SOMAIYA
VIDYAVIHAR UNIVERSITY

K J Somaiya School of Engineering
(formerly K J Somaiya College of Engineering)

F Y B Tech (Semester I and II)
(Common to all branches)

Teaching, Credit and Evaluation Scheme

From
Academic Year 2025-26
(Version 3.0)

Dates of Approvals and Amendments: Common Special Meeting of All-Department Boards of Studies and Faculty of Engineering & Technology jointly conducted on 7 July 2025

Preamble
(From the Dean, Faculty of Engineering and Technology)

It gives me immense pleasure to introduce the revised curriculum for the First Year B. Tech. (R-2025) at K J Somaiya School of Engineering, designed with a forward-looking vision to shape engineers of the future. This revision is aligned with the guiding principles of the National Education Policy (NEP) 2020, and in compliance with UGC and AICTE guidelines, while incorporating valuable inputs from our Academic Council, faculty members, and industry experts.

The R-2025 curriculum represents a significant step toward holistic and application-oriented learning. It has been thoughtfully structured to provide a strong foundation in engineering sciences, while fostering creativity, critical thinking, and multidisciplinary exposure from the very first year. The introduction of branch-specific core and science courses is a strategic move to immerse students early into their chosen fields. These courses enhance academic interest, improve retention, and allow students to apply scientific principles directly to domain-specific problems from the outset.

A key highlight of the revised curriculum is the Makerspace course, which brings innovation and experiential learning to the forefront. It blends traditional workshop practices with real-world project-building, enabling students to explore design thinking, rapid prototyping, and interdisciplinary collaboration. This hands-on approach is aimed at nurturing problem-solving abilities and an innovation mindset, essential for success in today's dynamic engineering landscape.

A particular emphasis has been laid on developing programming and problem-solving skills through structured and object-oriented programming methodologies, with flexibility in language platforms to suit diverse academic backgrounds and branch-specific needs. The inclusion of end-semester practical examinations and distinct passing criteria for continuous and end-semester assessments further strengthens academic rigor and continuous learning.

The inclusion of value-added courses like Sports, Environmental Science, and Biology for Engineers reflects our commitment to shaping well-rounded individuals equipped not only with technical skills but also with physical well-being, ecological awareness, and interdisciplinary insight. The foundational course in Biology for Engineers will be further complemented with advanced courses in higher semesters, enabling students to understand complex problems in biological sciences and healthcare. These courses will guide them to identify opportunities where engineering and technology can offer impactful solutions.

This curriculum is not just a syllabus; it is a blueprint for nurturing engineers who are resilient, innovative, and ethically grounded. We are confident that the R-2025 curriculum will empower our students to become competent professionals and responsible global citizens, ready to contribute meaningfully to society and the engineering world.

Dr. Suresh Ukarande
Dean, Faculty of Engineering & Technology

1. **Introduction:**
   K J Somaiya School of Engineering has revised the First Year B. Tech curriculum in alignment with the National Education Policy (NEP) 2020, UGC and AICTE guidelines, and suggestions from the Academic Council. The R-2025 curriculum aims to foster holistic, multidisciplinary, and application-oriented learning for engineering students.

2. **NEP 2020 Alignment:**
   The curriculum reflects NEP 2020 principles by:
   - Promoting **multidisciplinary and holistic education**
   - Emphasizing **skill-based and project-oriented learning** through Makerspace
   - Ensuring **flexibility in learning paths** (language options in programming)
   - Encouraging **physical education** and **environmental awareness**
   - Introducing **value-added, branch-specific, and contextual learning** early in the program

3. **Salient Features of FY B. Tech Curriculum (SVU R-2025):**
   a. **Defined Value-Added Course Basket (Sports):** Introduced as a structured and credit-based course as per NEP-2020 guidelines to promote physical well-being and teamwork.
   b. **Environmental Science (EVS):** Added as a compulsory course as per UGC and AICTE mandates, addressing sustainability, ecological literacy, and climate challenges.
   c. **Biology for Engineers:** Included based on the Academic Council's recommendation to promote interdisciplinary thinking and prepare students for bio-inspired engineering.
   d. **Makerspace (Project-Based Learning):** Combines elements of traditional workshop practice with real-world project building and innovation, fostering design thinking and problem-solving.
   e. **Workshop Trades Modernized:** Generic workshop trades have been customized to be **branch-specific**, ensuring direct industry relevance and skill development.
   f. **Branch-Specific Core Engineering Courses:** Introduced in the first year to help students engage early with their chosen discipline and improve retention and academic interest.
   g. **Branch-Specific Science Course:** Designed to complement core engineering subjects with relevant scientific principles from the first year itself.
   h. **Structured Programming Methodology:** Introduced with **flexible language platforms** (C/Python/Java etc.) based on needs of the branch, enhancing adaptability and practical coding skills.
   i. **Object-Oriented Programming Methodology:** Added as a full course to strengthen software design thinking and align with industry practices.
   j. **End-Semester Practical Examination for Programming Courses:** Assesses hands-on competencies alongside theory, ensuring balanced evaluation
   k. **Separate Heads of Passing for CA and ES:** Both Continuous Assessment (CA) and End Semester Examination (ESE) now have minimum marks for passing, ensuring consistent academic effort
   l. **Unified Curriculum – Common Syllabus for All:** The earlier "Group-wise" (C-group/P-group) system is removed; all students now take the same courses in the same semester, reducing administrative complexity and ensuring equity.

3. **Academic Advantages:**
   - Early exposure to core and specialized content increases engagement and program relevance.
   - Multidisciplinary inclusion (Biology, EVS, Makerspace) fosters 21st-century competencies
   - Emphasis on programming methodology and assessment balance improves computational thinking and hands-on skills
   - Value-based education and sports promote holistic development.

