Department of Engineering Sciences
## Structure & Syllabi
F. Y. B. Tech (2024 Pattern)

DEPARTMENT OF F.Y.B.TECH ENGINEERING

Vision

To satisfy the aspirations of youth force, who wants to lead nation towards prosperity through techno-economic development.

Mission

To provide, nurture and maintain an environment of high academic excellence, research and entrepreneurship for all aspiring students, which will prepare them to face global challenges maintaining high ethical and moral standards.
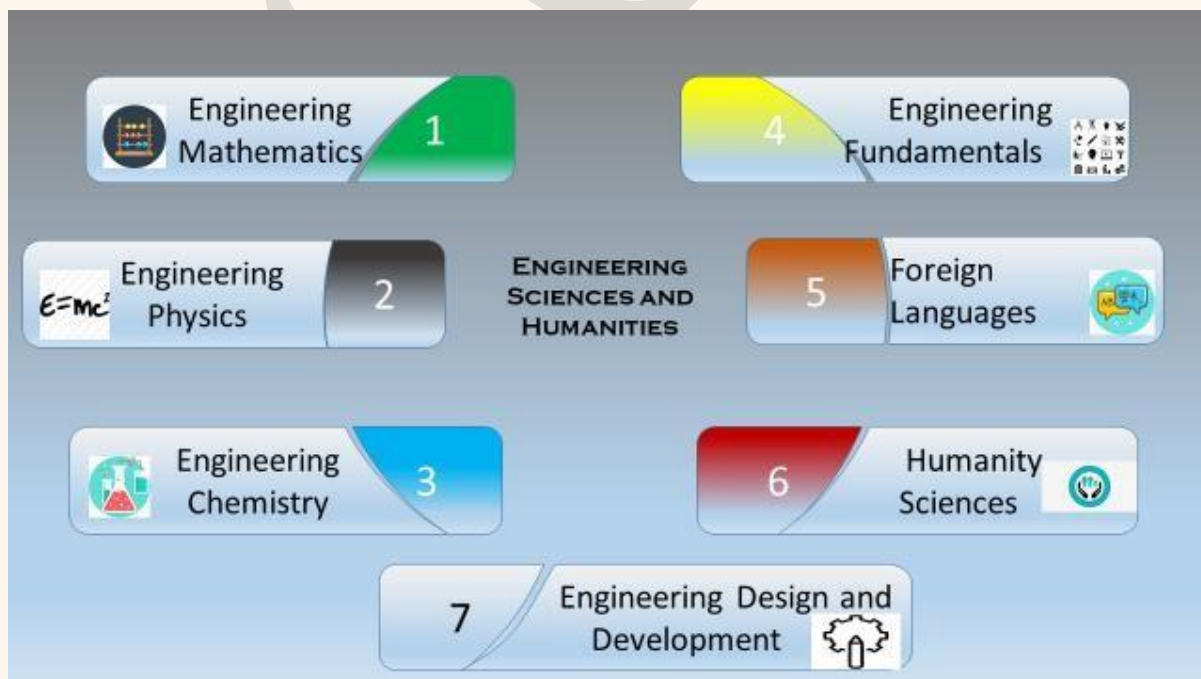
Dr. S M Yadav	Dr. Ram Joshi
H.O.D, Engg. Science	Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

DEPARTMENT OF F.Y.B.TECH
Program Outcomes (POs)

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

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

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

4. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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

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

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

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

9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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

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

12. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological challenges.

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Highlights of the Syllabus

Curriculum of F. Y. B. Tech Department is designed in consultation with experts like:

Academic Experts

Industry/Corporate Experts

Distinguished Alumni

The curriculum of the F.Y.B. Tech comprises of Four groups and designed in association with the Tata Consultancy Services, Pune, IIT Ropar, KPIT (Automotive Electronics), Bentley System and Persistent Systems Pvt. Ltd. Pune.

Group 1: Civil Engineering, Mechanical Engineering, Electronics and Telecommunication Engineering, Electrical Engineering and Automation & Robotics Engineering

Group 2: Computer Engineering.

Group 3: Information and Technology Engineering

Group 4: Computer science and Business System

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Unique features of the curriculum:

1. **Curriculum centered at Outcome Based Education**: The new curriculum is focused on **student-centered instruction models** that concentrate on evaluating student success by outcomes. The outcomes include topic awareness, industry required skills and attitude.

2. **Foundation Courses:** The **Basic Science** subjects and **Fundamental Engineering** subjects are pivotal for Engineering Education. These courses are structured in the sense of implementing the respective streams with a more realistic approach.

3. **Contemporary Curriculum:** Curriculum focuses on learning using **modern tools and technologies** such as Survey using Unmanned Aerial Vehicle: drone, robotics, biomedical engineering, CAD latest apps, hands-on experience on 3D printing technology and CNC / VMC machine, conceptualization of recent **Education 4.0** trends like Machine Learning, AI, Data Science

4. **Induction Training**: It's a well-planned three-week event to **acquaint** new aspirants about the atmosphere in the organization, connect them with the people in it, help themselves to unfold and get settled with an innocuous everyday routine. Training will also gain awareness, sensitivity and perception of oneself, individuals around them, society at large, and nature.

5. **Engineering Design and Development**: **Experiential learning** is the main aspect in information gain by experience. This gives students the opportunity to collaborate or develop their own learning skills, such as problem solving, critical thinking and time management. Students are exposed to various design and working models of Engineering Products such as AC, Refrigerator, CPU, 3D-Printer, reciprocating and rotary compressors using **Introduction to Engineering and Engineering Products (IEEP).**

6. **Self-Learning:** The curriculum provides students the **flexibility** to take initiatives satisfy their learning needs with the support of online learning platforms such as MOOCs, NPTEL, Swayam, MHRD, etc.

7. **Global Competence**: Curriculum aims to build **cognitive skills** that enable access to opportunities for personal and professional development. Foreign language training like English, German, Japanese and French enables to gain insight into the problems and solutions that arise from **different cultures**.

8. **Blend of Curricular and Extra-Curricular Activities**: The curriculum has a good blend of activities like co-curricular, extra-curricular, sports, culture etc. for the **overall development** of students.

9. **Inculcating Ethics and Values**: The curriculum included attempts to target **ethics and values** in order to improvise student conduct, helping them make the right choices, lead their professional lives and become ethical individuals.

10. **Internship Program:** The program involves internships with the goal of acquiring various **discipline-related skills and technologies** and developing their technical and professional knowledge.

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F. Y. B. Tech (Pattern 23)
Structure for Group 1
1. Civil Engineering 2. Electronics and Telecommunication 3. Electrical Engineering

Academic Year -2024-2025 (Semester –I)

Course	Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
			L	T	P	Hr	Cr	ISE	MSE	ESE	TW		
BSC	ES1201T	Engineering Mathematics-I	3	1	0	4	4	20	30	50	50	150	Mathematics
BSC	ES1206T	Physics for Engineers	3	0	0	3	3	20	30	50	-	100	Physics
BSC	ES1206L	Physics for Engineers Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Physics
HSSM (VSEC)	ME1202L	Engineering Drawing Laboratory	0	0	4	4	2	ISCE: 50		50	-	100	Mechanical
ESC	EE1201T	Introduction to Electrical Engineering	3	0	0	3	3	20	30	50	-	100	Electrical
ESC	EE1201L	Introduction to Electrical Engineering Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Electrical
ESC	CS1201T	Introduction to Computer Programming	1	0	0	1	1	20	10	20	-	50	Computer and IT
ESC	CS1201L	Introduction to Computer Programming Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Computer and IT
HSSM (AEC)	HS1202T/ HS1203T/ HS1204T/ HS1205T	Professional English Communication / English Language skills / German/ Japanese	2	0	0	2	2	20	30	50	-	100	Humanities
HSSM (AEC)	HS1202L/ HS1203L/ HS1204L/ HS1205L	Professional English Communication lab/ English Language skills lab / German lab/ Japanese lab	0	0	2	2	1	ISCE: 30		20	-	50	Humanities
CEP	ES1209L	Community Engagement Project	0	0	4	4	2	ISCE: 50		50	-	100	Engineering Sciences
CC	HS1211L	Co-curricular Courses	0	1	0	1	1	ISCE: 50		-	-	50	Humanities
HSSM	HS1201	Induction Training	Non-credit course										
Total			**12**	**2**	**16**	**30**	**22**					**950**	

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F. Y. B. Tech (Pattern 2023)
Structure for Group 1
1. Civil Engineering 2. Electronics and Telecommunication 3. Electrical Engineering

Academic Year -2024-2025 (Semester –II)

Course	Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
			L	T	P	Hr	Cr	ISE	MSE	ESE	TW		
BSC	ES1202T	Engineering Mathematics-II	3	1	0	4	4	20	30	50	50	150	Mathematics
BSC	ES1207T	Chemistry for Engineers	3	0	0	3	3	20	30	50	-	100	Chemistry
BSC	ES1207L	Chemistry for Engineers Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Chemistry
HSSM (VSEC)	ME1201L	Workshop Practice	0	0	4	4	2	ISCE: 60		40	-	100	Mechanical
ESC	EC1201T	Basic Electronics Engineering	2	0	0	2	2	20	30	50	--	100	E&TC
ESC	EC1201L	Basic Electronics Engineering Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	E&TC
ESC	CE1201T	Engineering Mechanics	3	0	0	3	3	20	30	50	-	100	Civil
ESC	CE1201L	Engineering Mechanics Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Civil
ESC	CS1202T	Fundamentals of Data Structure	1	0	0	1	1	20	10	20	-	50	Computer and IT
ESC	CS1202L	Fundamentals of Data Structure Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Computer and IT
HSSM (VSEC)	ES1208L	Introduction to Engineering and Engineering Products	0	0	2	2	1	ISCE: 30		20	-	50	Humanities
HSSM (IKS)	HS1207T	Indian Knowledge Systems	2	0	0	2	2	20	30	50		100	Humanities
HSSM	HS1206	Indian Constitution	**Non-credit course**										
Total			**14**	**1**	**14**	**29**	**22**					**950**	

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Abbreviations

L	:	Lecture	P	:	Practical
T	:	Tutorial	C	:	Credits
Hr	:	Hours			
In Course Code T	:	Theory	In Course Code L	:	Lab
BSC	:	Basic Science Course			
ESC	:	Engineering Science Course			
HSSM	:	Humanities Social Science and Management Course			
ASC		Ability Enhancement Course			
VSEC	:	Vocational Skill Enhancement Course			
CEP	:	Community Engagement Project			
CC	:	Co-curricular activities			
ISE	:	In Semester Evaluation			
MSE	:	Mid Semester Evaluation			
ESE	:	End Semester Evaluation			

Notes: For Theory courses: There shall be MSE, ISE and ESE. The ESE is a separate head of passing.

For Lab courses: There shall be continuous assessment (ISCE consists of ISE and MSE). The ESE is a

Separate head of passing.

List of Exit Courses after completion of Semester I and II

1. Exit option is available for students those who have earned the total 44 credits at the End of Second Semester.

2. Student who wants to avail the exit option after first year have to earn additional 8 credits from the list of courses shown below.

3. These courses student have to complete within summer vacation after 1 st Year.

4. After fulfillment as mentioned in 1 to 3 above, Students can earn **U.G Certificate** and same will be issued by the

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Civil Engineering

Sr. No.	Course code	Name	Credits
1.	EX-CE1201	Basic Civil Engineering	2
2.	EX-CE1202	Solid Mechanics	2
3.	EX-CE1203	Geotechnical Engineering	2
4.	EX-CE1204	Fluid Mechanics	2

Electronics and Telecommunication Engineering

Sr. No.	Course code	Name	Credits
1.	EX-EC1201	Electrical Technology	2
2.	EX-EC1202	Network analysis	2
3.	EX-EC1203	Basics of Power Electronics	2
4.	EX-EC1204	Electrical Measurement	2
5.	EX-EC1205	Analog and Digital Circuit	2
6.	EX-EC1206	Microcontroller	2

Electrical Engineering

Sr. No.	Course code	Name	Credits
1.	EX-ME1201	Certificate course in Electrical Wiring	2
2.	EX-ME1202	Certificate course in fundamental electrical circuit design	2
3.	EX-ME1203	Certificate course in electrical appliances operation	2
4.	EX-ME1204	Certificate course in electrical safety	2
5.	EX-ME1205	Certificate course in electrical drawing	2

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6.	EX-ME1206	Certificate course in Electrical studie	2

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F. Y. B. Tech (Pattern 2023)
Structure for Group 1
1. Mechanical Engineering 2.A&R Engineering

Academic Year -2024-2025 (Semester –I)

Course	Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
			L	T	P	Hr	Cr	ISE	MSE	ESE	TW		
BSC	ES1201T	Engineering Mathematics-I	3	1	0	4	4	20	30	50	50	150	Mathematics
BSC	ES1207T	Chemistry for Engineers	3	0	0	3	3	20	30	50	-	100	Chemistry
BSC	ES1207L	Chemistry for Engineers Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Chemistry
HSSM (VSEC)	ME1201L	Workshop Practice	0	0	4	4	2	ISCE: 60		40	-	100	Mechanical
ESC	EC1201T	Basic Electronics Engineering	2	0	0	2	2	20	30	50	--	100	E&TC
ESC	EC1201L	Basic Electronics Engineering Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	E&TC
ESC	CE1201T	Engineering Mechanics	3	0	0	3	3	20	30	50	-	100	Civil
ESC	CE1201L	Engineering Mechanics Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Civil
ESC	CS1201T	Introduction to Computer Programming	1	0	0	1	1	20	10	20	-	50	Computer and IT
ESC	CS1201L	Introduction to Computer Programming Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Computer and IT
HSSM (VSEC)	ES1208L	Introduction to Engineering and Engineering Products	0	0	2	2	1	ISCE: 30		20	-	50	Engineering Sciences
HSSM (IKS)	HS1207T	Indian Knowledge Systems	2	0	0	2	2	20	30	50	-	100	Humanities
HSSM	HS1201	Induction Training	**Non-credit course**										
Total			14	1	14	29	22					950	

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F. Y. B. Tech (Pattern 23)
Structure for Group 1
1. Mechanical Engineering 2.A&R Engineering

Academic Year -2024-2025 (Semester –II)

Course	Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
			L	T	P	Hr	Cr	ISE	MSE	ESE	TW		
BSC	ES1202T	Engineering Mathematics-II	3	1	0	4	4	20	30	50	50	150	Mathematics
BSC	ES1206T	Physics for Engineers	3	0	0	3	3	20	30	50	-	100	Physics
BSC	ES1206L	Physics for Engineers Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Physics
HSSM (VSEC)	ME1202L	Engineering Drawing Laboratory	0	0	4	4	2	ISCE: 50		50	-	100	Mechanical
ESC	EE1201T	Introduction to Electrical Engineering	3	0	0	3	3	20	30	50	-	100	Electrical
ESC	EE1201L	Introduction to Electrical Engineering Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Electrical
ESC	CS1202T	Fundamentals of Data Structure	1	0	0	1	1	20	10	20	-	50	Computer and IT
ESC	CS1202L	Fundamentals of Data Structure Laboratory	0	0	2	2	1	ISCE: 30		20	-	50	Computer and IT
HSSM (AEC)	HS1202T/ HS1203T/ HS1204T/ HS1205T	Professional English Communication / English Language skills / German/ Japanese	2	0	0	2	2	20	30	50	-	100	Humanities
HSSM (AEC)	HS1202L/ HS1203L/ HS1204L/ HS1205L	Professional English Communication lab / English Language skills lab / German lab / Japanese lab	0	0	2	2	1	ISCE: 30		20	-	50	Humanities
CEP	ES1209L	Community Engagement Project	0	0	4	4	2	ISCE: 50		50	-	100	Engineering Sciences
CC	HS1211L	Co-curricular Courses	0	0	2	1	1	ISCE: 50		-	-	50	Humanities
HSSM	HS1206	Indian constitution	Non-credit course										
Total			12	1	16	30	22					950	

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Abbreviations

L	:	Lecture	P	:	Practical
T	:	Tutorial	C	:	Credits
Hr	:	Hours			
In Course Code T	:	Theory	In Course Code L	:	Lab
BSC	:	Basic Science Course			
ESC	:	Engineering Science Course			
HSSM	:	Humanities Social Science and Management Course			
VSEC	:	Vocational Skill Enhancement Course			
AEC	:	Ability Enhancement Course			
CEP	:	Community Engagement Project			
CC	:	Co-curricular activities			
ISE	:	In Semester Evaluation			
MSE	:	Mid Semester Evaluation			
ESE	:	End Semester Evaluation			

Notes: For Theory courses: There shall be MSE, ISE and ESE. The ESE is a separate head of passing.

For Lab courses: There shall be continuous assessment (ISCE consists of ISE and MSE).

The ESE is a separate head of passing.

List of Exit Courses after completion of Semester I and II

1. Exit option is available for students those who have earned the total 44 credits at the End of Second Semester.

2. Student who wants to avail the exit option after first year have to earn additional 8 credits from the list of courses shown below.

3. These courses student have to complete within summer vacation after 1 st Year.

4. After fulfillment as mentioned in 1 to 3 above, Students can earn **U.G Certificate** and same will be issued by the

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Mechanical

Sr. No.	Course code	Name	Credits
1.	EX-ME1201	Certifiedin 3D modelling Software	2
2.	EX-ME1202	Certified in Drafting Skills	2
3.	EX-ME1203	Welding Technology	2
4.	EX-ME1204	Hands on Training in any workshop (2 Weeks)	2
5.	EX-ME1205	Certified Programmer in C	2
6.	EX-ME1206	Certified Programmer in AutoCAD	2

Automation and Robotics

Sr. No.	Course code	Name	Credits
1.	EX-AR1201	Fundamentals of Automation System	2
2.	EX-AR1202	Fundamentals of Robotics	2
3.	EX-AR1203	Certification in Design and Simulation of Hydraulic/Pneumatic System	2
4.	EX-AR1204	Certified Programmer in C++	2
5.	EX-AR1205	Mini Project	2
6.	EX-AR1206	Internship at Industry	2

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F. Y. B. Tech (Pattern 2023)
Structure for Group 2
F. Y. B. Tech. Computer Engineering
Academic Year -2024-2025 (Semester –I)

Course	Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
			L	T	P	Hr	C	ISE	MSE	ESE	TW		
BSC	ES1203T	Linear Algebra	3	1	-	4	4	20	30	50	50	150	Mathematics
BSC	ES1206T	Physics for Engineers	3	-	-	3	3	20	30	50	-	100	Physics
BSC	ES1206L	Physics for Engineers Laboratory	-	-	2	2	1	ISCE: 30		20	-	50	Physics
BSC	ES1204T	Discrete Mathematics	3	1	-	4	4	20	30	50	50	150	Mathematics
ESC	EC1201T	Basic Electronics Engineering	2	-	-	2	2	20	30	50	-	100	E&TC
ESC	EC1201L	Basic Electronics Engineering Laboratory	-	-	2	2	1	ISCE: 30		20	-	50	E&TC
ESC	CS1203T	Fundamentals of Computer Programming	1	-	-	1	1	20	10	20	-	50	Computer and IT
ESC	CS1203L	Fundamentals of Computer Programming Laboratory	-	-	4	4	2	ISCE: 60		40	-	100	Computer and IT
HSSM (IKS)	HS1207T	Indian Knowledge Systems	2	-	-	2	2	20	30	50	-	100	Humanities
CEP	ES1209L	Community Engagement Project	0	0	4	4	2	ISCE: 50		50	-	100	Engineering Sciences
HSSM	HS1201	Induction Training	Non-credit course										
		Total	14	2	12	28	22					950	

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F. Y. B. Tech (Pattern 2023)
Structure for Group 2
F. Y. B. Tech. Computer Engineering
Academic Year -2024-2025 (Semester –II)

