	3	3	50	50	100
3	ETC	1BAIA103/ BETC105x	Introduction to AI and Applications	Any Dept.	3	0	0	0	3	3	50	50	100
4	ESC	1BESC104x	Engineering Science Course -I	Respective Engg.Dept	3	0	0	0	3	3	50	50	100
5	PSC	1Bxxx105	Programme Specific Course	Respective Engg.Dept	2	2	0	0	3	3	50	50	100
					OR								
					3	0	0	0	3	3	50	50	100
	OR												
	PLC	1BPLC105x	Programming Language Course	Any Dept.	3	0	0	0	3	3	50	50	100
6	AEC	1BENGL106	Communication Skills	Humanities	1	0	0	0	1	0	50	0	50
7	PSC	1BxxxL107	Program Specific Course Laboratory	Respective Engg Dept	0	0	2	0	1	2	50	50	100
	OR												
	PLC	1BPLCL105x	Programming Language Course Laboratory	Any Dept.	0	0	2	0	1	2	50	50	100
8	ASC	1BCHxxL102	Applied Chemistry Laboratory (Stream Specific)	Chemistry	0	0	2	0	1	2	50	50	100
9	AEC/SDC	1BIDTL158	Innovation and Design Thinking Lab	Respective Engg Dept	0	0	2	0	1	0	50	0	50
10	AEC (NCMC)	1BICO107	Indian Constitution & Engineering Ethics	Humanities	0	0	0	2	0	0	50	0	50
				TOTAL					20				

AICTE Activity Points (students have to earn 100 activity points between 01 to 08 semester)

Compulsory requirement for the award of a degree

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The National Institute of Engineering

Scheme of Teaching & Examinations - 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the AY 2025-26)

Applied Mathematics - I (Stream Specific)					Applied Mathematics - II (Stream Specific)				
Code	**Title**	**L**	**T**	**P**	**Code**	**Title**	**L**	**T**	**P**
1BMACV101	Applied Mathematics - I for Civil Engineering	3	2	0	1BMACV201	Applied Mathematics - II for Civil Engineering	3	2	0
1BMAME101	Applied Mathematics - I for Mechanical Engineering	3	2	0	1BMAME201	Applied Mathematics - II for Mechanical Engineering	3	2	0
1BMAEC101	Applied Mathematics - I for Electronics & Communication Engineering	3	2	0	1BMAEC201	Applied Mathematics - II for Electronics & Communication Engineering	3	2	0
1BMAEE101	Applied Mathematics - I for Electrical & Electronics Engineering	3	2	0	1BMAEE201	Applied Mathematics - II for Electrical & Electronics Engineering	3	2	0
1BMACS101	Applied Mathematics - I for Computer Science & Engineering Stream	3	2	0	1BMACS201	Applied Mathematics - II for Computer Science & Engineering Stream	3	2	0
Applied Physics (Stream Specific)					**Applied Chemistry (Stream Specific)**				
Code	**Title**	**L**	**T**	**P**	**Code**	**Title**	**L**	**T**	**P**
1BPHCV102/ 202	Applied Physics for Civil Engineering	3	0	2	1BCHCV102/ 202	Applied Chemistry for Civil Engineering	3	0	2
1BPHME102/ 202	Applied Physics for Mechanical Engineering	3	0	2	1BCHME102/ 202	Applied Chemistry for Mechanical Engineering	3	0	2
1BPHEC102/ 202	Applied Physics for Electronics & Communication Engineering	3	0	2	1BCHEC102/ 202	Applied Chemistry for Electronics & Communication Engineering	3	0	2
1BPHEE102/ 202	Applied Physics for Electrical & Electronics Engineering	3	0	2	1BCHEE102/ 202	Applied Chemistry for Electrical & Electronics Engineering	3	0	2
1BPHCS102/ 202	Applied Physics for Computer Science & Engineering Stream	3	0	2	1BCHCS102/ 202	Applied Chemistry for Computer Science & Engineering Stream	3	0	2
Engineering Science Course - I (ESC - I)					**Engineering Science Course - II (ESC - II)**				
Code	**Title**	**L**	**T**	**P**	**Code**	**Title**	**L**	**T**	**P**
1BESC104A	Building Sciences & Mechanics	3	0	0	1BESC204A	Building Sciences & Mechanics	3	0	0
1BESC104B	Introduction to Electrical Engineering	3	0	0	1BESC204B	Introduction to Electrical Engineering	3	0	0
1BESC104C	Introduction to Electronics & Communication Engineering	3	0	0	1BESC204C	Introduction to Electronics & Communication Engineering	3	0	0
1BESC104D	Introduction to Mechanical Engineering	3	0	0	1BESC204D	Introduction to Mechanical Engineering	3	0	0
1BESC104E	Essentials of Information Technology	3	0	0	1BESC204E	Essentials of Information Technology	3	0	0
Programming Language Courses (PLC)					**Programming Language Courses (PLC)**				
Code	**Title**	**L**	**T**	**P**	**Code**	**Title**	**L**	**T**	**P**
1BPLC105E	Introduction to C (For non IT programmes)	3	0	0	1BPLC205E	Introduction to C (For non IT programmes)	3	0	0
1BPLC105B	Python Programming (for CSE and allied programmes)	3	0	0	1BPLC205B	Python Programming (for CSE and allied programmes)	3	0	0
Programming Language Courses Laboratory (PLCL)					**Programming Language Courses Laboratory (PLCL)**				
Code	**Title**	**L**	**T**	**P**	**Code**	**Title**	**L**	**T**	**P**
1BPLCL105E	Introduction to C Laboratory (For non IT programmes)	0	0	2	1BPLC205E	Introduction to C Laboratory (For non IT programmes)	0	0	2
1BPLCL105B	Python Programming Laboratory (for CSE and allied programmes)	0	0	2	1BPLC205B	Python Programming Laboratory (for CSE and allied programmes)	0	0	2