4. **Summary:**
   The SVU R-2025 First Year B. Tech. curriculum marks a strategic shift toward a more robust, inclusive, and application-oriented engineering education model. It ensures stronger alignment with national policies, global trends, and industry expectations with ease of administration

- **Acronyms use:**

1. **Acronyms for category of courses and syllabus template**

Acronym	Description	Acronym	Description
BS	Basic Science Courses	**CA**	Continuous Assessment (Theory Course)
ES	Engineering Science	**ESE**	End Semester Exam
HS	Humanities, Social Sciences and Management Courses	**IA**	Internal Assessment
PC	Professional Core Courses	**TH**	Theory
PE	Professional Elective courses	**TUT**	Tutorial
OET	Open Elective – Technical	**MSE**	Mid- Semester Examination
OEHM	Open Elective – Humanities and Management	**CO**	Course Outcome
LC	Laboratory Courses	**PO**	Program Outcome
PR	Project	**PSO**	Program specific Outcome
VAC	Exposure Course/Value-Added Course	**Lab/Tut CA**	Continuous Assessment of Laboratory/Tutorial Course

2. **Type of Course**

Acronym	Description
C	Core Course
E	Elective Course
O	Open Elective Technical
H	Open Elective - Humanities/ Management/ SWAYAM-NPTEL/ Coursera
P	Project
L	Laboratory Course
T	Tutorial
X	Value-Added Course/Exposure course

3. **Eight Digit Course code e.g. 116U06C101**

Acronym Serially as per code	Description
3	SVU-2025 Third Revision
16	College code
U	Alphabet code for type of program
06	Program/Department code
C	Type of course
1	Semester number (Semester I)
01	Course serial number

Knowledge and Attitude Profile (WK)
(As per NBA Criteria w. e. f. 2024-25)

WK1: A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences

WK2: Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline

WK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline

WK4: Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline

WK5: Knowledge, including efficient resource use, environmental impacts, whole-life cost, reuse of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area

WK6: Knowledge of engineering practice (technology) in the practice areas in the engineering discipline

WK7: Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development

WK8: Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues

WK9: Ethics, inclusive behaviour and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes

Program Outcomes (POs) (As per NBA Criteria w. e. f. 2024-25)

PO1: **Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problem

PO2: **Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: **Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

PO4: **Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5: **Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6: **The Engineer and The World:** Analyse and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7)

PO7: **Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: **Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams

PO9: **Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: **Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments

PO11: **Life-Long Learning:** Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

Somaiya Vidyavihar University
K J Somaiya School of Engineering

FY B Tech (Common to All)
SVU R-2025 Version 3.0
SEM I

Teaching and Credit Scheme

Course Code		Course Category	Name of the Course	Teaching Scheme TH-PR-TUT	Total (hrs.)	Credit Scheme TH-PR-TUT	Total Credits
SVU	KJSSE						
	316U06C101	BS	Applied Mathematics – 1	3 – 0 – 1	4	3 – 0 – 1	4
	316U06C102	BS	Engineering Physics	2 – 0 – 0	2	2 – 0 – 0	2
	316U06C103	BS	Engineering Chemistry	2 – 0 – 0	2	2 – 0 – 0	2
	316U06C104	ES	Basic Electrical Engineering	2 – 0 – 0	2	2 – 0 – 0	2
	316U06C105	ES	Engineering Drawing	2 – 0 – 1	3	2 – 0 – 1	3
	316U06C106	BS	Biology for Engineers	2 – 0 – 0	2	2 – 0 – 0	2
	316U06C107	ES	Structured Programming Methodology	2 – 2 – 0	4	2 – 1 – 0	3
	316U06L101	BS	Applied Science Laboratory	0 – 2 – 0	2	0 – 1 – 0	1
	316U06L102	ES	Basic Electrical Engineering Laboratory	0 – 2 – 0	2	0 – 1 – 0	1
	316U06L103	ES	Engineering Drawing Laboratory	0 – 2 – 0	2	0 – 1 – 0	1
	316U06L104	ES	Maker Space Laboratory – I	0 – 2 – 0	2	0 – 1 – 0	1
			Total	15 – 10 – 2	27	15 – 5 – 2	22

Examination Scheme

Course Code		Course Category	Name of the Course	Lab/Tut CA	CA		ESE		Total
SVU	KJSSE				IA	MSE	PR/OR Exam/ OST/ Project	Theory Exam	
	316U06C101	BS	Applied Mathematics – I	25	20	30	--	50	125
	316U06C102	BS	Engineering Physics	--	20	30	--	50	100
	316U06C103	BS	Engineering Chemistry	--	20	30	--	50	100
	316U06C104	ES	Basic Electrical Engineering	--	20	30	--	50	100
	316U06C105	ES	Engineering Drawing	--	20	30	--	50	100
	316U06C106	BS	Biology for Engineers	--	50	--	--	--	50
	316U06C107	ES	Structured Programming Methodology	50	--	--	50	--	100
	316U06L101	BS	Applied Science Laboratory	50	--	--	--	--	50
	316U06L102	ES	Basic Electrical Engineering Laboratory	50	--	--	--	--	50
	316U06L103	ES	Engineering Drawing Laboratory	50	--	--	--	--	50
	316U06L104	ES	Maker Space Laboratory – I	50	--	--	--	--	50
			Total	275	150	150	50	250	875

Somaiya Vidyavihar University
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FY B Tech (Common to All)
SVU R-2025 Version 3.0
SEM II

Teaching and Credit Scheme

Course Code		Course Category	Name of the Course	Teaching Scheme TH-PR-TUT	Total (hrs.)	Credit Scheme TH-PR-TUT	Total Credits
SVU	KJSSE						
	316U06C201	BS	Applied Mathematics – II	3 – 0 – 1	4	3 – 0 – 1	4
	316U06C202	BS	Program-Specific Science Course	3 – 0 – 0	3	3 – 0 – 0	3
	316U06C203	ES	Program-Specific Core Course	3 – 0 – 0	3	3 – 0 – 0	3
	316U06C204	HSS	Environmental Science	2 – 0 – 1@	3	2 – 0 – 1	3
	316U06C205	ES	Object-Oriented Programming Methodology	2 – 2 – 0	4	2 – 1 – 0	3
	316U06T201	HSS	Presentation and Communication Skills	1 – 0 – 1	2	1 – 0 – 1	2
	316U06L201	BS	Program-Specific Science Course Laboratory	0 – 2 – 0	2	0 – 1 – 0	1
	316U06L202	ES	Program-Specific Core Course Laboratory	0 – 2 – 0	2	0 – 1 – 0	1
	316U06L203	ES	Maker Space Laboratory – II	0 – 2 – 0	2+1#	0 – 1 – 0	1
	316U06X101	VAC	Sports	0 – 0 – 1	1	0 – 0 – 1	1
			Total	14 – 8 – 4	27 (26+1#)	14 – 4 – 4	22