Course	Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
			L	T	P	Hr	C	ISE	MSE	ESE	TW		
BSC	ES1205T	Probability and Statistics	3	1	-	4	4	20	30	50	50	150	Mathematics
BSC	ES1207T	Chemistry for Engineers	3	-	-	3	3	20	30	50	-	100	Chemistry
BSC	ES1207L	Chemistry for Engineers Laboratory	-	-	2	2	1	ISCE: 30		20	-	50	Chemistry
ESC	EE1201T	Introduction to Electrical Engineering	3	-	-	3	3	20	30	50	-	100	Electrical
ESC	EE1201L	Introduction to Electrical Engineering Laboratory	-	-	2	2	1	ISCE: 30		20	-	50	Electrical
ESC	CS1204T	Object Oriented Programming	1	-	-	1	1	20	10	20	-	50	Computer and IT
ESC	CS1204L	Object Oriented Programming Laboratory	-	-	4	4	2	ISCE: 60		40	-	100	Computer and IT
HSSM (AEC)	HS1202T/ HS1203T/ HS1204T /HS1205T	Professional English Communication/ English Language skills German/ Japanese	2	-	-	2	2	20	30	50	-	100	Humanities
HSSM (AEC)	HS1202L/ HS1203L/ HS1204L/ HS1205L	Professional English Communication lab English Language skills lab German lab Japanese lab	-	-	2	2	1	ISCE: 30		20	-	50	Humanities
HSSM	HS1209T	Economics	2	-	-	2	2	20	30	50	-	100	Humanities
HSSM (VSEC)	ES1208L	Introduction to Engineering and Engineering Products	-	-	2	2	1	ISCE: 30		20	-	50	Engineering Sciences
CC	HS1211L	Co-curricular Courses	0	1	0	1	1	ISCE: 50 -		-	-	50	Humanities
HSSM	HS1206	Indian Constitution	Non-credit course										
		Total	14	2	12	28	22					950	

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AEC	:	Ability enhancement course			
VSEC	:	Vocational Skill Enhancement Course			
AEC	:	Ability Enhancement course			
CEP	:	Community Engagement Project			
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4. After fulfillment as mentioned in 1 to 3 above, Students can earn **U.G Certificate** and same will be issued by the

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Computer Engineering

Sr. No.	Course code	Name	Credits
1.	EX-CS1201	Desktop Engineer	2
2.	EX-CS1202	IT Support Engineer	2
3.	EX-CS1203	Certified Programmer in C	2
4.	EX-CS1204	Certified Programmer in C++	2
5.	EX-CS1205	MS Office certification program	2
6.	EX-CS1206	Computer Hardware Maintenance	2

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Engg Sciences and Humanities

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Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Pattern 2023)
Structure for Group 2
F. Y. B. Tech. Information Technology
Academic Year -2024-2025 (Semester –I)

Course	Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
			L	T	P	Hr	C	ISE	MSE	ESE	TW		
BSC	ES1203T	Linear Algebra	3	1	-	4	4	20	30	50	50	150	Mathematics
BSC	ES1207T	Chemistry for Engineers	3	-	-	3	3	20	30	50	-	100	Chemistry
BSC	ES1207L	Chemistry for Engineers Laboratory	-	-	2	2	1	ISCE: 30	20	-		50	Chemistry
ESC	EE1201T	Introduction to Electrical Engineering	3	-	-	3	3	20	30	50	-	100	Electrical
ESC	EE1201L	Introduction to Electrical Engineering Laboratory	-	-	2	2	1	ISCE: 30	20	-		50	Electrical
ESC	CS1203T	Fundamentals of Computer Programming	1	-	-	1	1	20	10	20	-	50	Computer and IT
ESC	CS1203L	Fundamentals of Computer Programming Laboratory	-	-	4	4	2	ISCE: 60	40	-		100	Computer and IT
HSSM (AEC)	HS1202T/ HS1203T/ HS1204T /HS1205T	Professional English Communication English Language skills German Japanese	2	-	-	2	2	20	30	50	-	100	Humanities
HSSM (AEC)	HS1202L/ HS1203L/ HS1204L/ HS1205L	Professional English Communication lab English Language skills lab German lab Japanese lab	-	-	2	2	1	ISCE: 30	20	-		50	Humanities
HSSM	HS1209T	Economics	2	-	-	2	2	20		30	50	100	Humanities
HSSM (VSEC)	ES1208L	Introduction to Engineering and Engineering Products	-	-	2	2	1	ISCE: 30	20	-		50	Engineering Sciences
CC	IT1211L	Co-curricular Courses	0	1	0	1	1	ISCE: 50	-	-		50	Humanities
HSSM	HS1201	Induction Training	Non-credit course										
		Total	**14**	**2**	**12**	**28**	**22**					**950**	

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F. Y. B. Tech (Pattern 2023)
Structure for Group 2
F. Y. B. Tech. Information Technology Engineering
Academic Year -2024-2025 (Semester –II)

Course	Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
			L	T	P	Hr	C	ISE	MSE	ESE	TW		
BSC	ES1205T	Probability and Statistics	3	1	-	4	4	20	30	50	50	150	Mathematics
BSC	ES1206T	Physics for Engineers	3	-	-	3	3	20	30	50	-	100	Physics
BSC	ES1206L	Physics for Engineers Laboratory	-	-	2	2	1	ISCE: 30		20	-	50	Physics
BSC	ES1204T	Discrete Mathematics	3	1	-	4	4	20	30	50	50	150	Mathematics
ESC	EC1201T	Basic Electronics Engineering	2	-	-	2	2	20	30	50	-	100	E&TC
ESC	EC1201L	Basic Electronics Engineering Laboratory	-	-	2	2	1	ISCE: 30		20	-	50	E&TC
ESC	CS1204T	Object Oriented Programming	1	-	-	1	1	20	10	20	-	50	Computer and IT
ESC	CS1204L	Object Oriented Programming Laboratory	-	-	4	4	2	ISCE: 60		40	-	100	Computer and IT
HSSM (IKS)	HS1207T	Indian Knowledge Systems	2	-	-	2	2	20	30	50	-	100	Humanities
CEP	ES1209L	Community Engagement Project	0	0	4	4	2	ISCE: 50		50	-	100	Engineering Sciences
HSSM	HS1206	Indian Constitution	Non-credit course										
		Total	14	2	12	28	22					950	

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Abbreviations

L	:	Lecture	P	:	Practical
T	:	Tutorial	C	:	Credits
Hr	:	Hours			
In Course Code T	:	Theory	In Course Code L	:	Lab
BSC	:	Basic Science Course			
ESC	:	Engineering Science Course			
HSSM	:	Humanities Social Science and Management Course			
AEC	:	Ability Enhancement course			
VSEC	:	Vocational Skill Enhancement Course			
CEP	:	Community Engagement Project			
CC	:	Co-curricular activities			
ISE	:	In Semester Evaluation			
MSE	:	Mid Semester Evaluation			
ESE	:	End Semester Evaluation			

Notes: For Theory courses: There shall be MSE, ISE and ESE. The ESE is a separate head of passing.

For Lab courses: There shall be continuous assessment (ISCE consists of ISE and MSE). The ESE is a

Separate head of passing.

List of Exit Courses after completion of Semester I and II

1. Exit option is available for students those who have earned the total 44 credits at the End of Second Semester.

2. Student who wants to avail the exit option after first year have to earn additional 8 credits from the list of courses shown below.

3. These courses student have to complete within summer vacation after 1 st Year.

4. After fulfillment as mentioned in 1 to 3 above, Students can earn **U.G Certificate** and same will be issued by the

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Institute.

Information Technology

Sr. No.	Course code	Name	Credits
1.	EX-CS1201	Desktop Engineer	2
2.	EX-CS1202	IT Support Engineer	2
3.	EX-CS1203	Certified Programmer in C	2
4.	EX-CS1204	Certified Programmer in C++	2
5.	EX-CS1205	MS Office certification program	2
6.	EX-CS1206	Computer Hardware Maintenance	2

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F. Y. B. Tech (Pattern 2023)
Structure for Group 3
F. Y. B. Tech. Computer Science and Business System
Academic Year -2024-2025 (Semester –I)

Course	Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
			L	T	P	Hr	C	ISE	MSE	ESE	TW		
BSC	ES1203T	Linear Algebra	3	1	-	4	4	20	30	50	50	150	Mathematics
ESC	EE1201T	Introduction to Electrical Engineering	3	-	-	3	3	20	30	50	-	100	Electrical
ESC	EE1201L	Introduction to Electrical Engineering Laboratory	-	-	2	2	1	ISCE: 30	20		-	50	Electrical
ESC	CS1203T	Fundamentals of Computer Programming	1	-	-	1	1	20	10	20	-	50	Computer and IT
ESC	CS1203L	Fundamentals of Computer Programming Laboratory	-	-	4	4	2	ISCE: 60	40		-	100	Computer and IT
HSSM (AEC)	HS1202T/ HS1203T/ HS1204T/ HS1205T	Professional English Communication/ English Language skills German/ Japanese	2	-	-	2	2	20	30	50	-	100	Humanities
HSSM (AEC	HS1202L/ HS1203L/ HS1204L/ HS1205L	Professional English Communication lab English Language skills lab German lab Japanese lab	-	-	2	2	1	ISCE: 30	20		-	50	Humanities
SSM (VSEC)	ES1208L	Introduction to Engineering and Engineering Products	0	0	2	2	1	ISCE: 30	**20**	-		50	Engineering Sciences
HSSM	HS1209T	Economics	2	-	-	2	2	20	30	50	-	100	Humanities
HSSM	HS1210L	Business Communication and Value Science-I	-	-	-	2	1	ISCE: 50			-	50	Humanities
CC	ES1211L	Co-curricular Course	-	1	-	1	1	ISCE: 50	-	-		50	Humanities
HSSM	HS1208T	Universal Human values	3	-	-	3	3	20	30	50	-	100	Humanities
HSSM	HS1201	Induction Training	Non-credit course										
		Total	14	2	10	28	22					950	

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JSPM's
RAJARSHI SHAHU COLLEGE OF ENGINEERING
TATHAWADE, PUNE-33
(An Autonomous Institute Affiliated to Savitribai Phule Pune University, Pune)

F. Y. B. Tech (Pattern 2023)
Structure for Group 3

F. Y. B. Tech. Computer Science and Business System

Academic Year -2024-2025 (Semester –II)

Course	Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
			L	T	P	Hr	C	ISE	MSE	ESE	TW		
BSC	ES1204T	Discrete Mathematics	3	1	-	4	4	20	30	50	50	150	Mathematics
BSC	ES1206T	Physics for Engineers	3	-	-	3	3	20	30	50	-	100	Physics
BSC	ES1206L	Physics for Engineers Laboratory	-	-	2	2	1	ISCE: 30	20	-		50	Physics
ESC	EC1201T	Basic Electronics Engineering	2	-	-	2	2	20	30	50	-	100	E&TC
ESC	EC1201L	Basic Electronics Engineering Laboratory	-	-	2	2	1	ISCE: 30	20			50	E&TC
ESC	ES1205T	Probability and Statistics	3	1	-	4	4	20	30	50	50	150	Mathematics
ESC	CS1204T	Object Oriented Programming	1	-	-	1	1	20	10	20	-	50	Computer and IT
ESC	CS1204L	Object Oriented Programming Laboratory	-	-	4	4	2	ISCE: 60	40		-	100	Computer and IT
CEP	ES1209L	Community Engagement Project	0	0	4	4	2	ISCE: 50	50		-	100	Engineering Sciences
HSSM (IKS)	HS1207T	Indian Knowledge Systems	2	-	-	2	2	20		30	50	100	Humanities
HSSM	HS1206	Indian Constitution	Non-credit course										
		Total	14	2	12	28	22					950	

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Abbreviations

L	**:**	**Lecture**	**P**	**:**	**Practical**
T	**:**	**Tutorial**	**C**	**:**	**Credits**
Hr	**:**	**Hours**			
In Course Code T	**:**	**Theory**	**In Course Code L**	**:**	**Lab**
BSC	**:**	**Basic Science Courses**			
ESC	**:**	**Engineering Science Courses**			
HSSM	**:**	**Humanities Social Science and Management Courses**			
VSEC	**:**	**Vocational Skill Enhancement Courses**			
CEP	**:**	**Community Engagement Project**			
CC	**:**	**Co-curricular activities**			
ISE	**:**	**In Semester Evaluation**			
MSE	**:**	**Mid Semester Evaluation**			
ESE	**:**	**End Semester Evaluation**			

Notes: For Theory courses: There shall be MSE, ISE and ESE. The ESE is a separate head of passing.

For Lab courses: There shall be continuous assessment (ISCE consists of ISE and MSE). The ESE is a

Separate head of passing.

List of Exit Courses after completion of Semester I and II

1. Exit option is available for students those who have earned the total 44 credits at the End of Second Semester.

2. Student who wants to avail the exit option after first year have to earn additional 8 credits from the list of courses shown below.

3. These courses student have to complete within summer vacation after 1 st Year.

4. After fulfillment as mentioned in 1 to 3 above, Students can earn **U.G Certificate** and same will be issued by the Institute.

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Computer Sciences and Business Systems

Sr. No.	Course code	Name	Credits
1.	EX-CB1201	Desktop Engineer	2
2.	EX-CB1202	IT Support Engineer	2
3.	EX-CB1203	Certified Programmer in C	2
4.	EX-CB1204	Certified Programmer in C++	2

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F. Y. B. Tech
Academic Year – 2024-2025

Course Code	Course
ES1201T	Engineering Mathematics-I
ES1206T	Physics for Engineers
ES1206L	Physics for Engineers Laboratory
ME1202L	Engineering Drawing Laboratory
EE1201T	Introduction to Electrical Engineering
EE1201L	Introduction to Electrical Engineering Laboratory
CS1201T	Introduction to Computer Programming
CS1201L	Introduction to Computer Programming Laboratory
ES1207T	Chemistry for Engineers
ES1207L	Chemistry for Engineers Laboratory
ME1201L	Workshop Practice
EC1201T	Basic Electronics Engineering
EC1201L	Basic Electronics Engineering Laboratory
CE1201T	Engineering Mechanics
CE1201L	Engineering Mechanics Laboratory
ES1203T	Linear Algebra
ES1204T	Discrete Mathematics
CS1203T	Fundamentals of Computer Programming
CS1203L	Fundamentals of Computer Programming Laboratory
HS1209T	Economics
HS1210L	Business Communication and Value Science-I
HS1208T	Universal Human Values
ES1202T	Engineering Mathematics-II
CS1202T	Fundamentals of Data Structure
CS1202L	Fundamentals of Data Structure Laboratory
ES1205T	Probability and Statistics
CS1204T	Object Oriented Programming
CS1204L	Object Oriented Programming Laboratory
Common Courses for Group1,2 and 3	
HS1202T	Professional English Communication
HS1203T	English Language Skills
HS1204T	German
HS1205T	Japanese

Course Code	Course
HS1202L	Professional English Communication Lab
HS1203L	English Language Skills Lab
HS1204L	German Lab
HS1205L	Japanese Lab
ES1209L	Community Engagement Project
HS1211L	Co-curricular Courses
HS1201	Induction Training
ES1208L	Introduction to Engineering and Engineering Products
HS1207T	Indian Knowledge System
HS1206	Indian Constitution

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First Year B Tech. (Group -1) (Civil/Mech/Electrical/E&TC/A&R Engineering)
– Sem I (2023 Pattern)
Course Code: ES1201T, Course Name: Engineering Mathematics I

Teaching Scheme: TH: - 03 Hours/Week TU:- 01 Hours/Week	Credit TH:03 TU: 01	Examination Scheme: In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Term Work : 50 Marks

Course Prerequisites: Determinants, Matrices, Limits, continuity, Differentiation, Integration, Maxima, Minima.

Course Objective:
To familiarize the students with concepts and techniques in Linear algebra, Fourier series and Calculus. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance thinking power, useful in their disciplines.

Course Outcome: After successful completion of the course, students will able to
CO1: Apply the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, finding linear and orthogonal transformations. Eigen values and Eigen vectors applicable to various engineering problems.
CO2: Apply Mean value theorems and its generalization leading to Taylor's and Maclaurin's series useful in the analysis of engineering problems.
CO3: Apply the technique of Fourier series representation and harmonic analysis for design and analysis of continuous and discrete periodic system.
CO4: Deal with partial derivative of functions of several variables that are essential in various branches of engineering.
CO5: Apply the concept of Jacobian to find partial derivative of implicit function and functional dependence. Use of partial derivatives in estimating error and approximation and finding extreme values of the function.

Course Contents		
UNIT-I	**Linear Algebra-Matrices, System of Linear Equations**	**07 Hours**
Rank of a Matrix, System of Linear Equations, Linear Dependence and Independence, Linear and Orthogonal Transformations, Application to problems in Engineering.		
UNIT-II	**Linear Algebra-Eigen Values and Eigen Vectors**	**07 Hours**
Eigen Values and Eigen Vectors, Cayley Hamilton theorem, Diagonalization of a matrix, Reduction of Quadratic forms to Canonical form by Linear and Orthogonal transformations, Nature of quadratic form.		
UNIT-III	**Differential Calculus**	**07 Hours**
Rolle's Theorem, Mean Value Theorems, Infinite series, Alternating series, Power series, test for convergence, Taylor's Series, Maclaurin's Series, Indeterminate Forms, L' Hospital's Rule, Evaluation of Limits and Applications.		
UNIT-IV	**Fourier Series**	**07 Hours**
Definition, Dirichlet's conditions, Full range Fourier series, Half range Fourier series, Harmonic analysis and Applications to problems in Engineering.		
UNIT-V	**Multivariable Calculus-Partial Differentiation**	**07 Hours**
Introduction to functions of several variables, Limit, Continuity, Partial Derivatives, Euler's Theorem on Homogeneous functions, Partial Derivative of Composite Function, Total Derivative, Change of Independent variables.		
UNIT-VI	**Applications of Multivariable Calculus**	**07 Hours**
Jacobian and its applications, Errors and Approximations, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.		

Guidelines for Assessment
Guidelines for Tutorial and Term Work:
i) Tutorial shall be engaged in four batches (batch size of 20 students maximum) per division.
ii) Term work shall be based on continuous assessment of six assignments (one per each unit).
Text Books:
T1. Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill).
T2. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).
Reference Books:
R1. Advanced Engineering Mathematics, 10e, by Erwin Kreyszig (Wiley India).
R2. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education).
R3. Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Cengage Learning).
R4. Differential Equations, 3e by S. L. Ross (Wiley India).
R5. Complex Variables and Applications, 8e, by J. W. Brown and R. V. Churchill (McGraw-Hill Inc.)
Schaum's Outline of Complex Variables by Murray R. Spiegel, Seymour Lipschutz (McGraw-Hill Education)

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F. Y. B. Tech (Group 1)
Academic Year – 2024-2025 Semester -I
[ES1206T] Physics For Engineers

Teaching Scheme: Lectures : 3 Hrs./Week Practical : 2 Hrs./Week	Credit Scheme: TH: 3 PR : 1	Examination Scheme: ISE Evaluation: 20 Marks MSE Evaluation: 30 Marks ESE Evaluation: 50 Marks Practical Evaluation : 50 Marks Total: 100 Marks

Course Prerequisites: Basic concepts of Physics, laws of optics and modern physics.

Course Objective: The objective of this course is to
1) **Develop skills in analyzing oscillatory systems.**
2) **Apply principles of shock waves and acoustics.**
3) **Demonstrate knowledge of laser technology and optics.**
4) **Utilise modern physics and earth science concepts.**

Course Outcome:
After successful completion of the course, students will be able to:
- **CO1:** Recollect basic concepts of SHM, acoustics, optics, modern physics and quantum mechanics.
- **CO2** : Demonstrate the principles of sound, laser, optical fiber, interference and diffraction.
- **CO3 :** Comprehend and design solution for shock waves, acoustic measurement, interference, diffraction and wave equations.
- **CO4 :** Utilise quantum mechanics and optics concepts to address problems related to natural disasters.

Course Contents

UNIT-I	**Oscillations and Shock Waves**	**7 Hours**

Oscillations – SHM, Differential equation of SHM (No derivation) , Springs stiffness Factor and it's physical significance, series and parallel combination of Springs (Derivation) , Types of Springs and their applications, Theory of Damped oscillation (Qualitative), Types of Damping (Graphical approach) , Engineering applications in Damped Oscillation, Theory of forced oscillation (Qualitative), Resonance , Sharpness of Resonance , Numerical problem .
Shock Wave – Mach number and Mach angle, Mach Regimes , Definition and characteristics of shock waves , construction and working of Reddy shock tube , Applications of shock waves , Numerical problem.