Programme Specific Courses (PSC)					**Programme Specific Courses (PSC)**				
1BCIV105	Engineering Mechanics	3	0	0	1BCIV205	Engineering Mechanics	3	0	0
1BEME105	Elements of Mechanical Engineering	3	0	0	1BEME205	Elements of Mechanical Engineering	3	0	0
1BBEE105	Basics of Electrical Engineering	2	2	0	1BBEE205	Basics of Electrical Engineering	2	2	0
1BECE105	Fundamentals of Electronics & Communication Engineering	2	2	0	1BECE205	Fundamentals of Electronics & Communication Engineering	2	2	0
1BEIT105	Programming in C	3	0	0	1BEIT205	Programming in C	3	0	0
Program-Specific Course Lab (PSCL)					**Program-Specific Course Lab (PSCL)**				
1BMEML107	Mechanics and Materials Lab	0	0	2	1BMEML207	Mechanics and Materials Lab	0	0	2
1BEMEL107	Elements of Mechanical Engineering Lab	0	0	2	1BEMEL207	Elements of Mechanical Engineering Lab	0	0	2
1BBEEL107	Basic Electrical Lab	0	0	2	1BBEEL207	Basic Electrical Lab	0	0	2
1BECEL107	Fundamentals of Electronics & Communication Engineering Lab	0	0	2	1BECEL207	Fundamentals of Electronics & Communication Engineering Lab	0	0	2
1BPOPL107	C Programming Lab	0	0	2	1BPOPL207	C Programming Lab	0	0	2
Computer-Aided Engineering Drawing					**Computer-Aided Engineering Drawing**				
1BCEDCV103	Computer-Aided Engineering Drawing for CV	2	0	2	1BCEDCV203	Computer-Aided Engineering Drawing for CV	2	0	2
1BCEDME103	Computer-Aided Engineering Drawing for ME	2	0	2	1BCEDME203	Computer-Aided Engineering Drawing for ME	2	0	2
1BCEDEC103	Computer-Aided Engineering Drawing for ECE	2	0	2	1BCEDEC203	Computer-Aided Engineering Drawing for ECE	2	0	2
1BCEDEE103	Computer-Aided Engineering Drawing for EEE	2	0	2	1BCEDEE203	Computer-Aided Engineering Drawing for EEE	2	0	2
1BCEDCS103	Computer-Aided Engineering Drawing for CSE stream	2	0	2	1BCEDCS203	Computer-Aided Engineering Drawing for CSE stream	2	0	2

AICTE Activity Points Requirement for BE/B.Tech. Programmes

As per AICTE guidelines *(refer Chapter 6 – AICTE Activity Point Program, Model Internship Guidelines)* , in addition to academic requirements, students must earn a specified number of **Activity Points** to be eligible for the award of the degree. The points to be earned is:

1. **Regular students** admitted to a 4-year degree program must earn **100 Activity Points.**
2. **Lateral entry students** (joining from the second year) must earn **75 Activity Points.**
3. **Students transferred** from other universities directly into the fifth semester must earn **50 Activity Points** from the date of entry into VTU.