@class-wise tutorial
#Additional 1 hr/division/week is assigned for project review of PBL component (only for timetable slot. No separate course credit is given)

Examination Scheme

Course Code		Course Category	Name of the Course	Lab/Tut CA	CA		ESE		Total
SVU	KJSSE				IA	MSE	PR/OR Exam/ OST/ Project	Theory Exam	
	316U06C201	BS	Applied Mathematics – II	25	20	30	--	50	125
	316U06C202	BS	Program-Specific Science Course	--	20	30	--	50	100
	316U06C203	ES	Program-Specific Core Course	--	20	30	--	50	100
	316U06C204	HSS	Environmental Science	50	--	--	--	50	100
	316U06C205	ES	Object Oriented Programming Methodology	50	--	--	50	--	100
	316U06T201	HSS	Presentation and Communication Skills	50	--	--	--	--	50
	316U06L201	BS	Program-Specific Science Course Laboratory	50	--	--	--	--	50
	316U06L202	ES	Program-Specific Core Course Laboratory	50	--	--	--	--	50
	316U06L203	ES	Maker Space Laboratory – II	50	--	--	50#	--	100
	316U06X101	VAC	Sports	50	--	--	--	--	50
			Total	375	60	90	100	200	825

Detailed Syllabus
(Semester I)

Somaiya Vidyavihar University

K J Somaiya School of Engineering

Course Code	Course Title			
316U06C101	**Applied Mathematics – I**			
Teaching Scheme (hrs.)	**TH**	**PRACT**	**TUT**	**Total**
	03	--	01	04
Credits Assigned	03	--	01	04

Examination Scheme	Marks					
	CA		**ESE (Theory/On-Screen)**	**PR/OR Exam**	**LAB/TUT CA**	**Total**
	IA	**MSE**				
	20	30	50	--	25	125

Course prerequisites:

Basics of matrices, inverse and adjoint, differentiation techniques, differential equations, complex numbers

Course Objectives:

The course introduces concept of rank of matrix, solving system of linear equations is explained in detail with some applications. The course introduces the concept of partial differentiation and its applications to find extreme values of a function and Jacobian. The course communicates the methods of solving linear differential equations. The objective of the course is to impart knowledge of De-Moivre's theorem, hyperbolic functions and logarithm of complex numbers

Course Outcomes

At the end of the successful completion of the course, the student will be able to

CO1: Apply the concept of rank of a matrix and numerical methods to solve system of linear equations

CO2: Find partial derivatives of multivariable functions, apply the concept of partial differentiation to find maxima and minima of 2 variable functions

CO3: Apply Euler's theorem to prove results related to Homogeneous functions.

CO4: Identify and solve different types of ordinary differential equations using various methods.

CO5: Solve problems involving different forms and properties of complex numbers, hyperbolic functions and logarithm of complex numbers

Module No.	Unit No.	Details	Hrs.	CO
1		**Rank of Matrix and System of Equations**	**08**	**CO1**
	1.1	Types of matrices: Hermitian, Skew-Hermitian, Unitary and Orthogonal matrix, Encryption and Decryption using orthogonal matrix		
	1.2	Rank of a matrix using row echelon forms, reduction to normal form		
	1.3	System of homogeneous and non-homogeneous equations, their consistency and solutions		
	1.4	Linearly dependent and independent vectors		
	1.5	Introduction of transitioning from Linear Systems to Non-Linear System of Equations, Solution of system of linear algebraic equations by (a) Gauss-Seidal method (b) Jacobi iteration method		
	#	**Self-learning topics**: Symmetric, Skew-symmetric matrices and properties, Properties of adjoint and inverse of a matrix, Properties of orthogonal and unitary matrix, Solving System of linear equation using any mathematical software		
2		**Partial Differentiation and Application**	**09**	**CO2**
	2.1	Functions of several variables, Partial derivatives of first and higher order (definition using limits and simple problems)		
	2.2	Differentiation of composite functions		
	2.3	Maxima and minima of a function of two independent variables		
	2.4	Introduction of Jacobian of two and three independent variables (simple problems)		
3		**Homogeneous Functions**	**04**	**CO3**
	3.1	Euler's theorem on homogeneous functions with two and three independent variables (statement only) and problems		
	3.2	Deductions(Corollaries) from Euler's theorem (statements only) and problems		
4		**Linear Differential Equations of First and Higher Order**	**12**	**CO4**
	4.1	Differential Equation of first order and first degree- Exact differential equations, Equations reducible to exact equations by integrating factors.		
	4.2	Linear differential equations (Review), Equation reducible to linear form. Applications of Differential Equation of first order and first degree		
	4.3	Higher order Linear Differential Equation with constant coefficients: Complimentary function, particular integrals of differential equation of the type $f(D)y = X$, where X is $e^{ax}, sin\,(ax + b), cos\,(ax + b), x^n, e^{ax}V$		
	4.4	Method of variation of parameters		
	#	**Self-learning topic**: Bernoulli's equation. Equation reducible to Bernoulli's equation. Cauchy's homogeneous linear Differential Equation, Applications of Higher Order Differential Equations		
5		**Complex Numbers, Hyperbolic Functions and Logarithm of Complex Number**	**12**	**CO5**
	5.1	Statement of De Moivre's theorem and related examples		
	5.2	Powers and roots of complex numbers		
	5.3	Circular functions and hyperbolic functions of complex number		

	5.4	Inverse circular and inverse hyperbolic functions		
	5.5	Logarithm of complex numbers		
	5.6	Separation of real and imaginary parts of a function		
	#	**Self-learning topics**: Expansion of $sinn\theta$, $cosn\theta$ in terms of sine and cosine of multiples of angle θ and expansion of $sinn\theta$, $cosn\theta$ in powers of $sin\theta$, $cos\theta$		
		Total	**45**	

Students should prepare all self-learning topics on their own. Self-learning topics will enable students to gain extended knowledge of the topic. Assessment of these topics may be included in Tutorials.