UNIT-II	**Acoustics, Photometry & Radiometry**	**7 Hours**

Acoustics – Introduction to Acoustics , Reverberation and Reverberation Time , Absorption power and absorption coefficient , Requisites for Acoustics in Auditorium , Sabine's formula (Derivation) , Measurement of absorption coefficient , Factors affecting the Acoustics and remedial measures , Sound insulation and it's measurements , Noise and it's measurements , Impact of noise in multistoried buildings
Radiometry and Photometry – Radiation quantities ,Spectral quantities , Relation between luminance and Transmittance ,Photometry (Cosine law and Inverse square Law)

UNIT-III	**Laser & Optical Fiber Communication**	**7 Hours**

LASER – Properties of LASER beam , Interaction of radiation with Matter , LASER action

Population Inversion , Metastable state , Requisite of LASER system , Semiconductor LASER , LASER range finder , LIDAR , Road profiling , Bridge Deflection , Speed checker , Numerical
Optical Fibre – Principal and construction of Optical Fibre , Acceptance angle and Numerical Aperture (NA) ,Expression for NA , Modes of propagation, Attenuation and Fibre losses , Fibre Optic displacement Sensor ,Fibre optic Temperature sensor , Numerical Problem

UNIT-IV	Quantum Mechanics	7 Hours

Wave particle duality , De-Broglie's wave length, Heisenberg's Uncertainty Principle, Schrodinger's wave equation , Time independent and time dependent forms ,Free particle, Concept of Normalized wave packet , Particle in Box problem ,it's solutions ,Related concepts .Finite potential barrier , bound and scattering states ,reflection and transmission coefficients , Quantum tunneling.

UNIT-V	Optics & Modern Physics	7 Hours

Optics - Huygens's Principle and Superposition of waves , Concept of phase and group velocity Interference by division of wave front (Fresnel biprism) and amplitude (Newton's ring) Coherence of light ,Diffractionof light by single slit
Modern Physics – Black body radiation, Stefan-Boltzmann law, Photo electric Effect , Compton Effect

UNIT-VI	Natural Hazards & Safety	7 Hours

Introduction, Earthquake (General characteristics , Physics of Earthquake , Richter Scale of measurement and Earthquake resistant measure) ,Tsunami Causes of Tsunami , Characteristics, adverse effect , risk reduction measures, Engineering structure to withstand Tsunami), Landslide (Causes such as excess rain fall ,geological structure, human excavation etc., Types of landslide , adverse effects , Engineering solution for landslides) , Forest fires and detection using remote sensing Fire hazards and fire protection , Fire proofing material , Fire safety regulations and Fire fighting equipment's , prevention and safety measure , Numerical Problems.

Text Books:

T1. Daniel Kleppner, An introduction to Mechanics [Cambridge University Press; 2nd Ed.]
T2. H. J. Pain, Physics of Vibrations and Waves [Wiley; 6th Ed.]
T3. Eugene Hecht, Optics [Addison-Wesley; 4th Ed.]
T4. D. J. Griffith, Introduction to Electrodynamics [PHI Learning Pvt. Ltd.; 4th Ed. (2015)]
T5. Arthur Bieser, Concepts of Modern Physics [McGraw Hill Education; 6th Ed. (2009)]

Reference Books:

R1. Francis A. Jenkins, Fundamental of Optics (McGraw-Hill Primis Custom Publishing; 4 edition (1 December 2001)]
R2. Stephen Gasiorowicz, Quantum Physics, [John Wiley & Sons; 3rd Ed. (2003)]
R3. D. J. Griffiths, Introduction to Quantum Mechanics [Pearson Education India; 2nd Ed., (2015)]

Dr. S M Yadav
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F. Y. B. Tech (Group 1)
Academic Year – 2024-2025 Semester -I
[ES1206L] Physics For Engineers

Teaching-Scheme: PR: 2 Hour/Week	Credit PR:1	Examination Scheme: ISE Evaluation: 20 Marks MSE Evaluation: 10 Marks ESE Evaluation: 20 Marks Total :50 Marks

Course Prerequisites: Basic concept of physics, laws of optics and modern physics.

Course Objective: The Objective of this course is to make students learn and understand basic concepts and principles of waves and oscillations, to apply the knowledge gained to analyze practical engineering problems involving waves and oscillations, and also to evaluate and create solutions effectively and meaningfully. This course will be especially useful in understanding devices and equipment based on Optics,

Experimental Learning Outcomes:
After successful completion of the course, students will be able to:
- **ELO1: Recognize the monochromaticity of optical sources by various methods.**
- **ELO2: Describe the various electrical properties of LCR circuit.**
- **ELO3: Determine the values of Planck's constant and Stefan's constant.**
- **ELO4: Calculate the sound absorption coefficient, Hall coefficient, magnetic susceptibility and numerical aperture.**

Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance andunderstanding.

	List of Experiments
1	Calculate the sound absorption coefficients of various acoustical materials.
2	Determine the wavelength of He Ne laser by plane diffraction grating.
3	Determine the value of Planck's constant by photoelectric effect.
4	Determine the value of Stefan's constant by black body radiation.
5	Calculate the numerical aperture of optical fiber.
6	Study Hall effect and calculate the value of Hall coefficient of given semiconductor specimen.
7	Calculate the wavelength of monochromatic light source by Newton's rings.
8	Calculate the magnetic susceptibility of $MnSO_4$ solution by Quincke's method.
9	Determine the wavelength of laser beam by Michelson's interferometer.
10	Transient analysis of LCR circuit.

Text Books:
T1. Daniel Kleppner, An introduction to Mechanics [Cambridge University Press; 2nd Ed.]
T2. H. J. Pain, Physics of Vibrations and Waves [Wiley; 6th Ed.]
T3. Eugene Hecht, Optics [Addison-Wesley; 4th Ed.]
T4. D. J. Griffith, Introduction to Electrodynamics [PHI Learning Pvt. Ltd.; 4th Ed. (2015)]
T5. Arthur Bieser, Concepts of Modern Physics [McGraw Hill Education; 6th Ed. (2009)]

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Engg.Sciences and Humanities		

F. Y. B. Tech (Group 1)
Academic Year – 2024-2025 Semester –I/II [ME1202L]
Engineering Drawing Laboratory

Teaching-Scheme: PR:4 Hour/Week	Credit PR:2	Examination Scheme: ISCEEvaluation:50 Marks ESE Evaluation:50 Marks Total :100 Marks

Course Prerequisites: Basic geometrical measurements (linear and angular), Construction and deviation of line, circle and polygon, Coordinate geometry, computer literacy.

Course Objective: To provide students a basic understanding of the fundamentals of engineering drawing, with emphasis on visualization, standards and conventions, tools and usage in engineering applications.

Lab Outcome:

After successful completion of the course, students will be able to:
- **LO1:** Interpret and draw 2D views of engineering objects.
- **LO2:** Interpret and draw Projections of solids and Sections of standard solids.
- **LO3:** Interpret and draw 3D views of engineering objects.
- **LO4:** Develop Lateral surfaces of solids
- **LO5:** Draw Perspective Projections of given object.
- **LO6:** Demonstrate proficiency using modern drafting tools to create engineering drawings.

Guidelines for Assessment
1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

	List of Experiment
1	Introduction to Engineering Drawing A) Geometric Construction. B) Dimensioning
2	Engineering Curves A) Conic Curves B) Non-conic Curves
3	Orthographic Projection manual A) Simple Orthographic Projection B) Sectional Orthographic Projection
4	Orthographic Projection (Using CAD) A) Simple Orthographic Projection B) Sectional Orthographic Projection
5	A) Projection of Solids B) Section of Solids
6	Isometric Projections manual A) Without curve B) With curve/Hole
7	Isometric Projections (Using CAD) A) Without curve B) With curve/Hole
8	Development of lateral surfaces (DLS)
9	Perspective Projection manual
10	Model making of 3D objects.

Text Books:

T1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House.

T2. Textbook of Engineering Drawing by Reddy. K. Venkata, B. S. Publications.

T3. Textbook of Engineering Drawing by Dr. R. K. Dhawan, S. Chand Publications.

T4. A Textbook of Engineering Drawing by Prof. P. J. Shah, S. Chand Publications.

T5. A Textbook of Engineering Drawing [Along with an introduction to AutoCAD 2015] by Rana Ramakant, Lal Roop.

Reference Books:

R1. V. Laxminarayan and M. L. Mathur, A Textbook of Machine Drawing, Jain Brothers.

R2. N. D. Bhatt, Machine Drawing, CharotarPublishing House.

R3. Basant Agrawal and C. M. Agrawal, Engineering Drawing, Tata McGraw- Hill Publishing Co. Ltd.

R4. Dhananjay A. Jolhe, Engineering Drawing with an Introduction to AutoCAD, Tata McGraw-Hill \ Publishing Co. Ltd.

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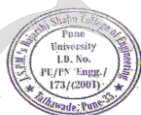
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F. Y. B. Tech (Group 1)
Academic Year – 2024-2025 Semester –I/II
[EE1201T]: Introduction to Electrical Engineering

Teaching Scheme: TH: - 3Hours/Week	Credit TH: 3	Examination Scheme: In Sem. Evaluation: 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks

Course Prerequisites: Modern Electron Theory, E.M.F., Electric Potential, Potential difference and current, Electrical circuit elements (R, L and C). Ohm's law.

Course Objective: To impart the fundamental knowledge of electrical engineering for the students of various disciplines and give comprehensive idea about AC fundamentals and DC circuit analysis, working principles and applications of electrical machines.

Course Outcome:
After successful completion of the course, students will able to:
CO1: Relate fundamental concepts of electromagnetism, AC-DC circuits and electrical machines.
CO2: Explain the operation of electrical circuits and machines.
CO3: Solve problems on electromagnetism, electrical circuits and machines.

Course Contents

UNIT-I	Electromagnetism and Transformers	6 Hours

Fundamentals of Magnetic Circuits. Faraday's Laws of Electromagnetic Induction and types of EMF's. Transformer: Construction, Working principle, Ideal and practical transformer. Equivalent circuit, losses in transformers, Regulation and efficiency. Auto-transformer.

UNIT-II	AC Fundamentals	7 Hours

Generation of single-phase sinusoidal voltages and currents, their mathematical and graphical representation. Concept of cycle, period, frequency, instantaneous, peak, average and RMS values, peak factor and form factor. Phase, Phasor, Phase difference, lagging, leading in phase quantities and their phasor representation. Rectangular and polar representation of phasors. Study of AC circuits consisting of pure resistance, pure inductance, pure capacitance.

UNIT-III	Single Phase and Poly Phase AC Circuits	5 Hours

Analysis of single-phase ac circuits consisting of R-L, R-C, R-L-C combinations, resonance. Real power, reactive power, apparent power, power factor. Three-phase balanced circuits, voltage and current relations in star and delta connections. Single line diagram of power system.

UNIT-IV	D.C. Circuits	6 Hours

Network terminologies, Classification of electrical networks. Series and parallel resistances. Kirchhoff's current and voltage laws. Analysis of simple circuits with DC excitation: Superposition Theorem, Thevenin's Theorem, Norton's Theorem.

UNIT-V	DC Motors	06 Hours
Construction: Parts, functions and types, working principle, EMF and Torque Equation. Back EMF and its significance. Power Flow Diagram. Characteristics and applications of DC Motors.		
UNIT-VI	AC Motors	06 Hours
Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency. Applications of three phase induction motor. Introduction to Single-phase induction motor.		

Text Books:

T1. Theory and problems of Basic Electrical Engineering-By I. J. Nagrath and Kothari PHI learning PVT. Ltd.

T2. Electrical Technology: Volume –I & Volume - II, B. L. Thereja, S. Chand and Company Ltd, New Delhi.

Reference Books:

R1. Principles of Electrical Engineering by Del. Toro, PHI learning pvt Ltd.

R2. Electrical power: S.L. Uppal.

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F. Y. B. Tech (Group 1)
Academic Year – 2024-2025 Semester –I/II
[EE1201L]: Introduction to Electrical Engineering

Teaching Scheme: PR:- 2 Hours/Week	Credit PR:1	Examination Scheme: ISCEEvaluation:30 Marks ESE Evaluation: 20 Marks Total :50 Marks

Course Prerequisites: Modern Electron Theory, E.M.F. Electric Potential, Potential difference and Current, Electrical circuit elements (R, L and C). Ohm's law.

Course Objective: To impart the fundamental knowledge of electrical engineering for the students of various disciplines and give comprehensive idea about AC fundamentals and D C circuit analysis working principles and applications of basic electric machines.

Lab Outcome:
After successful completion of the lab, students will able to:
LO1: Illustrate the performance of single phase transformer and R-L-C circuit.
LO2: Compare the calculated and observed values of electrical quantities.
LO3: Identify the different parts of electrical machines.

Guidelines for Assessment

1) **Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.**
2) **Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.**

List of Laboratory Experiments

1	Direct loading test on single phase transformers.
2	To measure amplitude, time period and frequency of time varying signals.
3	Study the electrical characteristics of an R-L-C series circuit.
4	Verification of voltage and current relations in polyphase AC circuits.
5	Verification of Kirchhoff's Laws.
6	Verification of Superposition theorem.
7	Constructional study of DC machine.
8	Constructional study of AC machine.

Text Books:
T1. Theory and problems of Basic Electrical Engineering-By I. J. Nagrath and Kothari PHI learning PVT. Ltd.
T2. Electrical Technology: Volume –I & Volume - II, B. L. Thereja, S. Chand and Company Ltd, New D

Reference Books:
R1. Principles of Electrical Engineering by Del. Toro, PHI learning pvt Ltd.

R2. Electrical power: S.L. Uppal.

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F. Y. B. Tech (Group 1)
Academic Year – 2024-2025 Semester -I
[CS1201T] Introduction to Computer Programming

Teaching-Scheme: TH:1 Hour/Week	Credit TH:1	Examination Scheme: ISE Evaluation : 20 Marks MSE Evaluation: 10 Marks ESE Evaluation : 20 Marks Total: 50 Marks

Course Prerequisites: Basic Computer Knowledge, Analytical and Logical skills.

Course Objective: The objective of this course is to make students learn and understand the fundamentals of programming, data structure and algorithms using C programming and to apply the knowledge gained to solve computational   problems.

Course Outcome:
After successful completion of the course, students will be able to:
- **CO1:** Recognize programming terms, to establish a fundamental understanding of the language
- **CO2:** Convert logical concepts into functional code
- **CO3:** Apply logical thinking to create simple, readable and error-free programs

Course Contents

UNIT-I	Basics of C Programming and Control Flow	8 Hours

Problem-solving techniques: Algorithm and flowchart, Structure of a C program, Writing, compiling, and running your first C program, Variables and Data Types, Operators and expressions, Control Flow Statements: Conditional statements, Looping statements

UNIT-II	Functions, Arrays, and File Handling	7 Hours

Functions: Function prototypes and return types, Recursion, Arrays and Strings, Basics of pointers and memory addresses, Basics of file handling

Text Books:
T1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
T2. Dromey, R. G., How to Solve it by Computer. Pearson Education India.
T3. Let Us C, Yashavant Kanetkar, BPB Publication
T4. Programming in ANSI C, Balaguruswamy, McGraw-Hill

Reference Books:
R1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
R2. Sumitabha Das, Computer Fundamentals and C Programming, McGraw- Hi

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F. Y. B. Tech (Group 1)

Academic Year – 2024-2025 Semester -I

[CS1201L] Introduction to Computer Programming

Teaching-Scheme: PR: 2 Hour/Week	Credit PR:1	Examination Scheme: ISCE Evaluation : 30 Marks ESE Evaluation : 20 Marks Total : 50 Marks

Course Prerequisites: Basic Computer Knowledge, Analytical and Logical skills.

Course Objective: The Objective of this course is to make students learn and understand basics of programming, data structure and algorithms using C programming language, and to apply the knowledge gained to solve computational problems.

Lab Outcome:
After successful completion of the course, students will be able to:
 LO1: Identify basic C programming components, including variables, data types, and control structures
 LO2: Illustrate the steps involved in writing, compiling, and executing simple C programs to solve defined problems
 LO3: Applying problem-solving strategies to find and fix errors to ensure error-free execution and improve program readability

Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	Identify and explain the output of a basic C program that prints "Hello, World!" to the console
2	Describe and demonstrate basic arithmetic operations to perform calculations and display results
3	Illustrate the use of conditional statements
4	Demonstrate a C Program using looping 'for' statements
5	Demonstrate a C Program using looping 'while' statements
6	Implement a C program that utilizes functions
7	Demonstrate Recursion in C programming with the help of Virtual Lab (VLab)
8	Implement a C program that uses arrays to store and manipulate data
9	Identify and explain the use of string functions
10	Discuss and demonstrate how file handling operations work in a C program

Text Books:
T1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
T2. Dromey, R. G., How to Solve it by Computer. Pearson Education India.
T3. Let Us C, Yashavant Kanetkar, BPB Publication
T4. Programming in ANSI C, Balaguruswamy, McGraw-Hill

Reference Books:
 R1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
 R2. Sumitabha Das, Computer Fundamentals and C Programming, McGraw- Hi

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F. Y. B. Tech (Group 1/2)
Academic Year – 2024-2025 Semester –I/II
[ES1207T] Chemistry For Engineers

Teaching-Scheme: TH:3 Hour/Week	Credit TH:3	Examination Scheme: ISE Evaluation: 20 Marks MSE Evaluation: 30 Marks ESE Evaluation: 50 Marks Total:100 Marks

Prerequisite: Volumetric analysis, Primary Reference Electrode – Standard hydrogen electrode, Typs of polymer and polymerization reactions, Electrochemical series, Electromagnetic radiation and Characteristics of Electromagnetic radiation.

Course Objective:
1) Provide students with a solid foundation in water impurities, types of electrodes, polymers, the electromagnetic spectrum, and electrochemical reactions.
2) Enable students to explain methods for water softening, the operation of electrochemical cells, the properties and uses of polymers and nanomaterials.
3) Equip students to explain alternative fuels, the electromagnetic spectrum, and corrosion protection techniques for metals.
4) Develop students' ability to calculate key parameters related to water quality, fuel properties, and the concentration of acids and bases in various samples.

Course Outcome:
After successful completion of the course, students will be able to:
CO1: Recall fundamental concepts related to water impurities, types of electrodes, the nature of polymers, the electromagnetic spectrum and electrochemical reactions.
CO2: Explain methods for water softening, essential aspects of electrochemical cells, properties and applications of polymer and nanomaterial's, alternative fuels, electromagnetic spectrum and corrosion protection for metals.
CO3: Calculate parameters of water, fuel and amount of acid/base in given sample.

Course Contents

UNIT-I	Water Technology	6Hours

Introduction, Impurities in water, Concept of Hardness, Types of Hardness, Units and numerical – Determination of hardness by EDTA method–numerical by using molarity concept, Alkalinity of water and numerical based on alkalinity. Ill effects of hard water in boiler: Priming and foaming, Boiler corrosion, Scales and Sludge's, Caustic Embrittlement. External treatment – Zeolite or Permutit method and numerical based on it, Ion Exchange or Deionization or Demineralization Method, Desalination of brackish water by Reverse Osmosis and Electrodialysis.

UNIT-II	Electroanalytical Techniques	6Hours

[Part-I]

Introduction:– Types of reference electrodes – Calomel electrode, Indicator electrode (Glass electrode), Ion selective Electrodes – Ion Selective membranes such as solid membrane, enzyme based membrane and gas sensing membrane, (A) p^Hmetry – Standardization of pH meter, pH metric titration of strong acid Vs strong base with titration curve and calculations.
(B) Conductometry –,Introduction, Types of Conductances, Different terms in Conductometry,

Conductometric titrations of acid versus base with titration curve

[Part-II]

Batteries- lithium ion battery - principle, construction, working ,applications and limitation

UNIT- III	Engineering Materials	6 Hours

A] Specialty Polymers: Introduction, Preparation, Properties and applications of the following polymers: Engineering Thermoplastic: Polycarbonate, Conducting polymers -Polyacetylene, Biodegradable polymer – Polyhydroxy butyrate – hydroxyvalerate, Electroluminiscent Polymers - Polyphenylenevinylene, polymer composites – Fibre Reinforced Plastic (FRP) – Glass Reinforced and Carbon Reinforced polymer composite
.B] Nanomaterials: Introduction, Classification of nanomaterials based on dimensions (zero-dimensional. One-dimensional, two-dimensional and three-dimensional), structure, properties and applications of graphene and carbon nanotubes.