These Activity Points are **non-credit** and will not be considered for **the SGPA/CGPA** or be used for **vertical progression**. However, earning Activity Points is mandatory for the **award of the degree**, and the points earned will be reflected on the **eighth semester Grade Card.**

If a student completes all the semesters (eight or six) at the end of the programme but fails to earn the required Activity Points, the eighth-semester Grade Card will be withheld until the requirement is fulfilled. Also, the degree will be awarded only after the Grade Card has been released.

The hours spent earning the activity points will not be counted for regular attendance requirements. Students can accumulate these points at any time during their program period, including weekends, holidays, and vacations, starting from the year of admission, provided they meet the minimum hours of engagement prescribed for each activity by AICTE.

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Scheme of Teaching & Examinations - 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the AY 2025-26)

II Semester (For the students who have studied the Physics Cycle in I semester)

Sl.No	Course	Course Code	Course Title	Teaching Department	Teaching Hrs/Week				Credits	Examination			
					L	T	P	SAAE		Duration in Hrs	CIE	SEE	Total
1	ASC	1BMAxx201	Applied Mathematics - II (Stream Specific)	Maths	3	2	0	0	4	3	50	50	100
2	ASC	1BCHxx202	Applied Chemistry (Stream Specific)	Chemistry	2	2	0	0	3	3	50	50	100
3	ETC	1BAIA203/ BETC205x	Introduction to AI and Applications	Any Dept.	3	0	0	0	3	3	50	50	100
4	ESC	1BESC204x	Engineering Science Course - I	Respective Engg.Dept	3	0	0	0	3	3	50	50	100
5	PSC	1Bxxx205	Programme Specific Course	Respective Engg.Dept	2	2	0	0	3	3	50	50	100
					OR								
					3	0	0	0	3	3	50	50	100
				OR									
	PLC	1BPLC205x	Programming Language Course	Any Dept.	3	0	0	0	3	3	50	50	100
6	AEC	1BENGL206	Communication Skills	Humanities	1	0	0	0	1	0	50	0	50
7	PSC	1BxxxL207	Program Specific Course Laboratory	Respective Engg Dept	0	0	2	0	1	2	50	50	100
				OR									
	PLC	1BPLCL205x	Programming Language Course Laboratory	Any Dept.	0	0	2	0	1	2	50	50	100
8	ASC	1BCHxxL202	Applied Chemistry Laboratory (Stream Specific)	Chemistry	0	0	2	0	1	2	50	50	100
9	AEC/SDC	1BIDTL258	Innovation and Design Thinking Lab	Respective Engg Dept	0	0	2	0	1	0	50	0	50
10	AEC (NCMC)	1BICO207	Indian Constitution & Engineering Ethics	Humanities	0	0	0	2	0	0	50	0	50
				TOTAL					20				

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Scheme of Teaching & Examinations - 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the AY 2025-26)

II Semester (For the students who have studied the Chemistry Cycle in I semester)

Sl.No	Course	Course Code	Course Title	Teaching Department	Teaching Hrs/Week				Credits	Examination			
					L	T	P	SAAE		Duration in Hrs	CIE	SEE	Total
1	ASC	1BMAxx201	Applied Mathematics - II (Stream Specific)	Maths	3	2	0	0	4	3	50	50	100
2	ASC	1BPHxx202	Applied Physics (Stream Specific)	Physics	2	2	0	0	3	3	50	50	100
3	ESC	1BCEDxx203	Computer-Aided Engineering Drawing (Stream Specific)	Mechanical	2	0	2	0	3	3	50	50	100
4	ESC	1BESC204x	Engineering Science Course - II	Respective Engg.Dept	3	0	0	0	3	3	50	50	100
5	PSC	1Bxxx205	Programme Specific Course	Respective Engg.Dept	2	2	0	0	3	3	50	50	100
					OR								
					3	0	0	0	3	3	50	50	100
				OR									
	PLC	1BPLC205x	Programming Language Course	Any Dept.	3	0	0	0	3	3	50	50	100
6	AEC (NCMC)	1Bxxx206	Soft Skills	Humanities	0	0	0	2	0	0	50	0	50
7	PSC	1BxxxL207	Program Specific Course Laboratory	Respective Engg Dept	0	0	2	0	1	2	50	50	100
				OR									
	PLC	1BPLCL205x	Programming Language Course Laboratory	Any Dept.	0	0	2	0	1	2	50	50	100
8	ASC	1BPHxxL202	Applied Physics Laboratory (Stream Specific)	Physics	0	0	2	0	1	2	50	50	100
9	AEC/SDC	1BPRJ258	Interdisciplinary Project-Based Learning	Respective Engg Dept	0	0	0	2	1	0	50	0	50
10	HSMS	1BKSK209(BKSK207)/ 1BKBK209(BKBK207)	Samskrutika Kannada / Balake Kannada	Humanities	1	0	0	0	1	0	50	0	50
				TOTAL					20				