Recommended Books:

Sr. No.	Name/s of Author/s	Title of Book	Name of Publisher with country	Edition and Year of Publication
1.	B. S. Grewal	Higher Engineering Mathematics	Khanna Publications, India	43rd Edition 2014
2.	Shanti Narayan	A text book of Matrices	S. Chand, India	10th Edition 2004
3.	Erwin Kreyszig	Advanced Engineering Mathematics	Wiley Eastern Limited, India	10th Edition 2015
4.	Ramana B.V.	Higher Engineering Mathematics	Tata Mcgraw Hill New Delhi, India	34th Edition (reprint) 2019
5.	Glyn James	Advanced Modern Engineering Mathematic	Pearson Publication India	4th Edition 2010
6.	M. D. Raisinghania	Ordinary and Partial Differential Equations	S. Chand, India	18th Edition 2013

Course Code	Course Title			
316U06C102	**Engineering Physics**			
Teaching Scheme (hrs.)	**TH**	**PRACT**	**TUT**	**Total**
	02	--	--	02
Credits Assigned	02	--	--	02

Examination Scheme	Marks					
	CA		**ESE (Theory/On-Screen)**	**PR/OR Exam**	**LAB/TUT CA**	**Total**
	IA	**MSE**				
	20	30	50	--	--	100

Course prerequisites:

Physics: Metric units and conversions, basic concepts and laws of optics, electricity and magnetism, electrical properties of conductors and semiconductors, particle properties of radiation

Mathematics: Basics of Differentiation and integration, differential equations, vector operations, trigonometric identities, logarithms

Course Objectives:

This course is designed to establish strong foundations of Engineering Sciences by using a problem-solving approach to learn fundamental physical concepts and mathematical formulation of a variety of real-life applications. The course covers areas of both, pure and applied Physics such as wave optics, laser and fibre optics, electromagnetism. This course promotes hands-on and inquiry-based learning and aligns with multidisciplinary frameworks

Course Outcomes

At the end of the successful completion of the course, the student will be able to

CO1: Explain different optical phenomena using concepts of wave optics
CO2: Develop conceptual understanding of the working of lasers and optical fibers
CO3: Understand the basic principle of quantum mechanics
CO4: Analyze semiconductor parameters and solve problems using mathematical foundations of electromagnetism

Module No.	Unit No.	Details	Hrs.	CO
1		**Wave Optics**	**08**	**CO1**
	1.1	Interference: Introduction, methods of interference, Derivation of interference in thin parallel films, Theoretical discussion of a wedge shaped film and Newton's Ring		
	1.2	Diffraction: Introduction, Theoretical discussion of diffraction grating and Resolving power		
2		**Photonics**	**07**	**CO2**
	2.1	**Lasers**: Interaction of radiation with matter, Basic principles and components required for lasing, Relation between Einstein's coefficient, Threshold condition of laser		
	2.2	**Fiber optics**: Concept of total internal reflection, Types of optical fiber, Derivation of Numerical aperture for step index fiber, Important parameters related an optical fiber, losses in optical fibers		
3		**Quantum Mechanics – I**	**07**	**CO3**
	3.1	De-Broglie hypothesis and its various forms		
	3.2	Heisenberg's uncertainty principle, its implications and application		
	3.3	Wavefunction and its probabilistic interpretation, Condition of Normalization		
4		**Basics of Semiconductors and Electromagnetism**	**08**	**CO4**
	4.1	Intrinsic and Extrinsic semiconductors, Mobility, Conductivity in semiconductors		
	4.2	Drift and Diffusion current densities		
	4.3	Fermi- Dirac distribution function, Position of Fermi Level in Intrinsic and Extrinsic Semiconductors		
	4.4	Del operator, Gradient, divergence, curl, Fundamental theorems and their physical interpretation		
		Total	**30**	

Recommended Books:

Sr. No.	Name/s of Author/s	Title of Book	Name of Publisher with country	Edition and Year of Publication
1	M N Avadhanulu, P G Kshirsagar	A Textbook of Engineering Physics	S Chand	11th edition, 2018
2	Gaur, Gupta	Engineering Physics	Dhanpat Rai, India	8 edition, 2018
3	Ajay Ghatak	Optics	McGraw Hill India	6th Edition, 2017
4	S. M. Sze	Physics of Semiconductors	Wiley	7th Edition, 2017
5	David Griffiths	Introduction to Electrodynamics	PHI	5th Edition, 2015

Course Code	Course Title			
316U06C103	**Engineering Chemistry**			
Teaching Scheme (hrs.)	**TH**	**PRACT**	**TUT**	**Total**
	02	--	--	02
Credits Assigned	02	--	--	02

Examination Scheme	Marks				
	CA		**ESE (Theory/On-Screen)**	**PR/OR Exam**	**LAB/TUT CA**	**Total**
	IA	**MSE**				
	20	30	50	--	--	100

Course prerequisites:

A foundational understanding of chemical principles, atomic structure, periodic classification, chemical bonding, and states of matter, basic organic and inorganic chemistry, and simple numerical problem-solving skills in chemistry is essential. This background will enable students to grasp the advanced concepts related to materials science, electrochemistry, corrosion, polymers, nanomaterials, and environmental chemistry encountered in the course.

Course Objectives:

The objective of course is to develop a strong conceptual foundation in fundamental chemical principles relevant to engineering applications and to appreciate the basic concepts of chemistry behind development of futuristic materials and their applications in engineering and technology. The course objective is to understand chemical processes involved in development of sustainable energy sources.

Course Outcomes

At the end of the successful completion of the course, the student will be able to

CO1: Understand and apply key parameters used to assess water pollution such as BOD and COD and explore modern techniques for the treatment of industrial wastewater.