UNIT-IV	Fuels	6 Hours

Introduction: Definition of fuel, Classification of fuel based on chemical reactions and Characteristics off ideal fuels Calorific Value (CV) : Higher Calorific Value (HCV) and Lower Calorific Value (LCV) and it's units, Determination of calorific value – Principle, construction and working of Bomb calorimeter and Boy's gas calorimeter and numericals. Solid fuel – Coal-proximate and ultimate analysis of coal and numericals, Liquid fuel – Petroleum Refining of petroleum/crude oil, composition, boiling point range and uses of various fractions. Octane number o petrol, cetane number of diesel, Alternative fuels: Power alcohol and Biodiesel. Gaseous fuel: Composition, propertie and applications of CNG.

UNIT-V	Spectroscopic Techniques	6 Hours

Introduction to spectroscopic techniques and types of spectroscopy.
A] **UV-Visible Spectroscopy:** Introduction, Interaction of electromagnetic radiation with matter, statement of Beer's and Lambert's law, absorption of UV radiations by organic molecule leading to different electronic transitions, Terms involved in UV-Visible Spectroscopy –Chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyperchromic effect and hypochromic effect. Fundamentals and types of spectroscopy, Instrumentation and basic principle of Single beam UV- Visible spectrophotometer, Applications of UV-Visible spectroscopy.
IR spectroscopy: Introduction, Principle of IR Spectroscopy (Selection Rule), Types of vibrations: Stretching (symmetric and asymmetric) and bending (scissoring, rocking, wagging and twisting), Conditions of absorption of IR radiations, vibration of diatomic and polyatomic molecules. Factors affecting IR group frequencies. Instrumentation with block diagram. Parts of IR Spectrum, fundamental group region, fingerprint region, applications of IR spectroscopy.

UNIT-VI	Corrosion Science and Its Preventions	6 Hours

Introduction – Types of corrosion, Dry corrosion - mechanism – Pilling-Bedworth rule (PBR), Wet corrosion-mechanism–H^2 evolution and O^2 absorption, Factors affecting the rate of for corrosion, Methodsof corrosion control, cathodic and anodic protection, Metallic coatings – Types of coating, Methods of applications (Hot Dipping, metal cladding, cementation and electroplating).

Text Books:

1. Engineering Chemistry by O. G. Palanna, Tata Mcgraw Hill Education Pvt. Ltd.

2. Textbook of Engineering Chemistry by Dr. S. S. Dara, Dr. S. S. Umare, S. Chand & Company Ltd.

3. Textbook of Engineering Chemistry by Dr. Sunita Rattan, S. K. Kataria& Sons Publisher.

Reference Books:

R1. Engineering Chemistry, Jain and Jain, DhanpatRai Publishing Company Edition.

R2. Engineering Chemistry, Wiley India Pvt. Ltd.

R3. Basic concepts of Analytical Chemistry, S. M. Khopkar, New Age International Publishers.

R4. Instrumental Methods of Chemical analysis, G. R. Chatwal& S. K. Anand, Himalaya Publishing House.

R5. Analytical Chemistry, B. K. Sharma, Educational Publishers.

R6. Polymer Science, V. R. Govarikar ,N.V. Vishwanathan, JayadevSreedhar, New Age International Publishers.

R7. Spectroscopy of Organic Compounds, 2 ed P. S. Kalsi, New Age-International Ltd., Publisher.

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F. Y. B. Tech (Group 1/2)
Academic Year – 2024-2025 Semester -I /II
[ES1207L] Chemistry For Engineers

Teaching-Scheme: PR: 2Hour/Week	Credit PR:1	Examination Scheme: ISCE Evaluation:30 Marks ESE Evaluation: 20 Marks Total :50 Marks

Prerequisite: Volumetric analysis, Primary Reference Electrode – Standard hydrogen electrode, Electrochemical series, Electromagnetic Spectrum and Characteristics of Electromagnetic radiation.

Course Objective:

1. To gain hands-on experience with titration techniques for determining hardness and alkalinity of water sample.
2. To explore the principles of conductometric and pH metric titration to determine strength of acid/base solution.
3. To acquire practical skills in polymer synthesizing and electroplating technique.
4. To develop analytical skills in the proximate analysis of coal and colorimetric analysis of unknown solution.

Lab Outcome: Students will be able

1. To measure the alkalinity and hardness of water samples using titration methods.

2. Apply conductometric titration techniques to determine the strength of acid/ base .

3. Develop practical skills in polymer synthesizing and electroplating techniques.

4. Determine moisture and ash content of coal by proximate analysis and concentration of unknown solution using colorimetric analysis.

Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

	List of Assignments
1	Determination of alkalinity of given water sample.
2	Determination of total hardness of water using Na_2EDTA method.
3	Determination of normality of acid in a titration of strong acid and strong base using p^H meter.
4	Conductometric titration of strong acid (HCl) with strong base (NaOH).
5	Preparation of Phenol formaldehyde resin and it's characterization.
6	Determination of moisture and ash content of a given coal sample by proximate analysis.
7	To verify Beer's law for solution of $CuSO_4$ using colorimeter and determine concentration of unknown sample.
8	Study of electroplating of copper on iron/stainless steel surface for corrosion protection.
9	Determination of dissociation constant of weak acid (CH_3COOH) by using pH meter.
10	Preparation of biodiesel from vegetable oil.

Text Books:
1. Engineering Chemistry by O. G. Palanna, Tata Mcgraw Hill Education Pvt. Ltd.
2. Textbook of Engineering Chemistry by Dr. S. S. Dara, Dr. S. S. Umare, S. Chand & Company Ltd.
3. Textbook of Engineering Chemistry by Dr. Sunita Rattan, S. K. Kataria& Sons Publisher.

Reference Books:
R1. Engineering Chemistry, Jain and Jain, Dhanpat Rai Publishing Company Edition.
R2. Engineering Chemistry, Wiley India Pvt. Ltd.
R3. Basic concepts of Analytical Chemistry, S. M. Khopkar, New Age International Publishers.
R4. Instrumental Methods of Chemical analysis, G. R. Chatwal& S. K. Anand, Himalaya
       Publishing House.
R5. Analytical Chemistry, B. K. Sharma, Educational Publishers.
R6. Polymer Science, V. R. Govarikar ,N.V. Vishwanathan, JayadevSreedhar, New Age
       International Publishers.
R7. Spectroscopy of Organic Compounds, 2 ed P. S. Kalsi, New Age-International Ltd., Publisher.

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F. Y. B. Tech (Group 1)
Academic Year – 2024-2025 Semester -I /II
[ME1201L] Workshop Practice

Teaching-Scheme: PR: 4 Hour/Week	Credit PR:2	Examination Scheme: ISCE Evaluation : 60 Marks ESE Evaluation : 40 Marks Total : 100 Marks

Course Prerequisites: Knowledge about basic measuring instruments, dimensions of products and drawings

Course Objective: To provide students a hands-on experience of various manufacturing techniques used for fabricating metallic and non-metallic components. Students will begin by learning the basics of safety practices in an industrial facility, followed by the basics of metrology. For each manufacturing process that is studied the design aspects as well as the economic, safety and environmental aspects will be highlighted.

Lab Outcome:
After successful completion of the course, students will be able to:
LO1: Explain the basic safety issues in a manufacturing facility.
LO2: Describe the common manufacturing processes.
LO3: Implement design, economic safety and environmental aspects of manufacturing processes.
LO4: Discuss the recent emerging areas in primary manufacturing processes such as CNC and EDM machines.

Guidelines for Assessment

1.   Practical for the subject shall be engaged in minimum three batches (batch size of 20-25 students maximum) per division.
2.   Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	Introduction to safety, metrology
2	Introduction to fitting
3	Introduction to sand casting and study of open die casting
4	Introduction to power hack saw cutting, Lathe machine and its operation
5	Detailed parts of Milling and Grinding Machine and its Operations
6	To understand metal forming process, hot working & cold working process.
7	To study of Electric Arc Welding
8	Introduction to CNC, VMC machine and understand the process of Electrical Discharge Machining

Text Books:

T1: B. S. Raghuwanshi, A Course in Workshop Technology, Dhanpat Rai and Co., 2014.

Reference Books:

R1: W. A. J. Chapman, Workshop Technology, CBS, New Delhi, 5th Ed., 1995.

R2: M. P. Groover, Principles of Modern Manufacturing: Materials, Processes and Systems, Wiley India Pvt. Ltd, 2018.

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F. Y. B. Tech (Group 1/2)
Academic Year – 2024-2025 Semester -I /II
[EC1201L] Basic Electronics Engineering Lab

Teaching-Scheme: PR: 2 Hour/Week	Credit PR:1	Examination Scheme: ISCE Evaluation:30 Marks ESE Evaluation: 20 Marks Total :50 Marks

Prerequisite: Semiconductor materials, P-N junction diode, V-I characteristics of Diode, Concept of Communication systems, Bandwidth, Basic number system, concept of transducer and sensors

Course Objective: This course emphasizes on effective knowledge of semiconductor devices-diodes, Transistors, Op-Amp and an astable multivibrator in the field of Electronics .It also gives insights on applications such as amplifiers, transducers based circuits.

Lab Outcome:

The Basic Electronics Engineering laboratory course will consists of experiments illustrating the

principles of Electronics relevant to the study of all branches of engineering. The student will learn to:

LO1: Identify all basic components and Instruments.

LO2: Calculate the parameters of rectifier and Integrated circuits.

LO3: Demonstrate temperature sensors in real world scenarios.

LO4: Verify truth tables of various Logic Gates.

LO5: Model Amplitude modulation Technique in Simulated environment.

Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

		List of Laboratory Experiments
1	I.	Familiarization of electronics components such as Resistors, Inductors, capacitors, diodes, Transistors, switches, connectors, wires, cables.
	II.	Familiarization of breadboard, Datasheet of Diode
2	I.	Generate different types of waveforms for given specification using function generator and CRO - a) Sine wave-1KHz,3V b) Square wave-5KHz,5V c) Triangular wave-1MHz,2.5V
	II.	Measure Voltage, Resistance using digital Multimeter. Test the functionality of diode and BJT using Multimeter.
3		Implement full wave Bridge rectifiers with capacitor filter and observe the effect of capacitor filter on rectifier output. Calculate V_{LDC}, I_{LDC} , ripple.

4	Calculate voltage gain of single stage RC coupled CE amplifier and observe phase shift between input and output
5	Design astable multivibrator using IC 555
6	Verify truth Tables of Logic Gates and implement any one basic gate using universal gate.
7	Temperature measurement system using PT100/LM35 OR Interface LED/LCD to Arduino Development board.
8	Simulate AM generation technique, observe waveform and calculate modulation Index
9	Design Inverting and Non inverting amplifier using Op-amp IC-741. OR Implement Adder using Op-Amp IC 741.
10	Design a Case study of any one electronics applications based on the curriculum and simulate/implement it. • **Design of DC Power supply** • **Electronics Thermometer using op-amp 741** • **LED blinking using IC 555** • **Design any on digital application** • **Design of any instrumentation system**

Text Books:

Electronics Devices by Thomas. L. Floyd, 9th Edition, Pearson
2. Modern Digital Electronics by R. P. Jain, 4th Edition, Tata McGraw Hill
3. Electronic Instrumentation by H. S. Kalsi, 3rd Edition, Tata McGraw Hill
4. Sensors and Transducers by D. Patrnabis, 2nd Edition, PHI
5. Electronic Communication Systems by Kennedy & Davis, 4th Edition, Tata McGraw Hill 6. Mobile Wireless communication by M. Schwartz, Cambridge University Press

Reference Books:

Digital Fundamentals by Thomas. L. Floyd, 11th Edition, Pearson
R2. "Sensors and Transducers" by D. Patrnabis, 2nd Edition, PHI
R3. Vijay Garg, Wireless Communications & Networking. 2nd Edition, Elsevier, 28-Jul-2010.
R4. "Sensors Handbook", by S. Soloman, 2nd Edition.
R5. Semiconductor devices-M K Achuthan,K.N.Bhat-2009
R6. Kevin Handreck. Good Gardens with Less Water, Csiro Publishing, 2008 ISBN 0643094709

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F. Y. B. Tech (Group 1/2)
Academic Year – 2024-2025 Semester –I/II
[EC1201T] Basic Electronics Engineering

Teaching-Scheme: TH:2 Hour/Week	Credit TH:2	Examination Scheme: ISE Evaluation: 20 Marks MSE Evaluation: 30 Marks ESE Evaluation: 50 Marks Total:100 Marks

Prerequisite: Semiconductor materials, P-N junction diode, V-I characteristics of Diode, Concept of Communication systems, Bandwidth, Basic number system, concept of transducer and sensors

Course Objective: This course emphasizes on effective knowledge of semiconductor devices-diodes, Transistors, Op-Amp and an astable multivibrator in the field of Electronics .It also gives insights on applications such as amplifiers, transducers based circuits.

Course Outcome:

After successful completion of the course, students will be able to:

CO1: Explain the concept of Electronic components, Circuits and Instruments.

CO2: Describe Electronic Circuits using diode,BJT,Op-Amp,IC555 ,Logic gates and Sensors.

CO3: Demonstrate application of Op -Amp, digital circuits, Sensors and modulation.

Course Contents

UNIT-I	Electronic Devices	7Hours

P-N Junction Diode: P-N Junction diode construction and its working in forward and reverse bias conditions, V-I characteristics of P-N junction Diode, Diode as a switch, Half wave rectifier, Full wave and Bridge rectifier. **Filte**r-Half wave, Full wave and Bridge rectifiers with Capacitor filter.
Special purpose diodes: Light Emitting Diode (LED) and photo diode along with V- I characteristics and their applications.
BJT: Construction, type, Operation, V-I Characteristics in common emitter mode, BJT as switch and Common Emitter(CE) amplifier.

UNIT-II	Integrated Circuits	7 Hours

Op-Amp: Block diagram, symbol, modes of operation, parameters-Ideal and practical (IC 741). Need of Feedback. Applications of amp as Inverting and non inverting amplifier, Summing and difference amplifier, Integrators and differentiators
IC555:: Block diagram, applications as Astable Multivibrator

UNIT- III	Digital Systems	6 Hours

Number system - Binary, octal, hexadecimal, Arithmetic operations and their conversions. Logic gates, Boolean algebra, Logical Equation-SOP and POS, Standard representation for logic function, Karnaugh Map Representation of Logic functions, Simplification of logic functions using K-map, Minimization of logic functions specified in Minterms/ Maxterms or Truth Table, Minimization of logic functions not specified in Minterms/Maxterms,

UNIT-IV	Instrumentation system	5 Hours

Basic Instrumentation system, Transducers: Classification, selection criteria, Types: Linear variable Differential Transducer, Load cell, Ultrasonic, Optical, Temperature sensors :Thermocouple, Thermistor, RTD and LM35, Soil moisture, Finger print

UNIT-V	Electronic Communication Systems	5 Hours

Block diagram, IEEE Frequency spectrum, Wired and Wireless media, Modulation techniques: AM and FM, Mobile communication system, 2G, 3G, 4G &5G Technologies, GSM and GPS.

Text Books:

1. Electronics Devices by Thomas. L. Floyd, 9th Edition, Pearson
2. Modern Digital Electronics by R. P. Jain, 4th Edition, Tata McGraw Hill
3. Electronic Instrumentation by H. S. Kalsi, 3rd Edition, Tata McGraw Hill
4. Sensors and Transducers by D. Patrnabis, 2nd Edition, PHI
5. Electronic Communication Systems by Kennedy & Davis, 4th Edition, Tata McGraw Hill 6. Mobile Wireless communication by M. Schwartz, Cambridge University Press

Reference Books:

R1. Digital Fundamentals by Thomas. L. Floyd, 11th Edition, Pearson

R2. "Sensors and Transducers" by D. Patrnabis, 2nd Edition, PHI

R3. Vijay Garg, Wireless Communications & Networking. 2nd Edition, Elsevier, 28-Jul-2010.

R4. "Sensors Handbook", by S. Soloman, 2nd Edition.

R5. Semiconductor devices-M K Achuthan,K.N.Bhat-2009

R6. Kevin Handreck. Good Gardens with Less Water, Csiro Publishing, 2008 ISBN 0643094709

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Department of Engineering Sciences and Humanities

Academic Year – 2024-2025
Semester –I/II [CE1201T]: Engineering Mechanics
F. Y. B. Tech (Group 1)

Teaching Scheme: TH:- 3 Hours/Week	Credit TH: 3	Examination Scheme: In Sem. Evaluation: 20 Marks Mid Sem Exam: 30 Marks End Sem Exam: 50Marks

Course Prerequisites: Elementary applied calculus- topics include graphs, derivatives, and integral functions. Introductory Algebra and Trigonometry based course on classical mechanics. Introductory Physics, Newtons laws and conservation of energy and momentum for solving problems in dynamics. Use of law of Universal gravitation to analyze the behavior of Alling objects and objects. in orbital motion.

Course Objective: The objective of this course is to make students to learn basics of engineering Mechanics concepts and its application to the real-world problems, solve problems involving Forces, loads and Moments and know their applications in allied subjects.

Course Outcome:
After successful completion of the course, students will be able to:
CO1 - Define fundamental mechanics concepts like force systems, equilibrium, statics, and dynamics.
CO2 - Explain centroid and moment of inertia calculations, and equilibrium conditions in planar and spatial force systems.
CO3 - Apply principles of equilibrium and free body diagrams to solve kinematic problems involving the motion and acceleration of objects.
CO4 - Analyze work, energy, momentum, and friction to assess trusses, cables, and frames.

Course Contents		
UNIT-I	**Fundamentals of Mechanics and Force systems**	**6 Hours**
Principle of statics, force systems, resolution, and composition of forces. Resultant of general forces, Moment of force, Varignon's theorem, resultant of parallel force system. Couple, Equivalent force, couple system.		
UNIT-II	**Equilibrium of space forces, Moment of Inertia and centroid**	**6 Hours**
Resultant of concurrent and parallel forces in space, Equilibrium of concurrent and parallel forces in space, Moment of forces in space. Centroid of plane lamina and wire bends, Moment of inertia.		
UNIT-III	**Motion of Particles**	**6 Hours**

Kinematics: - Basic concepts, equations of motion for constant acceleration and motion under gravity. Variable acceleration and motion curves. Relative motion.

Curvilinear motion: - Rectangular coordinate system (Projectile Motion), n-t coordinate system, polar coordinate

UNIT-IV	Equilibrium of Force System	6 Hours

Free body diagram, equilibrium of concurrent, parallel, and general forces in plane. Distributed forces, Types of beams: Simple and compound beams, Types of supports and reactions.

UNIT-V	Energy and Momentum	6 Hours

Work, power, energy conservatives and non- conservative forces. Conservation of energy and work energy principle for motion of particle. Impulse momentum, conservation of momentum and impulse momentum principle of particle. Direct central impact and coefficient of restitution.

UNIT-VI	Analysis of Trusses, Cables, Frames and Friction	6 Hours

Friction: Laws of friction, application of friction on inclined plane, Application of flat belt. Two force members: analysis of plane truss by method of joints, method of sections. Cables subjected to point loads. Analysis of Frames.