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(Effective from the AY 2025-26)

Applied Mathematics - I (Stream Specific)				
Code	**Title**	**L**	**T**	**P**
1BMACV101	Applied Mathematics - I for Civil Engineering	3	2	0
1BMAME101	Applied Mathematics - I for Mechanical Engineering	3	2	0
1BMAEC101	Applied Mathematics - I for Electronics & Communication Engineering	3	2	0
1BMAEE101	Applied Mathematics - I for Electrical & Electronics Engineering	3	2	0
1BMACS101	Applied Mathematics - I for Computer Science & Engineering Stream	3	2	0

Applied Mathematics - II (Stream Specific)				
Code	**Title**	**L**	**T**	**P**
1BMACV201	Applied Mathematics - II for Civil Engineering	3	2	0
1BMAME201	Applied Mathematics - II for Mechanical Engineering	3	2	0
1BMAEC201	Applied Mathematics - II for Electronics & Communication Engineering	3	2	0
1BMAEE201	Applied Mathematics - II for Electrical & Electronics Engineering	3	2	0
1BMACS201	Applied Mathematics - II for Computer Science & Engineering Stream	3	2	0

Applied Physics (Stream Specific)				
Code	**Title**	**L**	**T**	**P**
1BPHCV102/ 202	Applied Physics for Civil Engineering	3	0	2
1BPHME102/ 202	Applied Physics for Mechanical Engineering	3	0	2
1BPHEC102/ 202	Applied Physics for Electronics & Communication Engineering	3	0	2
1BPHEE102/ 202	Applied Physics for Electrical & Electronics Engineering	3	0	2
1BPHCS102/ 202	Applied Physics for Computer Science & Engineering Stream	3	0	2

Applied Chemistry (Stream Specific)				
Code	**Title**	**L**	**T**	**P**
1BCHCV102/ 202	Applied Chemistry for Civil Engineering	3	0	2
1BCHME102/ 202	Applied Chemistry for Mechanical Engineering	3	0	2
1BCHEC102/ 202	Applied Chemistry for Electronics & Communication Engineering	3	0	2
1BCHEE102/ 202	Applied Chemistry for Electrical & Electronics Engineering	3	0	2
1BCHCS102/ 202	Applied Chemistry for Computer Science & Engineering Stream	3	0	2

Engineering Science Course - I (ESC - I)				
Code	**Title**	**L**	**T**	**P**
1BESC104A	Building Sciences & Mechanics	3	0	0
1BESC104B	Introduction to Electrical Engineering	3	0	0
1BESC104C	Introduction to Electronics & Communication Engineering	3	0	0
1BESC104D	Introduction to Mechanical Engineering	3	0	0
1BESC104E	Essentials of Information Technology	3	0	0

Engineering Science Course - II (ESC - II)				
Code	**Title**	**L**	**T**	**P**
1BESC204A	Building Sciences & Mechanics	3	0	0
1BESC204B	Introduction to Electrical Engineering	3	0	0
1BESC204C	Introduction to Electronics & Communication Engineering	3	0	0
1BESC204D	Introduction to Mechanical Engineering	3	0	0
1BESC204E	Essentials of Information Technology	3	0	0

Programming Language Courses (PLC)				
Code	**Title**	**L**	**T**	**P**
1BPLC105E	Introduction to C (For non IT programmes)	3	0	0
1BPLC105B	Python Programming (for CSE and allied programmes)	3	0	0

Programming Language Courses (PLC)				
Code	**Title**	**L**	**T**	**P**
1BPLC205E	Introduction to C (For non IT programmes)	3	0	0
1BPLC205B	Python Programming (for CSE and allied programmes)	3	0	0

Programming Language Courses Laboratory (PLCL)				
Code	**Title**	**L**	**T**	**P**
1BPLCL105E	Introduction to C Laboratory (For non IT programmes)	0	0	2
1BPLCL105B	Python Programming Laboratory (for CSE and allied programmes)	0	0	2

Programming Language Courses Laboratory (PLCL)				
Code	**Title**	**L**	**T**	**P**
1BPLC205E	Introduction to C Laboratory (For non IT programmes)	0	0	2
1BPLC205B	Python Programming Laboratory (for CSE and allied programmes)	0	0	2