CO2: Understand and apply the principles and practices of Green Chemistry with a focus on designing environmentally benign chemical processes.

CO3: Apply the knowledge of synthetic organic chemistry for justifying mechanism of chemical reactions and appreciate its role for industrial development.

CO4: Apply electrochemical principles to analyze corrosion behavior and design practical protection strategies such as coatings, inhibitors, and cathodic/anodic methods for engineering systems

Module No.	Unit No.	Details	Hrs.	CO
1		**Industrial Applications of Water and its treatment methods**	08	CO1
	1.1	Introduction, Types of Hardness, Equivalence of CaCO3, Experimental determination of hardness.		
	1.2	Emerging Technology for Sustainable Water Treatment: Lime soda method Zeolite method, Ion Exchange process.		
	1.3	Methods to determine extent of water pollution, BOD, COD, Treatment of industrial wastewater.		
2		**Green Chemistry for Sustainable Engineering**	08	CO2
	2.1	Principles and Concept of Green Chemistry: Definition and need for green chemistry in modern chemical industries, Twelve principles of green chemistry (Anastas and Warner), significance of each principle with respect to sustainability goals.		
	2.2	Green solvents: water, supercritical CO_2, ionic liquids, Comparison of traditional vs green chemical processes, Atom economy, waste minimization, and environmental metrics		
	2.3	Green Synthesis and Applications: Microwave- and ultrasound-assisted green synthesis, Case studies of industrial green chemistry practices		
3		**Synthetic Organic reactions**	07	CO3
	3.1	Name reactions: i) Aldol Condensation, ii) Baeyer –Villiger oxidation, iii) Dakin Reaction, iv) Haloform reaction, v) Sharpless Epoxidation, 6) Wurtz synthesis		
	3.2	Rearrangement Reaction: 1) Benzil- Benzilic Acid Rearrangement, 2) Pinacole-Pinacolone Rearrangement 3) Bayer-Villiger Rearrangement 4) Fries Rearrangement		
4		**Electrochemistry & Corrosion Fundamentals**	07	CO4
	4.1	Nernst equation, electrode potentials, cell constructions, Definition and significance of corrosion in engineering: Types of Corrosion		
	4.2	Factors affecting rate of corrosion, Methods to control corrosion: Material Selection and Purity Improvement, Design Considerations to Minimize Corrosion, Use of Protective Coatings and Paints, Cathodic Protection, Anodic Protection, Use of Corrosion Inhibitors, Environmental Control, Alloying to Improve Corrosion Resistance		
		Total	30	

Recommended Books:

Sr. No.	Name/s of Author/s	Title of Book	Name of Publisher with country	Edition and Year of Publication
1.	Engineering Chemistry	K. SESHA Maheswaramma, Mridula Chugh	Pearson	2016
2.	A textbook of Engineering Chemistry	Dr. S.S.Dara, Dr. S.S. Umare	S. Chand	2015
3.	Organic reactions Mechanisms	V.K. Ahluwalia, Rakesh Kumar Parashar	Narosa	2015

| 4. | Green Chemistry: Theory and Practice | Paul T. Anastas , John Warner | Oxford University Press | 2000 |
| 5. | A Guidebook to Mechanism in Organic Chemistry | Peter Sykes | Pearson Education | 2003 |

Course Code	Course Title			
316U06C104	**Basic Electrical Engineering**			
Teaching Scheme (hrs.)	**TH**	**PRACT**	**TUT**	**Total**
	02	--	--	02
Credits Assigned	02	--	--	02

Examination Scheme	Marks					
	CA		**ESE (Theory/On-Screen)**	**PR/OR Exam**	**LAB/TUT CA**	**Total**
	IA	**MSE**				
	20	30	50	--	--	100

Course prerequisites:
Knowledge of Basic Electrical parameters: Resistance, Inductance, Capacitance, Frequency, Voltage, Current and Power and Energy, basic laws of magnetism

Course Objectives:
It is difficult to imagine life without electricity. Electricity plays a major role in the working of all minor and major devices used in our day to day life. In this course students acquire fundamental knowledge to understand the electrical systems

Course Outcomes
At the end of the successful completion of the course, the student will be able to
CO1: Analyze resistive DC networks using various network theorems
CO2: Analyze single phase AC circuits
CO3: Analyze three phase AC circuits
CO4: Understand principles and working of Transformer
CO5: Describe principles and working of DC and AC motors

Module No.	Unit No.	Details	Hrs.	CO
1		**DC Circuits**	**10**	**CO1**
	1.1	Concept of dependent and independent sources, ideal and practical voltage and current sources, Kirchhoff's Laws, source transformation and network terminology.		
	1.2	Resistive network simplification, Series, parallel connection and Star-Delta transformations		
	1.3	Mesh and nodal analysis, concept of super mesh and super node (Analysis only with independent sources)		
	1.4	Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem (Analysis only with independent sources)		
2		**Single Phase AC Circuits**	**10**	**CO2**
	2.1	Generation of alternating voltage, average value, RMS value, form factor, crest factor, phasor representation in rectangular and polar form.		
	2.2	Steady state behaviour of single phase AC circuits with pure R, L, and C, concept of inductive and capacitive reactance, phasor diagram of impedance, phase relationship in voltage and current.		
	2.3	RL, RC and RLC series and parallel circuits, concept of impedance and admittance, power triangle, power factor, active, reactive and apparent power, concept of power factor improvement.		
	2.4	Series and parallel resonance, Q-factor and bandwidth		
3		**Three Phase AC circuits**	**05**	**CO3**
	3.1	Three-phase balanced circuits, voltage and current relations in star and delta connections.		
	3.2	Measurement of power in 3-phase system using two wattmeter method		
4		**Introduction to Electrical Machines**	**05**	**CO4**
	4.1	**Single phase transformer :** Construction and principle of working, emf equation of a transformer, losses in transformer, Equivalent circuit of Ideal and practical transformer, and efficiency of transformer, (No numerical expected)		
	4.2	**DC motors** : Construction and working principle of DC motors such as series, shunt and compound, torque-speed characteristics, selection criteria and applications (no derivations and numerical expected)		
	4.3	**Single phase induction motor**: Construction, working principle, double field revolving theory, applications (no derivations and numerical expected)		
	#	**Self-Learning:** BLDC Motors, PMSM and Stepper Motors, SRM Motor, Servo Motor, Switch Fuse Unit (SFU), MCB, ELCB, MCCB ,Types of Wires and Cables, Earthing, Lamps: fluorescent, CFL, LED, Electrical measuring instruments principle and applications-energy meter, megger, tong tester.		
		Total	**30**	