Text Books:

1. A Text book of Engineering Mechanics by R. S. Khurmi, S. Chand publications,ISBN: 9788121926164.
2. A textbook of Engineering Mechanics by R. K. Bansal, Sanjay Bansal , Laxmi publications,8th edition**.**
3. Introduction to Statis and Dynamics, Andy Ruina and Rudra Pratap, Oxford University Press. 2008.
4. Engineering Mechanics Statics and Dynamics, I. H. Shames , PHI; 4th edition (1996), ISBN-10: 81-203-1127-2

Reference Books:

R1. F.P. Beerand E.R.Johnston"VectorMechanicsforEngineersVol.IandII",10thedition, Tata McGraw-Hill Education, 2012, ISBN:978-0077402327

R2. Engineering Mechanics: S Timoshanko, Dtp Young and J.V. Rao, Tata McGraw Hill Education Pvt. Ltd. New Delhi

R3. A. Nelson "Engineering Mechanics: Statics and Dynamics", 1st edition Tata McGraw-Hill Education, 2009, ISBN: 978-0-07-014614-3

R4. Ferdinand Singer,"EngineeringMechanicsStaticsandDynamics",3rdeditionHarperandRow, 1994ISBN:0063506610

R5. Engineering Mechanics by Basudeb Bhattacharyya- Oxford University Press

R6. Principle of Dynamics, Donald T. Greenwood, Pearson; 2 edition (13 July 1987) ISBN-13: 978-0137099818

R7. Engineering Mechanics: Statics (vol 1), J. L. Meriam, L.G. Kraige; Wiley; Seventh edition (20 September 2013), ISBN-13: 978-8126543960.

R8. Engineering Mechanics: Dynamics (vol 2); J. L. Meriam, L.G. Kraige; Wiley; Seventh edition (25 September 2013); ISBN-13: 978-8126543953

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Academic Year – 2024-2025
Semester –I/II [CE1201L]: Engineering Mechanics
F. Y. B. Tech (Group 1)

Teaching Scheme: PR - 2 Hours/Week	Credit PR:1	Examination Scheme: Lab Evaluation: 50 Marks

Course Prerequisites: Elementary applied calculus- topics include graphs, derivatives, and integral functions. Introductory Algebra and Trigonometry based course on classical mechanics. Introductory Physics, Newtons laws and conservation of energy and momentum for solving problems in dynamics. Use of law of Universal gravitation to analyze the behavior of Alling objects and objects. in orbital motion.

Course Objective: The objective of this course is to make students to learn basics of engineering Mechanics concepts and its application to the real-world problems, solve problems involving Forces, loads and Moments and know their applications in allied subjects.

Lab Outcome:
After successful completion of the course, students will be able to:

L01 - Verify equilibrium concepts using Lami's theorem and support reactions for beams.

LO2 - Measure mass moment of inertia for circular bodies and locate centroids for laminas and wire bends.

LO3- Demonstrate momentum and kinetic energy conservation in collisions and determine the coefficient of restitution.

LO4- Analyze projectile motion and friction effects on object interactions.

Lab Contents
Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Laboratory Experiments	
1	Verification of Lami's theorem for three coplanar forces acting at a point in equilibrium.
2	To determine the mass moment of inertia of different circular bodies.
3	Verification of location of Centroid of plane laminas and wire bends.
4	To study Projectile Motion.
5	To determine Coefficient of restitution for a given pair of material.

6	To determine coefficient of friction for various pairs of surfaces in contact
7	.To determine support reactions for simply supported beams.
8	To verify momentum and kinetic energy conservation using collision balls.

Text Books:

1. A Text book of Engineering Mechanics by R. S. Khurmi, S. Chand publications,ISBN: 9788121926164.
2. A textbook of Engineering Mechanics by R. K. Bansal, Sanjay Bansal , Laxmi publications,8th edition**.**
3. Introduction to Statis and Dynamics, Andy Ruina and Rudra Pratap, Oxford University Press. 2008.
4. Engineering Mechanics Statics and Dynamics, I. H. Shames , PHI; 4th edition (1996), ISBN-10: 81-203-1127-2

Reference Books:

R1. F.P. Beerand E.R.Johnston"VectorMechanicsforEngineersVol.IandII",10thedition, Tata McGraw-Hill Education, 2012, ISBN:978-0077402327

R2. Engineering Mechanics: S Timoshanko, Dtp Young and J.V. Rao, Tata McGraw Hill Education Pvt. Ltd. New Delhi

R3. A. Nelson "Engineering Mechanics: Statics and Dynamics", 1st edition Tata McGraw-Hill Education, 2009, ISBN: 978-0-07-014614-3

R4. Ferdinand Singer,"EngineeringMechanicsStaticsandDynamics",3rdeditionHarperandRow, 1994ISBN:0063506610

R5. Engineering Mechanics by Basudeb Bhattacharyya- Oxford University Press

R6. Principle of Dynamics, Donald T. Greenwood, Pearson; 2 edition (13 July 1987) ISBN-13: 978-0137099818

R7. Engineering Mechanics: Statics (vol 1), J. L. Meriam, L.G. Kraige; Wiley; Seventh edition (20 September 2013), ISBN-13: 978-8126543960.

R8. Engineering Mechanics: Dynamics (vol 2); J. L. Meriam, L.G. Kraige; Wiley; Seventh edition (25 September 2013); ISBN-13: 978-8126543953

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First Year B Tech. Comp / IT / CSBS Engineering – Semester- I & II (2023 Pattern)
Course Code: ES1203T, Course Name: Linear Algebra

Teaching Scheme: TH: - 03 Hours/Week TU:- 01 Hours/Week	Credit TH:03 TU: 01	Examination Scheme: In Sem. Evaluation :20Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Term Work : 50 Marks

Course Prerequisites: Matrix algebra, Determinants, Linear equations and Vector algebra.

Course Objective:
To familiarize the students with concept and techniques in System of Linear Equations, Vector Space, Inner Product Space, Linear Transformation, Eigen values and Eigen vectors, Canonical forms & applications. The aim is to equip them with the tools to understand Linear algebra and its applications that would enhance thinking power and useful in their discipline.

Course Outcome: After completion of this course, students will able to,

CO1: Apply the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations.

CO2: Apply the concept of vector space and inner product space useful in machine learning algorithm and natural language processing.

CO3: Apply the concept of linear transformation and orthogonal transformation useful in computer graphics and machine learning algorithm.

CO4: Determine eigenvalues & eigenvectors of a matrix and use it to diagonalize matrix useful in engineering problems.

CO5: Express quadratic form to canonical form, apply concept of SVD and PCA useful in image processing and machine learning algorithms.

	Course Contents	
UNIT-I	**System of Linear Equations**	**07 Hours**
Rank of a Matrix, Solution of System of Linear Equations, Applications, Gauss Elimination, LU Decomposition method and Cholesky's Method.	
UNIT-II	**Vector Space**	**07 Hours**
	Vector space, Subspace, Spanning Set, Linear Dependence and Independence, Basis and Dimension.	
UNIT-III	**Inner Product Space**	**07 Hours**
	Inner Product Space, Norm of a Vector, Cauchy – Schwartz inequality, Orthogonality, Orthogonal Projection, Gram-Schmidt orthonormalization and QR decomposition.	
UNIT-IV	**Linear Transformations**	**07 Hours**
	Linear Transformations (LT), Types of Linear Transformations, Orthogonal Transformation, Range and Kernel of Linear Transformation, Rank–Nullity Theorem, Non-singular Linear Transformation, Matrix of Linear transformation with respect to a basis.	
UNIT-V	**Eigen values and Eigen vectors**	**07 Hours**
	Eigen Values and Eigen Vectors, Cayley-Hamilton theorem and its applications, Diagonalization of Matrix, Inverse and power of matrix.	
UNIT-VI	**Quadratic Forms and Applications**	**07 Hours**
	Quadratic form, Reduction of Quadratic form to Canonical form, Rank, Index, Signature. Definite and Semi-definite form, Reduction of Quadratic form to Canonical form by Linear and Orthogonal transformation, Singular Value Decomposition (SVD) and Principal Component Analysis (PCA), Applications to Image Processing and Machine Learning.	

| Guidelines for Assessment |
|---|
| **Guidelines for Tutorial and Term Work:**
 i) Tutorial shall be engaged in three batches (batch size of 22 students maximum) per division.
 ii) Term work shall be based on continuous assessment of six assignments (one per each unit). |
| **MOOC Course Link:**
 "Basic Linear Algebra"
 https://archive.nptel.ac.in/courses/111/101/111101115/ |
| **Text Books:**
 T1. Ron Larson and David C. Falvo. "Elementary Linear Algebra", Houghton Mifflin Harcourt Publishing Company, Boston, New-York.
 T2. Gilbert Straing, "Introduction to linear algebra", 5th Edition |
| **Reference Books:**
 R1. David C Lay, "Linear Algebra and its Applications", Pearson
 R2. Seymour Lipschutz, 'Linear Algebra', McGraw Hill
 R3. K. Hoffmann and R. Kunze, 'Linear Algebra', Second Ed., Prentice Hall of India, (1998).
 R4. S. Lang, 'Introduction to Linear Algebra', Second Ed. Springer-Verlag, New-York.
 R5. Howard Anton, Chris Rorres, 'Elementary Linear Algebra', John Wiley and Sons, Inc.
 R6. A R Vasishtha, "Abstract Algebra", Krishna Prakashan**.** |

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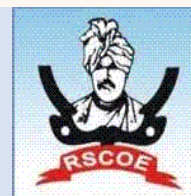
First Year B Tech. Comp / IT / CSBS Engineering – Semester- I & II (2023 Pattern)
Course Code: ES1204T, Course Name: Discrete Mathematics

Teaching Scheme: TH: - 03 Hours/Week TU:- 01 Hours/Week	Credit TH:03 TU: 01	Examination Scheme: In Sem. Evaluation :20Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Term Work : 50 Marks

Course Prerequisites: Permutations & Combinations and Matrix algebra.

Course Objective:
To familiarize the students with concept and techniques in Logic, Set, Relation, Functions, Algebraic Structure, Coding Theory, Combinatorics and Graph theory. The aim is to equip them with the tools to understand discrete mathematics and its applications that would enhance thinking power and useful in their discipline.

Course Outcome: After completion of this course, students will able to,

CO1: Apply the concepts of propositional logic to solve real world engineering problems.

CO2: Use the concept of set, relations and functions in computer engineering contexts.

CO3: Apply the concepts of algebraic structures such as Group, Ring and Field, useful in cryptography.

CO4: Solve problems related to computer based system, using the concept of Combinatorics.

CO5: Use the concept of Graph theory and Trees to solve problems in network theory and data structure.

Course Contents		
UNIT-I	**Logic**	**07 Hours**
Propositions and Connectives, Truth table, laws of Propositions, Logical Equivalence, Normal Forms, Logical implication, Rules of Inference, Validity and satisfiability, Compactness and resolution, Quantifiers, Application of Propositional logic.		
UNIT-II	**Set, Relations and Functions**	**07 Hours**
Set Theory:- Set, types, operations and laws, principle of inclusion and exclusion, multi-set, **Relation and Functions:-** Relation, representation of relation, types, n- ary relation and their application, Equivalence relation, Equivalence class, Partitions, Partial ordering relation, Hasse diagram, Lattice, chain and anti-chain, Function and types of Functions.		
UNIT-III	**Algebraic Structure and Coding Theory**	**07 Hours**
Introduction, Algebraic structures, Semi group, Monoid, Group, abelian group, cyclic group, Congruence relation, Homomorphism, Normal subgroup, Ring, Integral domain, Field, Galois Theory, Coding Theory.		
UNIT-IV	**Combinatorics**	**07 Hours**
Introduction, Basic Counting, The rule of sum and product, Permutation, Combination, Binomial Coefficients and identities, Pigeonhole Principle, Generating functions, Recurrence relations, Principle of Mathematical Induction.		
UNIT-V	**Graph and Applications**	**07 Hours**
Introduction, Graph models, Hand shaking lemma, Types of Graphs, Matrix representation of Graphs, adjacency and incidence Matrix, Isomorphism, Connectivity, Eulerian and Hamiltonian Graphs, Shortest path, Travelling Salesman Problem, Dijkstra's algorithm, Planar graph and Euler formula, colouring of graph, Chromatic number –Dual of Graph, Clique number.		
UNIT-VI	**Trees**	**07 Hours**
Introduction, properties, Rooted tree, Tree Traversal, path length, weighted tree, prefix code, Huffman coding, Binary search tree, spanning tree, Minimal spanning tree, Kruskal's algorithm, Prim's algorithm, Cut set, The Max flow- Min cut Theorem (Transport Network) Applications of tree.		

Guidelines for Assessment
Guidelines for Tutorial and Term Work: i) Tutorial shall be engaged in three batches (batch size of 22 students maximum) per division. ii) Term work shall be based on continuous assessment of six assignments (one per each unit).
Text Books: **T1.**Kenneth H. Rosen, "Discrete Mathematics and its applications", Tata McGraw Hill. **T2.**C. L. Liu, "Elements of Discrete Mathematics", Tata McGraw Hill.
Reference Books: **R1.** Bernard Kolman, Robert C. Busby, Sharon Ross. "Discrete Mathematical structures", Prentice Hall. **R2.** Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics" Pearson Addison Wesley. **R3.** T. Veerarajan, "Discrete Mathematics, with Graph Theory and Combinatorics", Tata McGraw Hill. **R4.** Narsingh Deo, "Graph Theory with Applications to Engineering and Computer Science", Prentice Hall. **R5.** C. V. Sastry and Rakesh Naik, "A textbook on Discrete Mathematics". **R6.** A R Vasishtha, "Abstract Algebra", Krishna Prakashan**.**

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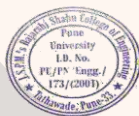
F.Y.B.Tech(ComputerEngineering/InformationTechnology)
Academic Year – 2024-2025 Semester -I
CS1203T: Fundamentals of Computer Programming

Teaching-Scheme: TH:1 Hour/Week	Credit TH:1	Examination Scheme: ISE Evaluation : 20 Marks MSE Evaluation: 10 Marks ESEEvaluation:20 Marks Total:50 Marks

Course Prerequisites: BasicmathematicsandScience.

Course Objective:

1. To understand the fundamental Concepts and acquire knowledge of Operators and Expressions in C Programming.
2. To apply Control Flow structures in C Programming for Problem solving.
3. To design a solution using Arrays, Character and String Arrays,User Defined Functions.
4. Justify the use of pointers and file handling in Problem solving using C programming language

Course Outcome:

After successful completion of the course, students will beable:

CO1: To design algorithms for simple computational problems and use of Operatorsand Expressions.

CO2: Toapply Control Flow structures for decision making and ability to analyse the code and remove errors.

CO3: To design Arraysfor solution of real-life problems.

CO4: To use user-defined functions,pointers and file handling for Problem solving using C programming language.

Course Contents		
UNIT-I	**Introduction to C programming - DataTypes,Operators and control statements**	**7Hours**

Program Design Tools: Art of Programming through Algorithms, Flowcharts.

Overview of C: History and importance C,

C Tokens: Character Set, Keywords and Identifiers, Constants, Variables, Data types, Declaration of variables, Storage Class, Assigning Values to variables, Defining Symbolic Constants, declaring a Variable as Constant

Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special

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Operators. Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Operator Precedence and Associativity, Mathematical Functions.

Decision Making and Branching: Simple If Statement, If-Else, Else-If, Switch Statement, Goto Statement Decision Making and Looping: While Statement, Do-While, For Statement, Break and Continue.

UNIT-II	Programming with Array, String, Functions, Pointers and File Handling	8 Hours

Arrays: Declaration and Initialization of One and Two –dimensional Arrays,

CharacterArrays and Strings: Declaration and Initialization String Variables, Reading Strings from Terminal, Writing Strings to Screen, Putting Strings Together, Comparison of Two Strings, Introduction to String handling Functions.

User Defined Functions: Need for User-defined Functions, A Multi-Function Program, Elements of User defined Functions, Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but No Return Values, Arguments with Return values, No Arguments but Returns a Value, Functions that Return Multiple Values, Nesting of Functions, Recursion

Pointers: Pointer basic concept, pointer variable – declaration and initialization, Types of Pointers, Pointeroperations – Pointer Arithmetic, PointersandArrays,

FileHandling: Basic concept of file Input and Output:StandardI/O,FormattedOutput – printf,FormattedInput – scanf,Reading and writing of files.

Text Books:

T1. B. W. Kernighan and D. M. Ritchi, "The C Programming Language", Second Edition, PHI.

T2. Programming in ANSIC, 8e –E. Balagurusamy.

Reference Books:

R1. Herbert Schildt, "C: The Complete Reference", Fourth Edition, McGraw Hill.

R2. Yashvant Kanetkar, "Let Us C", BPB Publications.

R3. B. S. Gottfried, Programming with C (Schaum's Outline Series), 2nd ed. McGraw-Hill, 1996.

MOOC / NPTEL/YouTube Links:

https://onlinecourses.nptel.ac.in/noc22_cs40/preview
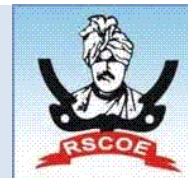
https://onlinecourses.nptel.ac.in/noc23_cs53/preview

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F. Y. B. Tech (Computer Engineering/Information Technology)
Academic Year – 2024-2025 Semester -I

[CS1203L] Fundamental of Computer Programming

Teaching-Scheme: PR: 4 Hour/Week	Credit PR:1	Examination Scheme: ISCE Evaluation : 60 Marks ESE Evaluation : 40 Marks Total : 100 Marks

Course Prerequisites: Basic mathematics and Science.

Course Objective:
1. To define logical steps via algorithms to solve simple computational problems using Operators and Expressions.
2. To apply Control Flow structures in C Programming for Problem solving.
3. To design a solution using Arrays, Character and String Arrays, User Defined Functions.
4. Justify the use of pointers and file handling in Problem solving using C programming language

Lab Outcome:
After successful completion of the course, students will be able to:
- LO1 : Read, understand and trace the execution of programs written in C language.
- LO2 : Implement Programs using concepts of functions, arrays and pointers
- LO3 : Write programs for data handling using file

Guidelines for Assessment
1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	To accept the number and Compute a) square root of number, b) Square of number, c) Cube of Number.
2	To accept an object mass in kilograms and velocity in meters per second and display its Momentum. Momentum is calculated as e=mc2 where m is the mass of the object and c is its velocity
3	To accept the number and a) check for prime, b) factorial of number e) prime factors.
4	To accept the number from user of Fibonacci numbers to be generated and print the Fibonacci series.
5	Write a program to determine whether the input character is capital or small letter, digits or special symbol. Using switch case
6	Demonstrate branching using switch construct to declare division of student. Accept a student's marks for five subjects, compute his/her result. Student is passing if he/she scores mark equal to and above 40 in each course. If student scores aggregate greater than 75%, then the grade is distinguished. If aggregate is 60>= and <75 then the Grade of first division. If aggregate is 50>= and <60, then the grade is second division. If aggregate is 40>= and <50, then the grade is third division.

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7	In array do the following: 1. Find given element in array 2. Find Max element 3. Find Min element 4. Find frequency of given element in array 5. Find Average of elements in Array.
8	Write a C program to demonstrate the use of 2D array (matrix manipulation).
9	Write a C program to demonstrate the use of user defined functions
10	Write a C program to demonstrate the use of function recursive function.
11	Write a C program to demonstrate the use of pointers using call by reference.
12	Write a C program for string manipulation.
13	Write a program to add two numbers using pointers.
14	Write a program to illustrate how a file stored on the disk is read.

Text Books:
T1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
T2. Programming in ANSI C,8e- Balaguruswamy, McGraw-Hill

Reference Books:
R1. Herbert Schildt, "C: The Complete Reference", Fourth Edition, McGraw Hill.
R2. Yashvant Kanetkar, "Let Us C", BPB Publications.
R3. B. S. Gottfried, Programming with C (Schaum's Outline Series), 2nd ed. McGraw-Hill, 1996.

MOOC / NPTEL/YouTube Links:
https://onlinecourses.nptel.ac.in/noc22_cs40/preview
https://onlinecourses.nptel.ac.in/noc23_cs53/preview

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F. Y. B. Tech (Group 2&3)
Academic Year – 2023-2024 Semester -II
[HS1209T]: Economics

Teaching Scheme: TH: 3 Hours/Week	Credit 03	Examination Scheme: InSem. Evaluation:20Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50Marks

Course Prerequisites: Not required

Course Objective:
1. To provide students with a foundational understanding of economics, focusing on both micro and macro aspects.
2. Students will learn essential concepts such as the basic economic problem, demand and supply theories, cost analysis, market structures, and financial systems, including the money and capital markets.
3. To analyze how individual firms and economies operate, make informed decisions, and assess the impact of different market forces.