Programme Specific Courses (PSC)					**Programme Specific Courses (PSC)**				
1BCIV105	Engineering Mechanics	3	0	0	1BCIV205	Engineering Mechanics	3	0	0
1BEME105	Elements of Mechanical Engineering	3	0	0	1BEME205	Elements of Mechanical Engineering	3	0	0
1BBEE105	Basics of Electrical Engineering	2	2	0	1BBEE205	Basics of Electrical Engineering	2	2	0
1BECE105	Fundamentals of Electronics & Communication Engineering	2	2	0	1BECE205	Fundamentals of Electronics & Communication Engineering	2	2	0
1BEIT105	Programming in C	3	0	0	1BEIT205	Programming in C	3	0	0
Program-Specific Course Lab (PSCL)					**Program-Specific Course Lab (PSCL)**				
1BMEML107	Mechanics and Materials Lab	0	0	2	1BMEML207	Mechanics and Materials Lab	0	0	2
1BEMEL107	Elements of Mechanical Engineering Lab	0	0	2	1BEMEL207	Elements of Mechanical Engineering Lab	0	0	2
1BBEEL107	Basic Electrical Lab	0	0	2	1BBEEL207	Basic Electrical Lab	0	0	2
1BECEL107	Fundamentals of Electronics & Communication Engineering Lab	0	0	2	1BECEL207	Fundamentals of Electronics & Communication Engineering Lab	0	0	2
1BPOPL107	C Programming Lab	0	0	2	1BPOPL207	C Programming Lab	0	0	2
Computer-Aided Engineering Drawing					**Computer-Aided Engineering Drawing**				
1BCEDCV103	Computer-Aided Engineering Drawing for CV	2	0	2	1BCEDCV203	Computer-Aided Engineering Drawing for CV	2	0	2
1BCEDME103	Computer-Aided Engineering Drawing for ME	2	0	2	1BCEDME203	Computer-Aided Engineering Drawing for ME	2	0	2
1BCEDEC103	Computer-Aided Engineering Drawing for ECE	2	0	2	1BCEDEC203	Computer-Aided Engineering Drawing for ECE	2	0	2
1BCEDEE103	Computer-Aided Engineering Drawing for EEE	2	0	2	1BCEDEE203	Computer-Aided Engineering Drawing for EEE	2	0	2
1BCEDCS103	Computer-Aided Engineering Drawing for CSE stream	2	0	2	1BCEDCS203	Computer-Aided Engineering Drawing for CSE stream	2	0	2

AICTE Activity Points Requirement for BE/B.Tech. Programmes

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3. **Students transferred** from other universities directly into the fifth semester must earn **50 Activity Points** from the date of entry into VTU.

These Activity Points are **non-credit** and will not be considered for **the SGPA/CGPA** or be used for **vertical progression**. However, earning Activity Points is mandatory for the **award of the degree**, and the points earned will be reflected on the **eighth semester Grade Card.**

If a student completes all the semesters (eight or six) at the end of the programme but fails to earn the required Activity Points, the eighth-semester Grade Card will be withheld until the requirement is fulfilled. Also, the degree will be awarded only after the Grade Card has been released.

The hours spent earning the activity points will not be counted for regular attendance requirements. Students can accumulate these points at any time during their program period, including weekends, holidays, and vacations, starting from the year of admission, provided they meet the minimum hours of engagement prescribed for each activity by AICTE.

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Code:	**1BESC104A/204A**	**Course: Building Sciences & Mechanics**	
Credits:	**3**	**L: T:P 3:0:0**	
SEE:	**50%**	**CIE: 50%**	
SEE Hours:	**3**	**Max. Marks:100**	

Prerequisites if any	Pre-University Physics and Mathematics
Learning objectives	1. To make students learn the scope of various specializations of building science. 2. Construct "Free Body Diagrams" of real-world problems and apply Newton's Laws of motion and vector operations to evaluate equilibrium of particles and bodies. 3. To develop the student's ability to find out the centre of gravity and moment of inertia and their applications.