Recommended Books:

Sr. No.	Name/s of Author/s	Title of Book	Name of Publisher with country	Edition and Year of Publication
1.	B. L. Thereja	Electrical Technology Vol-1 and Vol-II	S. Chand & Publications, India	25th Edition 2014
2.	Mittle and Mittle	Basic Electrical Engineering	Tata McGraw Hill, India	2nd edition (New) 2001
3.	Singh Ravish R	Basic Electrical Engineering	S. Chand	1st Edition, 2023
4.	B.R. Patil	Basic Electrical Engineering	Oxford University Press	2nd Edition, 2022

Course Code	Course Title			
316U06C105	**Engineering Drawing**			
Teaching Scheme (hrs.)	**TH**	**PRACT**	**TUT**	**Total**
	02	--	01	03
Credits Assigned	02	--	01	03

Examination Scheme	Marks					
	CA		ESE (Theory/On-Screen)	PR/OR Exam	LAB/TUT CA	Total
	IA	MSE				
	20	30	50	--	--	100

Course prerequisites:
Knowledge of various geometric constructions, Basics of trigonometry

Course Objectives:
The objective of course is to make students familiarize with the conventions and standards of engineering drawing along with the principles of projections applied to points, lines and planes, apply the principles of orthographic projections to draw elevation, plan, side view, and isometric views etc., apply the principles of orthographic projections to draw various views of regular solids and apply the fundamentals of sectional view to the regular solids and develop lateral surfaces of solids

Course Outcomes
At the end of the successful completion of the course, the student will be able to
CO1: Visualize and draw orthographic projection and sectional views of any 3D object.
CO2: Visualize and draw projection of lines and planes
CO3: Draw projection of regular solids
CO4: Draw sectional views and lateral development of regular solids
CO5: Visualize and draw isometric drawing

Module No.	Unit No.	Details	Hrs.	CO
1		**Orthographic Projection**	06	CO1
	1.1	Introduction to Engineering Drawing, Standard sizes of drawing sheets, Types of Lines, Dimensioning, Scales, Drawing Pencils etc.		
	1.2	Orthographic projections of simple machine parts by first angle method as recommended by Indian standards		
	1.3	Sectional views of simple machine parts (full section ONLY)		
2		**Projection of points, lines and planes**	08	CO2
	2.1	Projection of points, Projection of lines inclined to both the reference planes. (Line in 1st quadrant ONLY)		
	2.2	Projection of Planes: Triangular, Square, Rectangular, Pentagonal, Hexagonal and circular planes inclined to one reference plane only and perpendicular to other		
3		**Projection of Solids**	06	CO3
	3.1	Introduction to Projection of Solids, Classification of Solids		
	3.2	Projection of right regular solids (prism, pyramid, cylinder, and cone) inclined to one reference plane only		
4		**Section and Development of Solids**	06	CO4
	4.1	Projection of sectional views of solids (prism, pyramid, cylinder, and cone) cut by the plane perpendicular to one and inclined to other reference plane only		
	4.2	Lateral surface development of solids (prism, pyramid, cylinder, and cone) cut by the section plane inclined to one reference plane only		
5		**Isometric View**	04	CO5
	5.1	Introduction to Isometric view/drawing, isometric projection		
	5.2	Construction of isometric drawing of simple machine parts		
	#	**Self-Learning**: 3D modelling using AUTOCAD		
		Total	30	

Recommended Books:

Sr. No.	Name/s of Author/s	Title of Book	Name of Publisher with country	Edition and Year of Publication
1.	N.D. Bhatt	Engineering Drawing (Plane and solid geometry)	Charotar Publishing House Pvt. Ltd. India	52nd Revised and enlarged edition
2.	N.D. Bhatt V.M. Panchal	Machine Drawing	Charotar Publishing House Pvt. Ltd. India	48th edition
3.	P. S. Gill	Engineering Graphics and Drafting	S.K. Kataria & Sons, India	11th Edition
4.	P.J. Shah	Engineering Graphics	S. Chand Publications, India	Revised Edition
5.	Dhananjay Jolhe	Engineering Drawing	Tata McGraw Hill, India	Revised Edition

Course Code	Course Title			
316U06C106	**Biology for Engineers**			
Teaching Scheme (hrs.)	TH	PRACT	TUT	Total
	02	--	--	02
Credits Assigned	02	--	--	02

Examination Scheme	Marks					
	CA		ESE (Theory/On-Screen)	PR/OR Exam	LAB/TUT CA	Total
	IA	MSE				
	50	--	--	--	--	50

Course prerequisites:
 Basics of biological systems

Course Objectives:
Biology for Engineers is an interdisciplinary course designed for the students of various engineering streams to appreciate the link between biological Science and engineering

Course Outcomes
At the end of the successful completion of the course, the student will be able to
CO1: Describe the role of biomolecules and enzymes and evaluate their industrial applications
CO2: Explain the structure, function, and molecular biology of cells and apply basic bioinformatics tools
CO3: Illustrate fermentation processes, bioprocess equipment, and their industrial relevance
CO4: Analyze the design, principles, and applications of biosensors and biomedical instruments
CO5: Understand system biology and analysis
CO6: Apply biomechanical concepts and evaluate materials based on biocompatibility for biomedical applications.