Course Outcome:
On completion of the course, student will be able to–
CO 1: Record the core principles of economics, including the basic economic problem and the nature of firms.
CO 2: Explain the theory of demand, supply analysis and cost analysis.
CO 3: Apply the laws of demand and supply, understand their determinants, and recognize shifts in demand and supply curves.
CO4:. Calculate and interpret various cost concepts such as fixed, variable, total, and marginal costs, and use break-even analysis in decision-making.

Course Contents

UNIT-I	Basic Concept of Economics	04 Hours

Introduction to Economics, Basic Economic Problem, Circular Flow of Economics (Two, Three and Four Sector Model),Nature of the Firm- Rationale, Micro and Macro Economics and their interdependence on each other, Difference between Micro and Macro Economics

UNIT-II	Theory of Demand	04 Hours

Concept of Demand, Determinants of Demand, Demand function, Law of Demand, Demand Schedule and curve, Movement along and shift of Demand Curve, Exceptions to the law of demand.

UNIT-III	Theory of Supply Analysis	04 Hours

Meaning and concept of supply, Law of supply, Supply Schedule, Supply Curve and Shift of Supply Curve. Exception to Law of Supply

UNIT-IV	Cost Analysis	04 Hours
Concepts of Cost:- fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost. Break even analysis, Graphic Method and Algebraic method (Numerical from BEP)		
UNIT-V	Forms of Market and Price Determination	04 Hours
Forms of Market – Perfect Competition, Monopoly and Monopolistic Competition, Market Equilibrium– Price Determination under Perfect Competition, Monopoly and Monopolistic Markets		
UNIT-VI	Money Market and Capital Market	04 Hours
Meaning and concept of money market, Instruments of money market, Capital Market and its instruments, Role and Functions of Reserve Bank of India		

Text Books:
   T1. Economic Analysis of Business Decision – Dr Meenakshi Duggal
   T2. Introductory *Microeconomics and Macroeconomics* , T.R. Jain and Dr V.K. Ohri
   T3.3. *Managerial Economics* – D.N. Dwivedi

Reference Books:
   R1. *Intermediate Microeconomics: A Modern Approach*, Hal R, Varian.
   R2. *Principles of Macroeconomics*, N. Gregory Mankiw.

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F. Y. B. Tech (Computer Science & Business System Engineering)
Academic Year – 2024-2025   Semester -I
HS1210L: Business Communication & Value Science- I

Teaching Scheme: PR: 2 Hours / Week	Credit PR: 1	Examination Scheme: ISCE: 50 Marks

Course Pre-requisites: Basic knowledge of high school English.

Lab Objectives:
- Understand what life skills are and their importance in leading a happy and well-adjusted life
- Motivate students to look within and create a better version of self
- Introduce them to key concepts of values, life skills, and business communication

Lab Outcome:
After successful completion of the course, students will able to:
LO 1: Recognize the need for life skills and values.
LO 2: Recognize own strengths and opportunities.
LO 3: Apply the life skills to different situations.
LO 4: Describe the basic tenets of communication.
LO 5: Apply the basic communication practices in different types of communication.

Course Contents		
UNIT-I	**Self-Introduction**	**03 Hours**
Class activity–presentation on favorite cricket captain in IPL and the skills and values they demonstrate self-work with immersion – interview a maid, watchman, sweeper, cab driver, or beggar and narrate what you think are the values that drive them Activity: Write a newspaper report on an IPL match Activity: Record a conversation between a celebrity and an interviewer Quiz Time, Self-awareness – Questionnaire.		
UNIT-II	**Essential Grammar**	**03 Hours**
Refresher on Parts of Speech –Applications of tenses in Functional Grammar, Sentence formation (general & Technical), Common errors, and Voices. Show a sequence from a filmwhere a character uses the wrong sentence structure.		
UNIT-III	**Communication Skills & Speed reading and Skit**	**08 Hours**
Barriers of communication, Effective communication. Types of communication-verbal and non– verbal. Listening Skills: Law of nature- Importance of listening skills, Difference between listeningand hearing, Types of listening Activity: Skit based on communication skills Evaluations on Listening skills- listen to recordings and answer questions based on them.		
UNIT-IV	**E-mails and Verbal Communication & Written Communication & C.V.**	**03 Hours**
Email writing: Formal and informal emails, activity **Verbal communication**: Pronunciation, clarity of speech, **Vocabulary Enrichment**: Exposure to words phrases, idioms, significantabbreviations formal business vocabulary – Group discussion using words learned. **Written Communication**: Summary writing, story writing. **Build your CV** – start writing your		

comprehensive CV including every achievement in your life, no format, no page limit. **Life skill**: Stress management, working with rhythm and balance, colors, and teamwork.

UNIT-V	Leadership and Term Work.	03 Hours

Theory to find out from the participants their views, observations, and experiences of working in a team. Intro of Dr. Meredith Belbin and his research on teamwork and how individuals contribute.

Belbin's 8 Team Roles and Lindgren's Big 5 personality traits. Belbin's 8 team player styles. Team Falcon exercise.

UNIT-VI	Introduction To Life Skills	03 Hours

Critical life skills, Multiple Intelligences, embracing diversity – Activity on appreciation of diversity (A short film on diversity. Play the video (link to be attached in the FG) Session on :Diversity & Inclusion- Different forms of Diversity in our society).

Life skill: Community services Creating a virtual NGO and making a presentation

Life skill: Join a trek – Values to be learned: Leadership, teamwork, dealing with ambiguity managing stress, motivating people, creativity, result orientation.

Guidelines for Assessment

1) Practical for the subject shall be engaged in a minimum of three
   batches.(Batch size of 22 students maximum) per division.
2) Lab Evaluation is a continuous assessment based on experiments performed, submission of
   results of an experiment in the form of a report/journal, timely completion, attendance, and
   understanding.

List of Assignments	
1	Email writing.
2	Grammar and vocabulary test 1
3	Grammar and vocabulary test 2
4	Group discussion
5	Framing questions for interview
6	Writing Micro blog on given subject.
7	Exercise on life skills and personality types.
8	Speed reading exercise.
9	Debate on the topic of diversity with an angle of ethics, morality, and respect for individual (In the presence of an external moderator). Groups will be graded by the professor
10	Summary writing exercise.

Text Books:
   T1. Business Communication – Dr. Saroj Hiremath
   T2. English vocabulary in use – Alan McCarthy and O'Dell.

Reference Books:
   R1. APAART: Speak Well 1 (English language and communication)
   R2. APAART: Speak Well 2 (Soft Skills)

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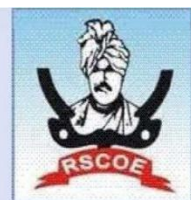
F.Y.B.Tech Computer Science and Business System Semester-I

[HS1208T]: Universal Human Values

Teaching Scheme: TH:- 3	CreditTH:3	Examination Scheme: InSem.Evaluation:20Marks MidSem.Exam:30marks EndSem.Exam:50marks

Course Objectives:
1. To help students to distinguish between values and skills and understand the need, basic guidelines, content and process of value education.
2. To help students to initiate a process of dialog within themselves to know what they 'really want to be' in their life and profession.
3. To help students to understand the meaning of happiness and prosperity for a human being.
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.

Course Outcome:
After successful completion of the course, students will be able to
1. Relate foundational concepts of value education , self-exploration, happiness, prosperity, and the basic human aspirations.
2. Develop an understanding of human beings as an co-existence of self and body,
3.Evaluate the values in human relationships and their impact on societal harmony and nature.

Course Contents

UNIT-I	Introduction to value education	6 Hours

Understanding value education, self-exploration as the process for value education, happiness and prosperity, right understanding, relationship and physical facility, happiness and prosperity–current scenario, method to fulfill the basic human aspiration.

UNIT-II	Harmony in human being	6 Hours

Understanding human being as a coexistence of the self and body, understanding the needs of self and body, the body as an instrument of the self, understanding activities of self, understanding harmony in the self, understanding the harmony in self with body, programs to fulfill the self-regulation and health.

UNIT-III	Harmony in family and society	6 Hours

Harmony in family-a basic unit of human interaction, Human—human relationship, values in relationships, understanding harmony in the society and vision for universal human order.
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UNIT-IV	Harmony in nature and existence	6 Hours

Understanding the harmony in nature, understanding the four orders of nature, realizing existence as co-existence at all levels and holistic perception of harmony in existence.

UNIT-V	Implications of the holistic understanding of harmony	6 Hours

Natural acceptance of human values, definitiveness of ethical human conduct, basis for universal human order, competence in professional ethics, holistic technologies, production systems and management models: Typical case studies.

Guidelines for Assessment

In semester evaluation shall be based on continuous assessment based on timely submission of assignments.

TextBooks:
T1. Human values and Professional Ethics by R R Gaur, R Sangal,G P Bagaria, Excel Books, New Delhi, 2010
T2.JeevanVidya: E k Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.

ReferenceBooks:
R1.Manav Vyavhar Darshan, ANagaraj, Jeevan Vidya Prakashan, Amarkantak,2001

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First Year B Tech. (Group -1) (Civil/Mech/Electrical/E&TC/A&R Engineering)
– Sem II (2023 Pattern)
Course Code: ES1202T, Course Name: Engineering Mathematics II

Teaching Scheme: TH: - 03 Hours/Week TU:- 01 Hours/Week	Credit TH:03 TU: 01	Examination Scheme: In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Term Work : 50 Marks

Course Prerequisites:
Solution of ODE by VS method, Two-dimensional Cartesian and polar coordinate systems, Jacobian, Integration.

Course Objective:
To make the students familiarize with Mathematical Modeling of physical systems using differential equations, advanced techniques of integration, tracing of curve, multiple integrals and their applications. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance thinking power, useful in their disciplines.

Course Outcome: After successful completion of the course, students will able to

CO1: Apply the effective mathematical tools for solution of first order differential equations that model physical Processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring system, Heat transfer, etc.

CO2: Apply advanced integration techniques such as reduction formulae, Beta function, Gamma function, Differentiation Under Integral Sign (DUIS) and Error function, useful in evaluation of multiple integrals and their applications.

CO3: Trace the approximate shape of curve for given equation and measure arc length of variouscurves.

CO4: Use the concept of solid geometry to understand sphere, cone and cylinder in comprehensivemanner.

CO5: Evaluate multiple integrals and its applications to find area bounded by curves, volumebounded by surfaces, center of gravity and moment of inertia.

Course Contents		
UNIT-I	**First Order Ordinary Differential Equations**	**07 Hours**
Exact differential equations, Equations reducible to exact form. Linear differential equations, Equations reducible to linear form, Bernoulli's equation, Equation solvable for *p, y, x* and Clairaut's form.		
UNIT-II	**Applications of Differential Equations**	**07 Hours**
Applications of Differential Equations to Orthogonal Trajectories, Newton's Law of Cooling, Kirchhoff's Law of Electrical Circuits, Rectilinear Motion, Simple Harmonic Motion, Onedimensional Conduction of Heat.		
UNIT-III	**Integral Calculus**	**07 Hours**
Reduction Formulae, Beta and Gamma functions, Differentiation Under Integral Sign and Errorfunctions.		
UNIT-IV	**Curve Tracing**	**07 Hours**
Tracing of Curves – Cartesian, Polar and Parametric curves, Rectification of curves.		
UNIT-V	**Solid Geometry**	**07 Hours**
Cartesian, Spherical polar and cylindrical coordinate systems and relation, Sphere, Cone and Cylinder		
UNIT-VI	**Multiple Integrals and their Applications**	**07 Hours**
Double and Triple integrations, Change of order of integration, Transformation of integral to polar form, Applications to find Area, Volume, Mass, Centre of Gravity and Moment of Inertia.		

Guidelines for Assessment
Guidelines for Tutorial and Term Work: i) Tutorial shall be engaged in four batches (batch size of 20 students maximum) per division. ii) Term work shall be based on continuous assessment of six assignments (one per each unit).

Text Books:
T1. Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill).
T2. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).

Reference Books:

R1. Advanced Engineering Mathematics, 10e, by Erwin Kreyszig (Wiley India).
R2. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education).
R3. Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Cengage Learning).
R4. Differential Equations, 3e by S. L. Ross (Wiley India).
R5. Thomas's Calculus by J. Hass, M. D. Weir, G. B. Thomas (Pearson,2014)
Applied Mathematics (Volume I and II) by P. N. Wartikar and J. N. Wartikar Vidyarthi Griha Prakashan, Pune.

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F. Y. B. Tech (Group 1)
Academic Year – 2024-2025 Semester -II
[CS1202T] Fundamentals of Data Structures

Teaching-Scheme: TH:1 Hour/Week	Credit TH:1	Examination Scheme: ISE Evaluation : 20 Marks MSE Evaluation: 10 Marks ESE Evaluation : 20 Marks Total: 50 Marks

Course Prerequisites: Introduction to Computer Programming

Course Objective: To understand importance of data structures in context of writing efficient programs and develop skills to apply appropriate data structures in problem solving.

Course Outcome:
After successful completion of the course, students will be able to:
- **CO1:** Identify and define fundamental data structures recognizing their key characteristics and basic applications.
- **CO2:** Explain the algorithms, and their time and space complexities to optimize performance in real-world applications.
- **CO3:** Apply problem-solving skills to design and implement data structures in programming projects, translating complex problems into efficient, structured solutions using appropriate data organization techniques.

Course Contents

UNIT-I	Sorting and Search Techniques	7 Hours

Fundamentals of algorithm analysis, Searching - Linear Search and binary search , Sorting - Insertion sort - Selection sort – Bubble sort

UNIT-II	Linear and Non-Linear Data Structures	8 Hours

Linear Data Structures : Detailed exploration of stacks, Queue operations and applications, Linked lists: types and implementations, Non-Linear Data Structures : Tree structures and their traversal methods, Graphs: representations and algorithms

Text Books:
T1.   Data Structure Using C, E. Balagurusamy
T2.   Data Structures using C", Y. Langsam, M. Augenstin and A. Tannenbaum, First Edition, 2002, Pearson Education Asia, ISBN 978-81-317-0229-1
T3.   Art of Computer Programming, Volumes 1, Donald Knuth

Reference Books:
R1. Gilberg and Forouzan: "Data Structure- A Pseudo code approach with C" by Thomson Publications
R2. "Fundamental of Data Structure" (Schaums Series) Tata-McGraw-Hill.

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F. Y. B. Tech (Group 1)
Academic Year – 2024-2025 Semester -II
[CS1202L] Fundamentals of Data Structures

Teaching-Scheme: PR: 2 Hour/Week	Credit PR:1	Examination Scheme: ISCE Evaluation : 30 Marks ESE Evaluation : 20 Marks Total : 50 Marks

Course Prerequisites: Introduction to Computer Programming.

Course Objective: To understand importance of data structures in context of writing efficient programs and develop skills to apply appropriate data structures in problem solving.

Lab Outcome:
After successful completion of the course, students will be able to:
  LO1: Identify and describe basic algorithms for finding and organizing data in various scenarios.
  LO2: Explain essential structures for storing and managing data and their practical applications.
  LO3: Apply problem-solving strategies to analyze and resolve issues in data-related operations, ensuring efficient execution.

Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	Demonstrate the Linear Search algorithm in practical scenarios.
2	Implement the Binary Search algorithm in a programming environment.
3	Demonstrate the Bubble Sort technique through coding examples.
4	Implement the Selection Sort technique to sort data sets.
5	Demonstrate stack operations by executing common stack manipulations.
6	Implement queue operations using appropriate data structures.
7	Use a Singly Linked List and perform basic operations.
8	Demonstrate the structure of a Binary Search Tree through visual representation.
9	Identify and describe basic graph representation techniques in practical applications.
10	Virtual Lab on Dijkstra's Shortest Path algorithm

Text Books:
T1. Data Structure Using C, E. Balagurusamy

T2. Art of Computer Programming, Volumes 1, Donald Knuth

Reference Books:
R1. Gilberg and Forouzan: "Data Structure- A Pseudo code approach with C"
     by Thomson Publications
R2. "Fundamental of Data Structure" (Schaums Series) Tata-McGraw-Hill.
R3. "Fundamentals of data structure in C" Horowitz, Sahani & Freed, Computer Science Press

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First Year B Tech.: Comp / IT / CSBS Engineering) – Sem II (2023 Pattern)
Course Code: ES1205T, Course Name: Probability & Statistics

Teaching Scheme: TH: - 03 Hours/Week TU:- 01 Hours/Week	Credit TH:03 TU: 01	Examination Scheme: In Sem. Evaluation :20Marks Mid Sem. Exam :30 Marks End Sem. Exam :50 Marks Term Work :50 Marks

Course Prerequisites: Permutation and Combinations, Differentiation and Integration.

Course Objective:
To familiarize the students with concepts and techniques in Statistics, Correlation and Regression, Probability Distributions, Sampling Techniques, Estimation, Test of Hypothesis. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance thinking power, useful in their disciplines.

Course Outcome: After completion of this course, students will able to,

CO1: apply statistical methods like correlation, regression in forecasting and interpreting experimental data useful in data analysis.

CO2: learn the essential tools like mathematical expectation, variance and moment generating functions useful in finding parameters of various probability distributions required in statistical inferences.

CO3: apply the techniques of sampling distributions of sample mean, Sample proportion and central limit theorem.

CO4: estimate the parameters, confidence intervals for sample mean and   sample proportion useful in statistical inferences.

CO5: apply the concept of testing of hypothesis useful in modern software computing.

Course Contents		
UNIT-I	**Descriptive Statistics**	**07 Hours**
Introduction, Collection of data, Representation of data, Measures of central tendency, Measures of dispersion, Coefficient of variation, Moments, Skewness and Kurtosis, Curve fitting by method of Least squares: fitting of straight line, parabolas and more general curves		
UNIT-II	**Correlation and Regression**	**07 Hours**
Scatter diagram Correlation, Linear Regression, Multiple Correlation and Regression, Reliability of Regression Estimates.		
UNIT-III	**Probability**	**07 Hours**
Probability, Theorems on Probability, Conditional probability, Bayes Theorem, Reliability of system, Discrete and continuous random variables, Probability distribution, Probability mass function, Probability density function, Mathematical expectation, variance and its properties, higher order moments and moments generating function.		
UNIT-IV	**Probability Distributions**	**07 Hours**
Binomial distribution, Poisson distribution, Normal distribution, Geometric distribution, Uniform distribution, Exponential distribution.		
UNIT-V	**Sampling Techniques & Estimation**	**07 Hours**
Sampling, Random sampling with & without replacement, Central limit theorem, Standard error, Sampling distribution of sample mean & proportion, Types of estimation, Interval estimation, Point estimation, Maximum likelihood estimation & Method of moments. Criteria for good Estimate, Sufficiency by Neyman factorization theorem, Unbiasedness, Consistency & Efficiency.		
UNIT-VI	**Test of Hypothesis**	**07 Hours**
Hypothesis, Type I and Type II errors, Level of significance, Critical region, Chi-Square test, Students-t test, Z-test, Test of hypothesis for small & large sample mean & proportion, Neyman Pearson lemma, Best critical region, Power of test, F-Test, Analysis of variance (ANOVA): one-way, two-way (with and without interactions).		

Guidelines for Assessment

Guidelines for Tutorial and Term Work:

i) Tutorial shall be engaged in three batches (batch size of 22 students maximum) per division.

ii) Term work shall be based on continuous assessment of six assignments (one per each unit).

Text Books:

T1. Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill).

T2.   Introduction of Probability Models by S. M. Ross (Academic Press, N.Y).

Reference Books:

1. Probability and statistics for Engineers and Scientists by Walpole, Myers, Myers, ye, 9e, (Pearson new International edition)
2. Applied Statistics by Parimal Mukhopadhyay , 2e, New central Book Agency
3. Probability and Statistics for Engineers, by I. R. Miller, J.E. Freund and R. Johnson, 4e, PHI.
4. Introduction to the Theory of Statistics by A. M. Mood, F.A. Graybill and D. C. Boes, McGraw Hill Education.
5. Advanced Engineering Mathematics by by Erwin Kreyszig, 10e, Wiley India Ltd.
6. Higher Engineering Mathematics by B. S. Grewal, Khanna Publication, Delhi.
7. Probability and Statistics by Murry R Spiegel and Others, Schaum's Outlines Series McGraw- Hill Education.