Course Outcomes:

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

COs	Course Outcomes	Bloom's level
CO1	Understand the various disciplines of building science	Understand
CO2	Apply principles of coplanar concurrent forces acting on particles	Apply
CO3	Apply principles of coplanar non-concurrent forces acting on rigid bodies	Apply
CO4	Analyze truss and Compute centroid, moment of inertia of plane geometrical and composite areas	Analyze

Mapping with POs and PSOs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11		PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-				
CO2	2	3	-	-	-	-	-	-	-	-	-				
CO3	2	3	-	-	-	-	-	-	-	-	-				
CO4	2	3	-	-	-	-	-	-	-	-	-				

Mapping Strength: Strong– 3 Medium – 2 Low – 1

Course Structure

		No. of Lecture Hours	No. of Tutorial Hours	No. of Practical Hours
Module – 1				
1.1	Introduction to sustainable development goals	1	-	-
1.2	Smart city concept, Clean city concept,	1	-	-
1.3	Safe city concept	1	-	-
1.4	Water Supply and Sanitary systems, urban air pollution management,	1	-	-
1.5	Solid waste management, identification of Landfill sites,	1	-	-
1.6	Urban flood control	1	-	-
1.7	Energy efficient buildings, recycling,	1	-	-
1.8	Temperature and Sound control in buildings, Smart buildings.	1	-	-
Module – 2				
2.1	Classifications of Mechanics, Definitions – Particle, rigid body, force, mass, time, space force system	1	-	-
2.2	Newton's laws, system of units, sign conventions	1	-	-
2.3	Principle of transmissibility of forces	1	-	-
2.4	Concurrent forces in plane: Introduction	1	-	-
2.5	Resultant forces – Parallelogram law, Triangle law & Polygonal law	1	-	-
2.6	Resolution and component of forces	1	-	-
2.7	Resultant of several concurrent forces, free body diagram	1	-	-
2.8	Equilibrium conditions, Lami's Theorem	1	-	-
Module – 3				
3.1	Introduction, Moment of a force about a point	1	-	-
3.2	Varignon's Theorem, Moment of a couple	1	-	-
3.3	Resolution of a force into force-couple system	1	-	-
3.4	Coplanar parallel force system	1	-	-
3.5	Coplanar Non concurrent system	1	-	-
3.6	Resultant of Coplanar non concurrent system	1	-	-
3.7	Equilibrium of Rigid bodies	1	-	-
3.8	Applications of statics of rigid bodies – Types of support in two dimensions, beams, types of loads, multi-force members.	2	-	-
Module – 4				
4.1	Introduction to Plane Trusses, Pin jointed Plane Trusses (Method of Joints & Sections	2	-	-
4.3	Importance of centroid and centre of gravity	1	-	-
4.4	Methods of determining the centroid	1	-	-
4.5	Locating the centroid of plane laminae from first principles	2	-	-
4.6	Numerical examples	2	-	-
Module – 5				
5.1	Importance of Moment of Inertia	1	-	-
5.2	Method of determining the second moment of area (moment of inertia) of plane sections from first principles,	2	-	-
5.3	Parallel axis theorem and perpendicular axis theorem,	1	-	-
5.4	Section modulus, radius of gyration,	1	-	-
5.5	Numerical Examples.	2	-	-
	Total No. of Lecture Hours	40	-	-
	Total No. of Tutorial Hours			-
	Total No. of Practical Hours			**-**

Self-learning topics identified: (Maximum of 5 topics)

1. Multi-force members
2. Derivation of centroid of Quarter-circle
3. Derivation of moment of inertia of Quarter-circle

Textbooks:

1. R. K. Bansal, R. R. Beohar and A. A. Khan, “Basic Civil Engineering and Engineering Mechanics”, Laxmi Publications, 2015.
2. S. Rajasekharan, G. Sankar Subramanian, “Engineering Mechanics- Statics and Dynamics”- Vikas Publishing House, 2011.

Reference Books:

1. Stephen Timoshenko, D. Young, J Rao “Engineering Mechanics”, Tata-McGraw Hill, Special Indian edition, 2006.
2. Beer FP and Johnson ER, “Mechanics for Engineers- Dynamics and Statics”, 3rd SI Metric edition, Tata McGraw Hill,2008.
3. P.N. Chandra Mouli, “Engineering Mechanics” PHI Learning, 2011.
4. Shames IH, “Engineering Mechanics – Statics & Dynamics”, PHI, 2009.
5. J. L. Meriam and L. G. Kraige, "Engineering Mechanics: Statics", Don Fowley Publishers, 2006.