Module No.	Unit No.	Details	Hrs.	CO
1		**Biomolecules and Enzymes**	**05**	**CO1**
	1.1	Lipids, carbohydrates, amino acids and proteins, nucleic acids		
	1.2	Enzymes and Industrial applications: Enzymes, endo-enzymes and exo-enzymes, enzyme action, Types of enzymes, Cofactors , Enzyme Kinetics, Industrial Applications of Enzymes		
2		**Basic Cell Biology and bioinformatics**	**06**	**CO2**
	2.1	Basic definition of a cell, prokaryotic cell , eukaryotic cell, cell cycle and cell division, m-phase, meiosis, cell differentiation		
	2.2	Nucleotides, DNA, RNA, tRNA, mRNA		
	2.3	DNA replication, transcription, translation		
	2.4	Introduction to bioinformatics, applications of bioinformatics		
3		**Bioprocess Engineering**	**05**	**CO3**
	3.1	Design of Fermentors - Types, Components, sensors		
	3.2	Upstream and downstream process- Fermentation kinetics, monod kinetics, Thermal kinetics		
	3.3	Case studies of fermentation of products and processes – Enzyme, acids, antibiotics		
4		**Biosensors and Bioelectronics**	**04**	**CO4**
	4.1	Design and Applications of Biosensors and Biofuels		
	4.2	Voltage Sensors, Optical Sensors, Displacement/Pressure Sensors and Accelerometers, Chemical Sensors, Acoustic Sensors		
	4.3	Heart, Working of Heart, Heartbeat monitoring, EEG, ECG, Sonography, MRI, Tomography		
5		**Systems Biology**	**05**	**CO5**
	5.1	Systems biology of metabolic pathways		
	5.2	Systems analysis and modelling in medicine, agriculture and climate change		
	5.3	Systems dynamics, control and optimization		
		Biomechanics and Biocompatible materials	**05**	**CO6**
	6.1	Introduction of biomechanics; anatomical concepts in biomechanics		
	6.2	Musculoskeletal biomechanics and Cardiovascular mechanics: musculoskeletal geometry, muscle structure and force generation, motion tracking techniques, cardiovascular physiology, Blood Flow Models		
	6.3	Case studies on applications of biomechanics on bones, joints, muscles, tissues etc.		
	6.4	Physico-chemical properties of biomaterials: mechanical (elasticity, yield stress, ductility, toughness, strength, fatigue, hardness, wear resistance), tribological (friction, wear, lubricity), morphology and texture, physical (electrical, optical, magnetic, thermal), chemical and biological properties.		
	6.5	Technologies of biomaterials processing, as implants and medical devices; improvement of materials biocompatibility by plasma processing.		
	6.6	Tissue engineering		
		Total	**30**	

Recommended Books:

Sr. No.	Name/s of Author/s	Title of Book	Name of Publisher with country	Edition and Year of Publication
1.	G. K. Suraishkumar	Biology for Engineers	Oxford University Press	Edition 2019
2.	Wiley Editorial	Biology for Engineers	Wiley	Edition 2018
3.	Andrew G. Webb	Principles of Biomedical Instrumentation,	Cambridge Texts in Biomedical Engineering.	9th Edition, 2018
4.	Campbell, N. A.	Biology: A global approach	Pearson Education Ltd.	11th Edition
5.	Jin Xiong	Essential Bioinformatics	Cambridge University Press	Edition 2007
6.	S. Ignacimuthu	Basic Bioinformatics	Narosa Publishing House	2md Edition (2013)
7.	Cees Oomens, Marcel Brekelmans, Frank Baaijens	Biomechanics: concepts and computation	Cambridge texts in Biomedical Engineering	2nd Edition
8.	Peter F. Stanbury, Allan Whitaker, Stephen J. Hall	Principles of Fermentation Technology	Butterworth-Heinemann (Elsevier)	2nd Edition (1995)

Course Code	Course Title			
316U06C107	**Structured Programming Methodology**			
Teaching Scheme (hrs.)	**TH**	**PRACT**	**TUT**	**Total**
	02	02	--	04
Credits Assigned	02	01	--	03

Examination Scheme	Marks					
	CA		**ESE (On-Screen*)**	**PR/OR Exam**	**LAB/TUT CA**	**Total**
	IA	**MSE**				
	--	--	50	--	50	100

*The End Semester Examination (ESE) will be conducted in an onscreen format and may include a combination of theoretical questions, practical coding tasks, and/or an oral/viva component

Course prerequisites:
Students taking this course should have a basic understanding of computer operations, including familiarity with operating systems and file management. They are expected to possess fundamental logical reasoning skills and the ability to approach problems methodically. A basic grasp of mathematics, particularly arithmetic and simple algebra

Course Objectives:
The objective of course is to understand structured programming concepts and basic problem-solving techniques using algorithms, flowcharts, and pseudocode, implement decision-making and looping constructs to control program flow effectively, use arrays and strings for data storage and manipulation and apply functions, structures, and pointers to create modular and efficient programs.

Course Outcomes

At the end of the successful completion of the course, the student will be able to understand
CO1: Formulate a problem statement and develop the logic (algorithm/flowchart) for its solution
CO2: Demonstrate the use of control structures
CO3: Apply the concepts of arrays and strings
CO4: Design modular programs using functions and the use of structure