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F. Y. B. Tech (Computer Engineering/Information Technology)
Academic Year – 2024-2025 Semester -II
CS1204T: Object Oriented Programming

Teaching-Scheme: TH:1 Hour/Week	Credit TH:1	Examination Scheme: ISE Evaluation : 20 Marks MSE Evaluation: 10 Marks ESE Evaluation : 20 Marks Total: 50 Marks

Course Prerequisites: Basic mathematics and Science.

Course Objective:

1. To explore the principles of Object-Oriented Programming (OOP).
2. To understand object-oriented concepts such as data abstraction, encapsulation, inheritance, and polymorphism
3. To use the object-oriented paradigm in program design
4. To lay a foundation and programming insight using OOP constructs for advanced programming

Course Outcome:

 After successful completion of the course, students will be able:

CO1: Explain the basic concepts of object-oriented programming using class and object.

CO2: Apply the Inheritance, Polymorphism to solve the real-life problems.

CO3: Use the concept of exception handling in OOP

CO4: Describe Files and Stream handling for input output data.

Course Contents

UNIT-I	Principles of Object-Oriented Programming and Inheritance	8 Hours

OOP Fundamentals: Programming Paradigms, An Overview of C, Necessity for OOP, difference between C and C++, Data Hiding, Data Abstraction, Encapsulation, Class and Object. Single line comments, Local variable declaration within function scope, function declaration, parameters passing – value Vs reference, Operator new and delete, the typecasting operator.

Class and Object: Scope of Class and Scope Resolution Operator, Member Function of a Class, private, protected and public Access Specifier, this Keyword, Inline Functions in contrast to macro, default arguments, Constructors and Destructors, friend function and friend class.

Inheritance: Introduction to Inheritance, Types of inheritance: Single inheritance, Multiple inheritance, Multilevel inheritance, Hierarchy inheritance, Hybrid Inheritance, Virtual Class, Abstract Class, Constructor in Derived Classes, Pointers to Objects, Pointer to Derived Classes Virtual Functions, Pure Virtual Functions

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UNIT-II	Programming with Polymorphism, Template and File Handling	7 Hours
Polymorphism: Introduction to Polymorphism, Operator Overloading - Concept of overloading, operator overloading, Overloading Unary Operators, Overloading Binary Operators, Data Conversion, Type casting (implicit and explicit), Pitfalls of Operator Overloading and Conversion, Mutable keyword, Function overloading, Explicit keyword, Polymorphism through dynamic binding. **Exception Handling:** Basics of Exception Handling, Exception Handling Mechanism, Throwing Mechanism, Caching Mechanism, Re-Throwing Mechanism, Standard Template Library (STL). System exceptions. **File Handling:** Data hierarchy, Stream and files, Stream Classes, Stream Errors, Disk File I/O with Streams, File Pointers, Error Handling in File I/O, Library functions and formatted output, File I/O with Member Functions, Overloading the Extraction and Insertion Operators, memory as a Stream Object .		
Text Books: T1. E Balgurusamy , "Object Oriented Programming with C++" , McGraw-Hill T2. Bjarne Stroustrup , "Programming – Principles and Practice Using C++", Addison-Wesley Educational Publishers Inc; 4th edition.		
Reference Books: **R1**. Yashavant Kanetkar, "Let Us C++", BPB Publications. **R2.** Herbert Schildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.		
MOOC / NPTEL/YouTube Links: https://onlinecourses.nptel.ac.in/noc24_cs125/preview		

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F. Y. B. Tech (Computer Engineering/Information Technology)
Academic Year – 2024-2025 Semester -II
[CS1204L] Object Oriented Programming Lab

Teaching-Scheme: PR: 4 Hour/Week	Credit PR:1	Examination Scheme: ISCE Evaluation : 60 Marks ESE Evaluation : 40 Marks Total : 100 Marks

Course Prerequisites: Basic mathematics and Science.

Course Objective:

1. To explore the principles of Object-Oriented Programming (OOP).
2. To understand object-oriented concepts such as data abstraction, encapsulation, inheritance, and polymorphism.
3. To use the object-oriented paradigm in program design.
4. To lay a foundation and programming insight using OOP constructs for advanced programming.

Lab Outcome:
After successful completion of the course, students will be able to:
- LO1 : Read, understand and trace the execution of programs written in C++ language.
- LO2 : Implement Programs using concepts of class , encapsulation ,inheritance and polymorphism.
- LO3 : Write programs using templates and for data handling using file streams.

Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	Write a C++ program to create a calculator for an arithmetic operator.
2	Write a C++ programs for illustrating the Looping, Expressions & Functions.
3	Develop an object-oriented program in C++ to create a database for any information system using constructor, default constructor, copy constructor, destructor.
4	Write a C++ programs for implementation of friend class.
5	Write a C++ programs for implementation of inline code and dynamic memory allocation operators- new and delete.
6	Write a C++ program to perform function overloading.
7	Write a C++ program to perform different arithmetic operations on complex number using unary operator overloading
8	Write a C++ program to perform different operations binary operator overloading.
9	Write a C++ program to implement the concept of Single inheritance.

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10	Write a C++ program to Manage bank account using multiple inheritance concepts using C++.
11	Write a C++ program to Manage bank account using multilevel inheritance concepts using C++.
12	Create User defined exception to check the given conditions and throw the exception if the criterion does not meet.
13	Write a C++ menu driven program that will create a data file and implement the following a. operations on data: b. Search the specific item c. Display the item Update the item
14	Mini Project

Text Books:

T1. E Balgurusamy , "Object Oriented Programming with C++" , McGraw-Hill

T2. Bjarne Stroustrup,"Programming – Principles and Practice Using C++", Addison-Wesley Educational Publishers Inc; 4th edition.

Reference Books:

R1. Yashavant Kanetkar, "Let Us C++", BPB Publications.
R2. Herbert Schildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.

MOOC / NPTEL/YouTube Links:

https://onlinecourses.nptel.ac.in/noc24_cs125/preview

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Syllabus of

Common Courses for

Group1,2&3

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F.Y. B. Tech (Group 1, 2 & 3)
Academic Year – 2024-2025 Semester: I&II
[HS1202T]: Professional English Communication

Teaching Scheme: TH: 2Hours/Week PR: 2Hours/Week	Credit TH: 02 PR: 01	Examination Scheme: In Sem Evaluation: 20 Marks Mid Sem. Exam: 30 Marks End Sem. Exam: 50 Marks

Pre requisite: Student should have basic knowledge about grammar.

Course Objective:
Prepare students to equip with the tools to express themselves accurately and assertively in both written and spoken form, thereby improving their professional and personal interactions.

Course Outcome:
After successful completion of the course, students will be able to:
CO1: Recognize fundamentals of language to enhance communication skills.
CO2: Express coherent and precise professional written communication.
CO3: Articulate persuasive and informative communication.

Course Contents		
UNIT - I	**Mastery in Grammar**	**6 Hours**
Common errors, Subject – Verb – Agreement, Modal Auxiliary Verbs, Voice.		
UNIT-II	**Language Luminaries**	**6 Hours**
Phonetics, Rhetorical Devices, Communication – Process, Barriers, Types, Interview Techniques, Idea Exchange Forum.		
UNIT-III	**Art of Technical Writing**	**6 Hours**

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Agenda of the meeting, Minutes of the meeting, Advertisement Writing, Article Writing, Email Writing.

UNIT-IV	Comprehensive Writing and Presentation Skills	6 Hours

Introduction, Structure, Process and Implementation, Visual Data Translation, Book Analysis, Character Interaction Writing

Guidelines for Assessment
Assessment is a continuous evaluation based on submission of the assignments, timely completion, attendance and understanding.
List of Experiments/Assignments

1	Exercises based on Unit – I.
2	Enlist rhetorical devices with definition after completion of Unit – II.
3	Draft an informal email after completion of Unit – III.
4	Enlist rules of presentation after completion of Unit – IV.

Textbook:
1. M Ashraf Rizvi, Effective Technical Communication, McGraw Hill Education India, 2nd Ed., 2017.
2. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Oxford University Press India, 3rd Ed., 2015.
3. Professional Communication (Global Goo English) by Dr. P. Prasad. Katson Books

Reference Books:
1. Paul V Anderson, Technical Communication, Cengage Learning, 9th Ed., 2017.
2. Susan Thurman, Only Grammar Book You Will Ever Need, Adams, 2003.
3. Practical English Grammar & Composition by SC Gupta, 2012.

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F.Y. B. Tech (Group 1, 2 & 3)
Academic Year – 2024-2025 Semester: I&II
[HS1203T]: English Language Skills

Teaching Scheme: TH: 2Hours/Week PR: 2Hours/Week	Credit TH: 02 PR: 01	Examination Scheme: In Sem Evaluation: 20 Marks Mid Sem. Exam: 30 Marks End Sem. Exam: 50 Marks

Course Objective:
Prepare students to develop fundamental language skills that foster clear and effective communication, enhance personal confidence, and strengthen overall personality.

Course Outcome:
After successful completion of the course, students will be able to:
CO1: Recognize Linguistic elements for effective communication.
CO2: Express organized and logical structured texts.
CO3: Develop strategies for different communication platforms.

UNIT-I	Grammar Building Blocks	6 Hours
Articles and its uses, Parts of speech and its types, Tenses and its types, WH Questions.		
UNIT-II	**Linguistic Elements**	**6 Hours**
Phonetics, Wordsmith practices, Text Interpretation Skills, Figurative Language Essentials.		
UNIT-III	**Creative Writing Techniques**	**6 Hours**
Email Writing, Report writing, Summary writing, Book review, Plot Development, Bacon's Essays (Of Friendship, Of Studies, Of Revenge, Of Youth and Age).		

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UNIT-IV	Navigating Digital Landscape	6 Hours
Introduction, Structure, Process and Implementation, Dynamic Communication Practices, Online Interaction techniques.		

Guidelines for Assessment
Assessment is a continuous evaluation based on submission of the assignments, timely completion, attendance and understanding.

List of Experiments/Assignments	
1	Exercises based on Unit – I.
2	Multiple Choice questions based on topics in Unit – II.
3	Enlist rules of writing formal email after completion of Unit – III.
4	Quiz based on Unit – IV.

Textbook:
1. M Ashraf Rizvi, Effective Technical Communication, McGraw Hill Education India, 2nd Ed., 2017.
2. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Oxford University Press India, 3rd Ed., 2015.
3. English Grammar & Composition by SC Gupta, 2nd ED., 2014.

Reference Books:
1. Paul V Anderson, Technical Communication, Cengage Learning, 9th Ed., 2017.
2. Susan Thurman, Only Grammar Book You Will Ever Need, Adams, 2003.

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F.Y. B. Tech (Group 1, 2 & 3)
Academic Year – 2024-2025 Semester: I&II
[HS1204T]: German Language Skills

Teaching Scheme: TH: 2Hours/Week PR: 2Hours/Week	Credit TH: 02 PR: 01	Examination Scheme: In Sem Evaluation: 20 Marks Mid Sem. Exam: 30 Marks End Sem. Exam: 50 Marks

Course Objective: Prepare students to seek and provide guidance in a variety of context, using appropriate sentence structure to ensure effective communication and mutual understanding.

Course Outcome:
After successful completion of the course, students will be able to:
CO1: Relate simple statements, articles, verbs and prepositions.
CO2: Describe oneself, likes, meetings and appointments.
CO3: Recognize strong, weak, separable and inseparable verbs accurately
CO4: Express language effectively using prepositional accuracy for phrasing invitations.

Course Contents

UNIT - I	Menschen und Reisen (People and Travel)	6 Hours

- Self and Partner introduction; giving information about oneself and others; travelogue; Identify nouns along with their articles.
- **Grammar -** W-questions; simple statements; numbers till 100, nouns singular and plural.

UNIT-II	Personen und Aktivitäten (People and Activities)	6 Hours

- Introduce oneself and family members; talk about one's likes and dislikes, talk about one's ability and capability; price and quantities;
- **Grammar-** Personal pronouns; possessive articles; verb conjugations; modal verbs and sentence structure of the same.

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UNIT-III	Wollen und Sollen (Wants and Needs)	6 Hours
• Describe the modes of transport; permissions and denials; plan meetings, appointments; • **Grammar** – modal verbs (all 7); strong verbs and weak verbs; separable and inseparable verbs		

UNIT-IV	Bewegung und Orientierung (Travel and Guidance)	6 Hours
• Guests and their invitations; planning and preparation; Route description and explaination; • **Grammar** – changing prepositions; Dativ prepositions; Akkusativ prepositions; Imperativ (Singular and Plural)		

Guidelines for Assessment	
Assessment is a continuous evaluation based on submission of the assignments, timely completion, attendance and understanding.	
List of Experiments/Assignments	
1	Self-introduction and basic sentences
2	Exercise based on the grammar parts and its basic components.
3	Exercises on forms of verbs.
4	Solve worksheets on the different verb forms and its use.
Text Books: **T1.** Lagune (Kursbuch und Arbeitsbuch)	

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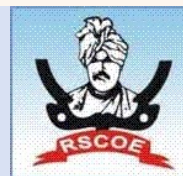
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Academic Year: 2024-25 Semester: I&II
[HS1205T]: Japanese Language Skills

Teaching Scheme: TH: 2Hours/Week PR: 2Hours/Week	Credit TH: 02 PR: 01	Examination Scheme: In Sem Evaluation: 20 Marks Mid Sem. Exam: 30 Marks End Sem. Exam: 50 Marks

Course Objective:
Prepare students to see and provide guidance in variety of context, using appropriate sentence structure to ensure effective communication and mutual understanding.

Course Outcome:
After successful completion of the course, students will be able to:
CO1: Identify fundamental language elements in Hiragana, Katakana, sentence structure and pictorial presentation.
CO2: Interpret scripts, grammatical expressions and Kanji.
CO3: Implement basics of the language through Reading and writing Skills.

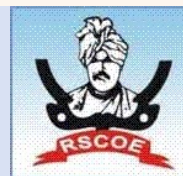|	Course Content	
UNIT – I	ひらがなのしょうかい **(Introduction to Hiragana and Katakana Script)**	**6 Hours**
Introduction of Hiragana and Katakana characters and related vocabulary, Numbers – 1 to 10, Days of week, months, dates, Basic Greetings, Listening Basic Expressions	
UNIT-II	ぶんぽうのしょうかい **(Introduction to Grammar）**	**6 Hours**
Basic sentence structure – positive, negative, interrogative, particles, Numbers – 11 to 100, Counters, Listening conversational sentences	
UNIT-III	かんじのしょうかい **(Introduction to Kanji)**	**6 Hours**
Basic Kanji 1 to 20 – numbers, natural elements, person, days, months, Vocabulary about color, fruits, vegetables, Conversation practice	
UNIT-IV	どおかいりょく **(Comprehensive Practice）**	**6 Hours**
Self -introduction, Sentences about likes, dislikes, hobby, Advance Greetings, Reading passage – comprehension, Practice audio questions	

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Guidelines for Assessment
Assessment is a continuous evaluation based on submission of the assignments, timely completion, attendance and understanding.

List of Experiments/Assignments	
1	Exercise based on Hiragana and Katakana after completing Unit I.
2	Miscellaneous exercise on Unit II .
3	Complete the grid of vocab with Kanji.
4	Complete the given sentences using advance grammar patterns.

Textbook:
1. Minna no Nihongo. Second Indian edition Goyal Publishers & Distributors Pvt. Ltd.
2. N5 kanji Book (JALTAP)

Reference Books:
1. Genki: An Integrated Course in Elementary Japanese 1
2. Japanese verbs and essentials of Grammar (second edition)

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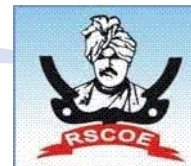
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Academic Year – 2024-2025 Semester -I&II

[HS1202L] Professional English Communication

Teaching-Scheme: PR: 2 Hour/Week	Credit PR:1	Examination Scheme: ISCE: 30 Marks ESE Practical: 20 Marks

Pre requisite: Student should have basic knowledge about grammar.

Course Objective: Prepare students to equip with the tools to express themselves accurately and assertively in both written and spoken form, thereby improving their professional and personal interactions.

Lab Outcome:
After successful completion of the course, students will be able to:
LO1: Recall Observe grammatical structures to refine overall communication skills.
LO2: Interpret Incorporate sound patterns and rhetorical devices in writing and speaking skills.
LO3: Develop Compose coherent and precise professional written communication.
LO4: Construct Deliver persuasive and informative written communication effectively.

Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	Exercises based on common errors and subject – verb – agreement
2	Exercises based on Modal Auxiliary Verbs, Voice
3	Write the communication process and express your opinion on given topic.
4	Questions based on phonetics transcription.
5	Write agenda and minutes of the meeting.
6	Write an article and advertisement.
7	Write a report and formal email on given topics.
8	Convert the diagram into text.
9	Develop a script on given guidelines.
10	Analyze a given story.

Text Books:
1. M Ashraf Rizvi, Effective Technical Communication, McGraw Hill Education India, 2nd Ed., 2017.
2. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Oxford University Press India, 3rd Ed., 2015.
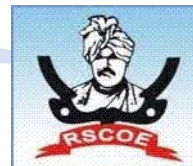
Reference Books:
1. Paul V Anderson, Technical Communication, Cengage Learning, 9th Ed., 2017.
2. Susan Thurman, Only Grammar Book You Will Ever Need, Adams, 2003.

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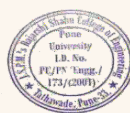
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F. Y. B. Tech (Group 1,2,3)
Academic Year – 2024-2025 Semester -I&II

[HS1203L] English Language Skills

Teaching-Scheme: PR: 2 Hour/Week	Credit PR:1	Examination Scheme: ISCE: 30 Marks ESE Practical: 20 Marks

Course Objective: Prepare students to develop fundamental language Skills that foster clear and effective communication, enhance personal confidence, and strengthen overall personality.

Lab Outcome:
After successful completion of the course, students will be able to:
 LO1: Recall different grammatical structures.
 LO2: Illustrate various language patterns and elements in the communication.
 LO3: Construct written texts with logical structure and coherence.
 LO4: Utilize communication strategies for effectiveness across various platforms.

Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	Exercises based on Articles & Parts of speech.
2	Multiple Choice questions based on Tenses and WH Questions.
3	Spoken and Listening exercises to evaluate the learning process.
4	Questions based on Text Interpretation and Phonetics.
5	Write a formal & Informal email on given topic.
6	Write a magazine and news report on given topics.
7	Develop a story on the given guidelines.
8	Summarize Bacon's essay.
9	Perform a presentation on given topics.
10	Answer in Brief on Interview Q&A.

Text Books:
 1. M Ashraf Rizvi, Effective Technical Communication, McGraw Hill Education India, 2nd Ed., 2017.
 2. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Oxford University Press India, 3rd Ed., 2015.

Reference Books:
1. Paul V Anderson, Technical Communication, Cengage Learning, 9th Ed., 2017.
2. Susan Thurman, Only Grammar Book You Will Ever Need, Adams, 2003.

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Academic Year – 2024-2025 Semester -I&II

[HS1204L] German Language Skills

Teaching-Scheme:PR: 2 Hour/Week	Credit PR:1	Examination Scheme: ISCE: 30 Marks ESE Practical: 20 Marks

Course Objective: Prepare students to seek and provide guidance in a variety of context, using appropriate sentence structure to ensure effective communication and mutual understanding.

Lab Outcome:
After successful completion of the course, students will be able to:
LO1: Recognize spoken language including conversation and information.
LO2: Illustrate vocabulary and grammar structures in both spontaneous and rehearsed speech.
LO3: Relate formal and informal speech patterns.

Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum)per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	Write conversation on self-introduction with the help of Wh questions.
2	Exercise based on grammar.
3	Practice exercises on verb conjugations.
4	Solve worksheets on modal verbs and articles.
5	Practice worksheets on sentence formation.
6	Vocabulary on modes of transport and articles.
7	Conversations with help of imperative sentences.
8	Worksheets on Dativ and Akkusativ.
9	Exercises on different verb forms and sentence structures.
10	Assignments on Imperative sentences

Text Books:
Lagune Kursbuch and Arbeitsbuch.