Online Resources:

1. Engineering Mechanics by Prof. K. Ramesh, IIT Madras https://nptel.ac.in/courses/112106286

Code: 1BCIV105/205 **Course: Engineering Mechanics**
Credits: 3 **L:T:P 3:0:0**
SEE: 50% **CIE: 50%**
SEE Hours: 3 **Max. Marks:100**

Prerequisites if any	Pre-University Physics and Mathematics
Learning objectives	• Construct "Free Body Diagrams" of real-world problems and apply Newton's Laws of motion and vector operations to evaluate equilibrium of particles and bodies. • Identify the moment of a force and calculate its value about a specified axis. Define the moment of a couple. • To analyze the member forces in trusses and students to learn the effect of friction on different planes • To develop the student's ability to find out the Centre of gravity and moment of inertia and their applications and learn about kinematics and kinetics and their applications.

Course Outcomes:

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

COs	Course Outcomes	Bloom's level
CO1	Understand coplanar concurrent and non-concurrent forces acting on particles and rigid bodies	Understand
CO2	Analyze the loading types, reactions for beams and apply the principles of friction.	Analyze
CO3	Analyse the equilibrium of force system including friction.	Apply
CO4	Compute centroid and second moment of area of composite sections	Apply

Mapping with POs and PSOs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11		PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	-		3	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-		3	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-		3	-	-
CO4	-	2	2	-	-	-	-	-	-	-	-		3	-	-

Mapping Strength: Strong– 3 Medium – 2 Low – 1

Course Structure

		No. of Lecture Hours	No. of Tutorial Hours	No. of Practical Hours
Module – 1				
1.1	**Coplanar force system:** Basic dimensions and units, Idealisation Classification of force system	01	----	----
1.2	Principle of transmissibility of a force, Composition and resolution of forces, Numerical examples	02	----	----
1.3	Free body diagrams, Resultant of coplanar concurrent and non-concurrent force system, Numerical examples	02	----	----
1.4	Moment, Couple and Characteristics of couple	01	----	----
1.5	Non-concurrent force system Varignon's theorem: Numerical Examples.	02	----	----
Module – 2				
2.1	**Equilibrium:** Conditions of static equilibrium, Equilibrium of coplanar concurrent force systems, Lami's theorem, Numerical ex	02	----	----
2.2	Equilibrium of coplanar non-concurrent force system, Numerical examples.	02	----	----
2.3	Types of supports, loadings and beams, Concept of statically determinate and indeterminate beams.	02	----	----
2.4	Support reactions for statically determinate beams subjected to various loadings: Numerical examples.	02	----	----
Module – 3				
3.1	**Friction:** Introduction, Types of friction, Concept of static friction	01	----	----
3.2	Kinetic (Dynamic) friction, Laws of friction, Angle of repose, Cone of friction, Numerical examples	01	----	----
3.3	Equilibrium of blocks on horizontal, Numerical examples	02	----	----
3.4	Equilibrium of blocks on inclined plane, Numerical examples	03	----	----
3.5	Ladder friction: Numerical examples	01	----	----
Module – 4				
4.1	**Centroid:** Introduction, definitions of centroid and centre of gravity.	01	----	----
4.2	Axes of symmetry, Locating the centroid of square, rectangle, triangle using method of integration	02	----	----
4.3	Circle, semicircle, quadrant and sector of a circle using method of integration	02	----	----
4.4	Centroid of composite areas and simple built up sections: Numerical examples	03	----	----
Module – 5				
5.1	**Moment of Inertia of plane Areas:** Introduction, Moment of inertia about an axis	01	----	----
5.2	Parallel axes theorem, Perpendicular axes theorem, Polar moment of inertia, Radius of gyration.	01	----	----
5.3	Moment of inertia of square, rectangular, triangular from the method of Integration	02	----	----
5.4	Circular areas from the method of Integration	01	----	----
5.5	Moment of inertia of composite areas and simple built-up sections: Numerical Examples.	03	----	----
	Total No. of Lecture Hours	**40**		
	Total No. of Tutorial Hours		----	
	Total No. of Practical Hours			----

Self-learning topics:

1. Introduction to vector approach
2. Vector representation of moment of a force
3. Centroid of line segments
4. Product of inertia

Textbooks:

1. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, third edition, 2015, Laxmi Publications, ISBN: 9789380856674.
2. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, Eleventh edition, 2018, Eastern Book Promoters Belgaum [EBPB], ISBN: 5551234003896.