Module No.	Unit No.	Details	Hrs.	CO
1		**Introduction to Structured Programming methodology**	**05**	**CO1**
	1.1	Problem solving skill development: Problem Definition, fundamentals of algorithms and flowcharts, Program Design, Pseudocode.		
	1.2	Structured Programming		
	1.3	Program execution process, Systems Development Life Cycle		
	1.4	Understanding concept and importance of header file/ package/namespaces Data & Operators: Data Types, Identifier, Constants and Variables		
	1.5	Types of Operators, Expressions and Evaluation of Expressions, Operator Precedence and Associativity, Type Conversions		
2		**Program Control Functions**	**06**	**CO2**
	2.1	Decision Making and Branching Control Structures: Two Way Selection, Multiway Selection		
	2.2	Looping Control Structures, Flag Concept, Counting Loops		
	2.3	Documentation and Making Source Code Readable		
3		**Introduction to Arrays**	**07**	**CO3**
	3.1	Arrays: Introduction to One Dimensional Arrays, Multidimensional Arrays, Declaration and Initialization of Arrays, Reading and Displaying arrays		
	3.2	Character Arrays and Strings: Introduction, Declaring and Initializing String Variables, Reading Character and Writing Character, Reading and Writing Strings, various operation on strings, Implementation of string handling operations (from scratch)		
4		**User defined function and Structures**	**12**	**CO4**
	4.1	User Defined Functions: Need, Function Declaration and Definition, Return Values, Function Calls, Passing Arguments to a Function by Value, Recursive functions, String Handling Functions (inbuilt)		
	4.2	Structures and Unions: Introduction, Declaring and defining Structure, Structure Initialization, Accessing and Displaying Structure Members, Array of Structures		
	4.3	Introduction to pointers: Pointer declaration and initialization, Pointer addition and subtraction, evaluating pointer expressions Pointers and Functions: Pass by Reference, Returning pointers from functions		
	#	**Self-Learning**: Introduction to Unions, Structure Vs Unions, File Handling		
		Total	**30**	

Recommended Books:

Sr. No.	Name/s of Author/s	Title of Book	Name of Publisher with country	Edition and Year of Publication
1	Kenneth Leroy Busbee	Programming Fundamentals - A Modular Structured	Rice University, Houston, Texas	2013

		Approach using C++		
2	Hassan Afyouni Behrouz A. Forouzan	Computer Science: A Structured Programming Approach Using C	Cengage India Private Limited	4th Edition 2023
3	Behrouz A. Forouzan Richard F. Gilberg	Computer Science: A Structured Approach Using C++	Cengage India Private Limited	2nd edition 2012
4	E. Balagurusamy	Programming in ANSI C	McGraw-Hill Education, India	8th Edition, 2019
5	Pradeep Dey and Manas Ghosh	Structured Programming Approach	Oxford University Press, India	1st Edition, 2016
6	https://press.rebus.community/programmingfundamentals/chapter/structured-programming/			
7	https://tfetimes.com/wp-content/uploads/2015/04/structured-programming-with-c-plus-plus.pdf			
8	https://open.umn.edu/opentextbooks/textbooks/144			
9	NPTEL (C)	https://onlinecourses.nptel.ac.in/noc22_cs40/preview		
10	NPTEL (C++)	https://onlinecourses.nptel.ac.in/noc21_cs02/preview		

Course Code	Course Title			
316U06L101	**Applied Science Laboratory**			
Teaching Scheme (hrs.)	**TH**	**PRACT**	**TUT**	**Total**
	--	02	--	02
Credits Assigned	--	01	--	01

Examination Scheme	Marks					
	CA		**ESE (Theory/On-Screen)**	**PR/OR Exam**	**LAB/TUT CA**	**Total**
	IA	**MSE**				
	--	--	--	--	50	50

Note: List of experiments/tutorials, scheme for continuous assessment and rubrics will be shared by course coordinators from time to time at the beginning of every semester

Course Code	Course Title			
316U06L102	**Basic Electrical Engineering Laboratory**			
Teaching Scheme (hrs.)	**TH**	**PRACT**	**TUT**	**Total**
	--	02	--	02
Credits Assigned	--	01	--	01

Examination Scheme	Marks					
	CA		**ESE (Theory/On-Screen)**	**PR/OR Exam**	**LAB/TUT CA**	**Total**
	IA	**MSE**				
	--	--	--	--	50	50

Note: List of experiments/tutorials, scheme for continuous assessment and rubrics will be shared by course coordinators from time to time at the beginning of every semester

Course Code	Course Title			
316U06L103	**Engineering Drawing Laboratory**			
Teaching Scheme (hrs.)	**TH**	**PRACT**	**TUT**	**Total**
	--	02	--	02
Credits Assigned	--	01	--	01

Examination Scheme	Marks					
	CA		ESE (Theory/On-Screen)	PR/OR Exam	LAB/TUT CA	Total
	IA	MSE				
	--	--	--	--	50	50

Note: List of experiments/tutorials, scheme for continuous assessment and rubrics will be shared by course coordinators from time to time at the beginning of every semester

Course Code	Course Title			
316U06L104	**Maker Space Laboratory – I**			
Teaching Scheme (hrs.)	**TH**	**PRACT**	**TUT**	**Total**
	--	02	--	02
Credits Assigned	--	01	--	01

Examination Scheme	Marks					
	CA		**ESE (Theory/On-Screen)**	**PR/OR Exam**	**LAB/TUT CA**	**Total**
	IA	**MSE**				
	--	--	--	--	50	50

Course prerequisites:
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Course Objectives:
The main objective of the Maker Space Laboratory is to provide all engineering students with theoretical and practical knowledge of the manufacturing environment. This course is the foundation of the real industrial environment, and it helps students develop and improve relevant technical hand skills. It teaches the fundamentals of various hand tools, power tools, machine tools, and their applications in various areas of manufacturing. The Design Thinking Laboratory experiences would help in developing an understanding of the complexity of real world problems, as well as the time and skill requirements for finding solutions to the same

Note:
1. Each student must complete three shops during semester I. The shops compulsory for the specified branch are mentioned in the bracket
2. A student team will have four or five members. Each team will have a maximum of 10 hours to complete their assigned task in each shop
3. Assessment:
   i. Continuous assessment will be done throughout the semester for the allotted shops
   ii. Quality of finished product

Shops:
- Precision Sheet Metal Working Shop (Compulsory for All Programs)
- Project Based Learning (PBL) (Compulsory for All Program)
- Computer Hardware and Assembly Shop (Compulsory for Computer Engineering Department and Information Technology Department programs)
- Printed Circuit Board (PCB) Shop (Compulsory for Electronics Engineering Department and Electronics and Telecommunication Engineering Department programs)
- Woodcraft and Fabrication Shop (Compulsory for Mechanical Engineering Department programs)*
- Fabrication Process Shop (Compulsory for Mechanical Engineering Department programs)*

*Any one of woodcraft and fabrication OR Fabrication processes shop

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