Reference Books:
Hilfe, Netzwerk(Kursbuch und Arbeitsbuch)

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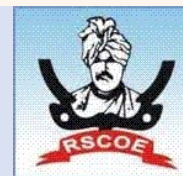
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Academic Year – 2024-2025 Semester -I&II

[HS1205L] Japanese Language Skills

Teaching-Scheme: PR: 2 Hour/Week	Credit PR:1	Examination Scheme: ISCE: 30 Marks ESE Practical: 20 Marks

Course Objective: Prepare students to see and provide guidance in variety of context, using appropriate sentence structure to ensure effective communication and mutual understanding.

Lab Outcome:
After successful completion of the course, students will be able to:
LO1: Identify Hiragana characters and numbers.
LO2: Translate foreign words into katakana.
 LO3: Interpret the Hiragana words into kanji.
 LO4: Use grammatical structures for communication.

Guidelines for Assessment

1.   Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2.   Lab Evaluation is a continuous assessment based on experiments performed, submission of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	Write various exercises on Hiragana characters.
2	Write the numbers 1 to 50 in Hiragana.
3	Complete the grid of vocab with Hiragana characters.
4	Solve miscellaneous exercises on Katakana.
5	Complete the family chart in Hiragana.
6	Write the given kanji in Hiragana and vice versa.
7	Write down the correct tenses of given verbs.
8	Exercise based on advance grammar.
9	Match the pair with correct form of verb.
10	Exercise on comprehension.

Text Books:
1.   Minna no Nihongo. Second Indian edition Goyal Publishers & Distributors Pvt. Ltd.

Reference Books:
1.   Genki: An Integrated Course in Elementary Japanese
2.   Japanese verbs and essentials of Grammar (second edition)

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F. Y. B. Tech (Group 1)

Academic Year – 2023-2024 Semester -I

[ES1209 L]   Community Engagement Project

Teaching-Scheme: Lab:- 4 Hour/Week	Credit: 2	Examination Scheme: ISCE: 60 Marks ESE: 40 Marks

Course Prerequisites: NA

Course Objective:
- To develop an appreciation of rural culture, lifestyle, and wisdom amongst students.
- To learn about the status of various agricultural and development programmes.
- To understand the causes of distress and poverty faced by vulnerable households and explore solutions for the same.
- To apply classroom knowledge of courses to field realities and thereby improve the quality of learning.

Course Outcome:
After successful completion of the course, students will be able to:
CO1 : Describe rural life, Indian culture, ethos, and social realities.
CO2 : Explain Stages, Components and Principles of community development
CO3 : Illustrate Rural Development Programs and Rural institutions
CO4 : Evaluate programmes of community engagement
CO5 : Identify opportunities for contributing to community's socio-economic improvements.

Lab Course Contents
Unit 1: Introduction to Community Engagement

Module 1: Concept, Ethics and Spectrum of Community engagement: Rural lifestyle, rural society, caste and gender relations, rural values with respect to community
Module 2: Local community, Rural culture, and Practice of community engagement: nature and resources, elaboration of 'Soul of India lies in villages' (Gandhi), rural infrastructure. Rural development Concept and system of rural life, Concept of joint family

Unit 2: Community development

Module 3: Stages, Components and Principles of community development, Utility of public resources.
Module 4: Contributions of self-help groups, case studies of self-help groups: Agriculture, farming, land ownership, water management, animal husbandry, non-farm livelihoods and artisans, rural entrepreneurs, rural markets, migrant labor.

Unit 3: Rural Development Programs and Rural institutions

Module 5: Rural Development Programs and Rural institutions: Health and safety schemes for rural community, History of rural development and current national programs in India: NABARD, Khadi and Gramodyog Ayog, Asha and Anganwadi Centres, Concept of literacy and employment in context of rural culture and multidimensional development of rural India
Module 6: Local Administration and Community Involvement.

Unit 4: Community Networking

Module 7: Social contribution of community networking, Various government schemes such as : Sarva Shiksha Abhiyan, Beti Bachao, Beti Padhao, Ayushman Bharat, Swachh Bharat, PM Awaas Yojana, Skill India, Gram Panchayat Decentralized Planning, National Rural Livelihood Mission (NRLM), Mahatma Gandhi National Rural Employment Guarantee Act 2005 (MGNREGA), SHRAM, Jal Jeevan Mission, Scheme of Fund for Regeneration of Traditional Industries (SFURTI), Atma Nirbhar Bharat, etc.
Role of social networking for government and public.
Module 8: Programs of community engagement and their evaluation.

Unit 5: Community Participation

Module 9: Community Engaged Research and Ethics in Community Engaged Research: Focus on long term relationship for community benefits, Research and innovation addressing various community problems
Module 10: Rural Distress, Rural Poverty, Health and Sanitization, Inequality, Mitigation of Disaster

Assessment:
Scheduled assignments: Total 5 assignments will be given to students. One assignment after every two modules will be conducted at the end of each unit.
Assignment may be in the form of field visit, map, survey, project etc.
Readings from e-content and reflections from field visits should be maintained by each student in a field diary.

References
1. https://onlinecourses.swayam2.ac.in/ugc24_ge05/preview
2. Principles of Community Engagement, 2nd Edition, NIH Publication No. 11-7782, Printed June 2011
3. https://www.mapsofindia.com/my-india/government/schemes-for-rural-development-launched-by-government-of-india (Government programmes for rural development)
4. https://unnatbharatabhiyan.gov.in › presentations

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F. Y. B. Tech (Group 1, 2 & 3)

Academic Year – 2024-2025 Semester: I&II

Co-curricular Activities [CODE HS1211L]

Teaching Scheme: Tutorial: 1 Hour	**Credit: 01**	**Examination Scheme:** In Semester Continuous Evaluation: 50 Marks

Course Objective:

To provide students the opportunity to better explore their interests and to groom overall personality, apart from academic ability.

Course Outcome:
Students will be able to

CO1: Broaden students' breadth of knowledge and horizons.
CO2: Stimulate out of the box thinking, self-reflection, and self-understanding to promote their individual growth.
CO3: Build solid foundation for "Whole Person Education" which will nurture and foster the holistic development.

Course Contents

List of Extracurricular activities:

1. Leadership Work and Positions

2. Sports and Athletic Participation

3. Academic Clubs and Teams/ Professional student chapters

4. Artistic and Creative Pursuits

5. Volunteering and Community Service

6. Internships

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Rules & Regulations:

- All the first-year students should enroll in one of the Extra-Curricular Activities
- Students opting for Sports / Games / Yoga / Martial Arts / Dance can continue the same activity in the I/II/III/IV/V/VI/VII/VIII semester or can choose another activity
- Every week, any day 1 hour is given for Cocurricular activity.
- Students are given grades credits in the final memorandum.

Guideline for grading Co/Extra-Curricular Activity

- RSCOE shall organize various competitions through its various clubs (governed by either by Student Affairs pr Department) during the semester and academic year.
- All UG students shall choose at least ONE activity/event from the group of Co-curricular and Extra-curricular activities happening on campus or off campus during the semester. The student shall take active part in the activity, take part in competitions and earn grade points.
- On registering for a particular activity, the performance of a student will be continuously monitored by the faculty-in-charge.

RSCOE plans club activities into three categories.

1. Art Club
2. Technical Club
3. Sports and Games
4. SWAYAM

- Art club include various clubs related to liberal arts, music, performing arts etc.
- Technical club include chapters of professional societies like SAE, ASRAE, ISHRAE, CSI, RSI, IEEE, ISTE, IET, Department Associations, Shashwat (socio-technical club), Rotaract, ASCE, ICI etc.
- National Service Scheme (NSS) and Similar activities such as Unnat Bharat, Social Work, Blood donation etc.
- SWAYAM portal offers some self-paced courses related with YOGA such as Physical Activity (YOGA) (योग) or approved by Dean concern.
- Participation in competitions, winning prizes, representing institute on state, national and international level etc shall get weightage as mentioned in the Annexure I and rubrics for same is designed
- All competition to which Academic credit is concerned, shall have set of guidelines and rubrics defined by the department or Student Affair or concern faculty in charges.
- Few examples of Competition/Activity and is given in Annexure II

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Annexure I: Assessment Rubrics:

Table A Rubrics for Assessment for Clubs Sports and cultural events(@UG Level)

		Clubs/Activity				Marks*	Grade point	Letter Grade
	• Art clubs • Technical Clubs • Sports • Any other competition/activity defined by institute/ department.	NSS/NCC/Unnat Bharat Abhiyan	Participation in events outside of the institutes	SWAYAM Courses (only4 week course approved Dean concern)	Leadership & Management of clubs'/activities/ Student Professional Societies/Institute Festival & Technical Events etc.			
Achievement level	I Prize winner, II Prize Winner, III winner	Best NSS/NCC Volunteer Awardee (State/National level) / Participation in Republic Day Parade Camp/International Youth Exchange Programme, Supported by certification	I Prize winner, II Prize Winner, III Prize Winner	As reflected in grade sheet	Top level management	50-45	10	O
	Active Participation (High)	Active Participation (High)	Selection in such events supported By certification		Middle level management	40-35	9	A+
						35-30	8	A
	Active Participation (Medium)	Active Participation (Medium)			Lower-level management	30-25	7	B+
						25-20	6	B
	Active Participation (low)	Active Participation (low)				20-15	5	C
						12	4	P
	Not participate	Not participate	-	-	-	0	0	F

*Various clubs   different marking system, however, it can be scaled down to 50 and assign credit accordingly.

Table B Rubrics for Assessment for Professional Society/Hackathons events (@FY Level)

10 pts=1 credits

Sr No	Category	International	National	State	Inter college	In-house
1	Organizer	8 pts	5 pts	4 pts	3 pts	2 pt

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2	Participants	Shortlisted for final round=5	Shortlisted for second round=4	Shortlisted for first round=3	Shortlisted for final round=4	Shortlisted for second round=3	Shortlisted for first round=2	Shortlisted for final round=3	Shortlisted for second round=2	Shortlisted for first round=1	2	1
3	Winner	Rank 1 = 10	Rank 2= 9	Rank 3= 8	Rank 1 = 9	Rank 2= 9	Rank 3= 7	Rank 1 = 8	Rank 2= 7	Rank 3= 6	7,6,5	7,6,5

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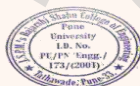## Academic Year – 2024-2025
[HS1201]: Induction Training

Training Duration: 3 Weeks	Non - Credit Audit Course

Course Objective:
To familiarize the students with new environment and inculcate in them the ethos of the institution with a sense of larger purpose. The aim of induction training is to make the students feel comfortable in the new environment, create bonding in the batch as well as between the faculty and students, people around them, society at large and nature, useful in character building as responsible engineer, a citizen and a human being.

Course Outcome:
After successful completion of the course, students will able to:

CO1: Incorporate importance of health, fitness, outdoor activities and develop a sense of aesthetics and enhance creativity.

CO2: Explore one self, experience the joy of learning, take decisions with courage, built relationships between teachers and students and be sensitive to others.

CO3: Interact with the people who are eminent in industry, social service or in public life.

CO4: Get familiarize with the institution, department and local area and role of an engineer in society through technology.

Course Contents	
I	**Physical Activity**
Physical activity with games / sports/ yoga. Gardening or other suitably designed activity	
II	**Creative Arts**
Skills related to Visual or Performing arts e.g painting, music, dance, pottery, sculpture etc.	
III	**Mentoring and Universal Human Values**
Universal Human Values through group discussion and real life activities in small group with faculty as mentor for each group	
IV	**Familiarization to Department/Branch and Innovations**
Guidelines related to rules and regulation of Choice Based Credit System (CBCS) and Examination Scheme. A College tour to explore common facilities like library, canteen, workshop etc. Visit to their Department and laboratories to understand role, achievements and innovations	
V	**Proficiency Modules**
Modules in the form of crash courses to overcome some lacunas that students may have e.g English, skills, computer Familiarity, stress management etc.	

VI	Literary Activity
Reading a book, writing a summary , debating, enacting a play etc	
VII	Lectures & Workshops by Eminent People
Motivational lectures about life, meditation, lectures by eminent personalities from industry, social service or public life, lectures by Training Placement Officer and Alumni	
VIII	Visits in Local Area
Visits to the local landmarks including historical monuments, visits to a hospital, orphanage or a village, visits to an industry in local area	
Guidelines for Assessment	

Guidelines for Assessment

1) Induction Training is mandatory non - credit audit course.
2) Internal continuous assessment and evaluation has to be carried out based on participation in activities (like creative arts, proficiency, literary, universal human values etc.) for award of grade at college level. Grade awarded for audit course shall not be calculated for grade point & SGPA.
3) Based on experience each group of students shall prepare report on their program feedback.

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F. Y. B. Tech (Group 1, 2, 3)
Academic Year – 2024-2025 Semester –I/II
[ES1208L] Introduction to Engineering and Engineering Products

Teaching-Scheme: PR: 2 Hour/Week	Credit PR:1	Examination Scheme: ISCE Evaluation : 30 Marks ESE Evaluation : 20 Marks Total : 50 Marks

Course Prerequisites: Knowledge about history of engineering, science & technology, basics of core engineering discipline, components and function of different engineering equipment..

Course Objective: To Impart the basic knowledge of engineering, science & technology, and to explore the state of the art of frequently used engineering products such as computer, mobile phone, compressor, 3-D printer, refrigerator, air-conditioner, motorcycle, diesel engine, fan, electric-motor etc. by disassembling the product, studying the structure and function of the components, and assembling them back.

Lab Outcome:
After successful completion of the course, students will be able to:
- **LO1:** Explain the historical evolution of engineering, science and technology.
- **LO2:** Describe the basics and importance of various core engineering discipline.
- **LO3:** Demonstrate the electronic devices (Computer/Mobile) disassembling and learn about its different components & their function.
- **LO4:** Explain the construction and working of core mechanical devices such as Compressor, Diesel Engine & Petrol Engine.
- **LO5:** Demonstrate the construction and working of advanced engineering equipment like 3-D Printer and CNC Machine.
- **LO6:** Explain the construction and working of common household products such as Fan, Refrigerator and Air-conditioner.

Guidelines for Assessment

1. Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Experiment

1	Introduction to Engineering, Science and Technology.
2	Historical Evolution of Engineering, Science & Technology and Indus Valley Civilization.
3	Introduction to Basics of Core Engineering Discipline.
4	Visit to Various Labs in Core Engineering Departments.
5	Assembling and Disassembling of Computer Set.
6	To Study the Construction and Working of a 3D Printer.
7	Assembling and Disassembling of a Compressor.
8	To Study the Construction and Working of a Refrigerator.
9	To Study the Construction and Working of Internal Combustion (Petrol/ Diesel) Engine.
10	To Study the Construction and Working of an Air Conditioner.

Text Books:
T1. E. G. Garrison, A History of Engineering and Technology, CRC Press Inc, 1998.
T2. J. E Mcclellan, and Harold Dorn, Science and Technology in World History - An Introduction, JHU Press, 2006.
T3. L P. Lathwal, A Brief History of Science & Technology in India, Indu Book Services Pvt Ltd, 2022.

Reference Books:
R1. D. F. Channell, The Rise of Engineering Science: How Technology Became Scientific (History of Mechanism and Machine Science), Springer Publication, 2018.
R2. C. P. Arora, Refrigeration and Air Conditioning, McGraw Hill Education, 2017.
R3. V. Ganesan, Internal Combustion Engines, McGraw Hill Education, 2017.

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F. Y. B. Tech Semester-I (Group 1,2,3&4)
[HS1207T]: Indian Knowledge System

Teaching Scheme: TH: 2 Hours/Week	Credit TH: 02	Examination Scheme: In Sem.Evaluation:30 Marks End Sem Examination: 20 Marks

Prerequisite: Historical background of India

Course objective: i) Understand the foundational concepts and key tenets of Indian knowledge systems.
ii) Understand various philosophical and spiritual traditions within the Indian context.
iii) Examine the historical evolution of Indian literature, art, and science..

Course Outcome: After successful completion of the course, students will be able
CO1: Recollect the ancient Indian rich heritage through philosophy, science, spirituality and health.
CO2: Explain wisdom and moral framework to shape management skills , interpersonal and social interaction patterns required in every step of life's journey.
CO3: Develop collaborative learning to solve socio economical and Environmental problems.

Course Contents

UNIT-I	**Introduction to Indian Knowledge Systems and Vedic Corpus**	5

Overview of Indian Knowledge system with Ancient Indian Knowledge in Action. Shrutis with synopsis of Vedas. Message in Vedas. Application of concept in Vedas. Glimpses of Upanishads. Message of Upanishads.

UNIT-II	**Wisdom through Smrutis and Foundation of Indian Education**	6

Classification of Indian philosophy with Unique features. Science based knowledge from Darshanas. Wisdom through Ages, Glimpses of Kautilyas Arthashastra (Mind map on Statecraft, leadership and ethics, and Governance. for better management), Management Principles from Mahabharata. Indigenous Indian Education System overview.

UNIT-III	**Health wellness and Psychology**	5

Introduction wellness through Indian medical system, Glimpses of Yoga Shastra, Mind body consciousness complex. Ancient Indian approach to psychology, Contributions of Yoga to the world.

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F. Y. B. Tech Semester-I (Group 1,2,3&4)
[HS1207T]: Indian Knowledge System

UNIT-IV	Foundational concepts for Science, Engineering and Technology through (IKS)	6
Ancient Indian Mathematics and its contribution to the world. Introduction to mathematics (number system). Binary Mathematics and Geometry.Metallurgy (Iron and steel in India and alloys). Mining and ore extraction.Surgical instruments and ship building. The great Indian Architecture and irrigation systems.	

Guidelines for Assessment
Assessment is a continuous assessment based on submission of the assignments, timely completion, attendance and understanding

List of Assignments	
1	Participation in class discussions and activities
2	Weekly quizzes to assess understanding of concepts
3	Theme based poster presentation exploring a specific aspect of Indian knowledge systems
4	Case Studies from ancient Indian knowledge and Foundational aspects of Ashtanga yoga

Text Books:
1.An Introduction to Indian Knowledge Systems: Concepts and Applications, B Mahadevan, V
R Bhat, and Nagendra Pavana R N; 2022 (Prentice Hall of India).
2.Indian Knowledge Systems: Vol I and II, Kapil Kapoor and A K Singh; 2005 (D.K. Print
World Ltd).

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F. Y. B. Tech
Academic Year – 2024-2025 Semester –I/II
[HS1206]: Indian Constitution

Teaching Scheme:	Non-credit course	Examination Scheme: Non credit course

Course Objectives:
1. To provide students with a comprehensive understanding of the meaning, importance, and making of the Indian Constitution.
2. To educate students on the Fundamental Rights, Fundamental Duties, and Directive Principles of State Policy.
3. To provide insights into the powers and functions of the Indian Parliament, the Rajya Sabha, the Lok Sabha, the Prime Minister, and the President, as well as the independence of the Supreme Court in the Indian judicial system.

Course Outcome:
After successful completion of the course, students will able to:
CO1: Recall the structure and principles of the Indian Constitution and Indian Parliament.
CO2: Explain fundamental rights and directive principles of the Indian Constitution and Indian Parliament
CO3: Practice Fundamental Rights, Fundamental Duties, Directive Principles of State Policy.

Course Contents		
UNIT-I	**Constitution – Structure and Principles**	**2 Hours**
Meaning and importance of constitution, making of Indian Constitution – Sources, Salient features of Indian Constitution.		
UNIT-II	**Fundamental Rights and Directive Principles**	**2 Hours**
Fundamental Rights, Fundamental Duties and its legal status, Directive principles of state policy,		
UNIT-III	**Union Government**	**2 Hours**
Powers of Indian Parliament, Function of Rajya sabha and Lok sabha, Powers and functions of prime minister and president, Judiciary – The Independence of the Supreme Court. in the Indian judicial system.		

Text Books:
T1. Durga Das Basu, Introduction to the Constitution of India, Gurgaon; LexisNexis, 2018
T2. . M. V. Pylee, India's Constitution, New Delhi; S. Chand Pub., 2017
T3. Constitution of India (Full Text), India. Gov. in., National Portal of India,
https://www.india.gov.in/sites/upload_files/npi/files/coi_part_full.pdf
T4. G. Austin Working of a Democratic Constitution of India, New Delhi: Oxford University Press. 2004

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