Reference Books:

1. Beer F.P. and Johnston E. R., Mechanics for Engineers: Statics and Dynamics, Fourth edition, 1987, McGraw Hill, ISBN: 9780070045842.
2. Meriam J. L. and Kraige L. G, Engineering Mechanics-Statics, Vol I–sixth Edition,2008, Wiley publication.
3. Irving H. Shames, Engineering Mechanics-Statics and Dynamics, fourth edition, 2002, Prentice-Hall of India(PHI).
4. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, fourteenth edition, 2017, Pearson Press, New Delhi.ISBN:9789332584747.
5. Timoshenko S, Young D. H., Rao J. V., Sukumar Patil, Engineering Mechanics, fifth Edition, 2017,McGraw Hill Publisher, ISBN: 9781259062667
6. Bhavikatti S S, Engineering Mechanics, fourth edition, 2018, New Age International Publications.

Online Resources:

1. Engineering Mechanics by Prof. K. Ramesh, IIT Madras https://nptel.ac.in/courses/112106286

Code: 1BMEML107/207 **Course: Mechanics and Materials Laboratory**
Credits: 1 **L:T:P 0:0:2**
SET: 50% **CIE: 50%**
SET Hours: 2 **Max. Marks:100**

Prerequisites if any	Pre-University Physics and Mathematics
Learning objectives	1. Verfiy fundamental principles and theorems of mechanics. 2. Identify and determine properties of construction materials

Course Outcomes:

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

COs	Course Outcomes	Bloom's level
CO1	Apply fundamental principles of engineering mechanics to verify theorems of equilibrium, analyze force systems, determine properties of construction materials through laboratory tests (specific gravity, sieve analysis), and identify common building materials through visual inspection.	Understand, Apply
CO2	Conduct open-ended laboratory experiments related to reactions, cement testing, and particle size distribution of aggregates (gap graded, uniformly graded, well graded),	Apply, Analyze Evaluate, Create

Mapping with POs and PSOs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11		PSO1	PSO2	PSO3
CO1	3	2	2	2	-	-	-	-	3	3	-		2	-	3
CO2	3	2	2	2	-	-	-	-	3	3	-		2	-	3

Mapping Strength: Strong– 3 Medium – 2 Low – 1

Course Structure

		No. of Lecture Hours	No. of Tutorial Hours	No. of Practical Hours
List of Experiments				
1.1	Verification of Lami's Theorem			2
1.2	Equilibrium of concurrent forces			2
1.3	Parallel force system- Simply supported beam.			2
1.4	Verification of Varignon's theorem			2
1.5	Specific Gravity of a) Fine aggregates. b) Coarse aggregates. c) Cement d) Soil			4
1.6	Sieve analysis of Soil - Graphical representation of the gradation curve			2
1.7	**Visual identification of building materials:** Bricks, Blocks, Stones, Tiles, M-Sand, Standard Sand, Soil, Aggregates, Bitumen, Wood, Steel Bars of Various Sizes.			2

1.8	**Open-ended experiments:** These are a type of laboratory activity where the outcome is not predetermined, and students are given the freedom to explore, design, and conduct the experiment based on the problem statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and inquiry-based learning. 1. Reactions. 2. Field tests on cement. 3. Particle size distribution. 4. Gap graded. 5. Uniformly graded. 6. Well graded.			4
	Total No. of Lecture Hours			
	Total No. of Tutorial Hours			
	Total No. of Practical Hours			**20**

Textbooks:

1. M. L. Gambhir: Concrete Manual: Dhanpat Rai & Sons New – Delhi, ISBN 135551234001965.
2. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, third edition, 2015, Laxmi Publications, ISBN: 9789380856674
3. Ramamrutham S, Engineering Mechanics, Dhanpat Rai Books, 2013, ISBN: 9789352164271.
4. B C Punmia, Ashok Kumar Jain, Arun Kumar Jain, Soil Mechanics and foundation Engineering, 18th edition, 2023, Laxmi Publications New Delhi.

Reference Books:

1. Meriam J. L. and Kraige L. G, Engineering Mechanics-Statics, Vol I–sixth Edition,2008, Wiley publication.
2. Rattan S.S., Strength of Materials, Third edition, 2017, McGraw Hill Education; New Delhi. ISBN-13978-9385965517.
3. Bansal R K, Strength of Materials, Laxmi Publications. 2023, 4th Edition, ISBN:978 8131808146.
4. IS 4031 (Part 11):1988 – Specific gravity test for hydraulic cement.
5. IS 383:1970 – Specification for coarse and fine aggregates from natural sources for concrete.
6. IS 2386(Part 3):1963 Methods of test for aggregates for concrete: Part 3 Specific gravity, density, voids, absorption and bulking.
7. IS 2720 (Part 3/Sec 1):1980 – Determination of specific gravity of soil.

Online Resources:

1. https://nptel.ac.in/courses/112103109/
2. http://vlab.co.in/