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

Department of Engineering Sciences

Structure &Syllabi

F.Y. B. Tech (2019 Pattern)

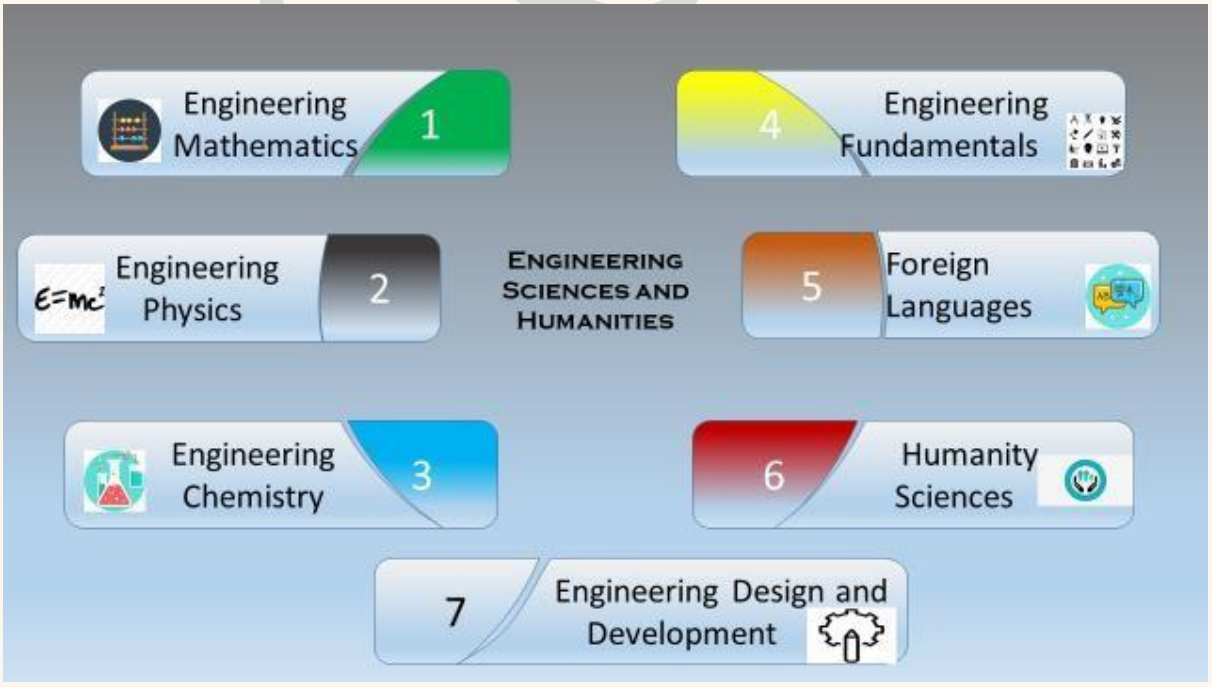
DEPARTMENT OF F.Y.B. TECH ENGINEERING

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
H.O.D, Engg. Science

Dr. S V Kedar
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 insocietal 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 principle sand 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.

Dr. S M Yadav H.O.D, Engg. Science	Dr. S V Kedar Dean Academics		Dr. R. K. Jain Director RSCOE, Pune

DEPARTMENT OF F.Y.B.TECH

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

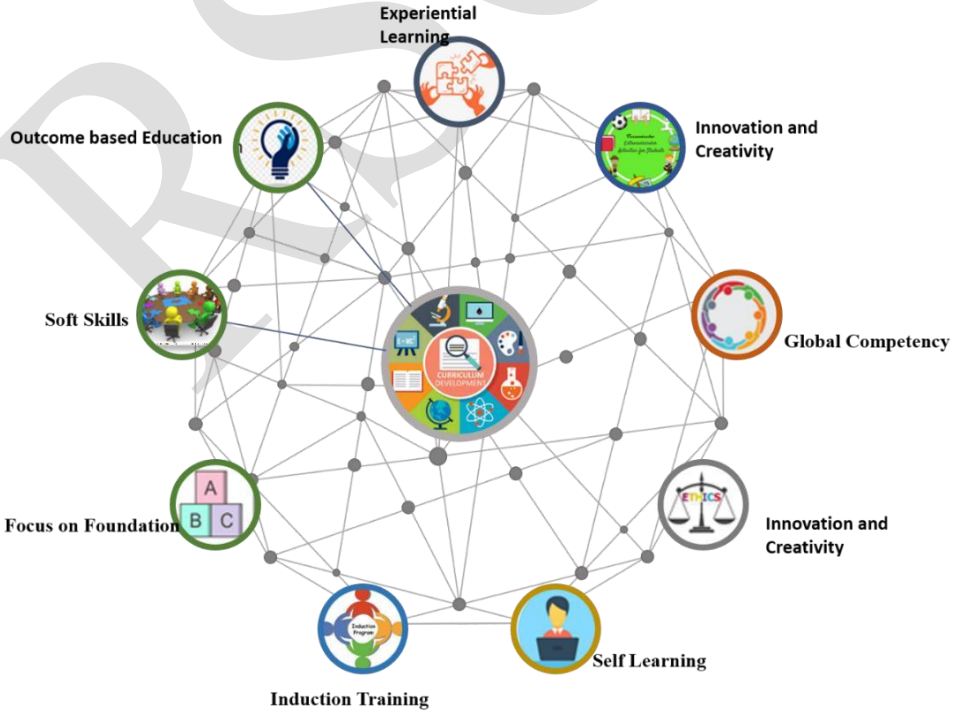
The curriculum of the F.Y.B. Tech comprises of three groups and designed in association with the Tata Consultancy Services, Pune, IIT Ropar, KPIT (Automotive Electronics), Bentley System and Persistent Systems Pvt. Ltd. Pune.

Group 1: Civil Engineering, Mechanical Engineering, Electronics and Telecommunication Engineering and Electrical Engineering.

Group 2: Computer Engineering

Group 3: Information and Technology Engineering

.



Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain Director
RSCOE, Pune

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 ofrecent**Education4.0** 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 every day 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, which exploit the advantages of modern techniques to solve real-world problems using **Problem Based Learning pedagogy(PBL).**

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, JapaneseandFrenchenablestogaininsightintotheproblemsandsolutions 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.

Dr. S M Yadav H.O.D, Engg. Science	Dr. S V Kedar Dean Academics	Dr. R. K. Jain Director RSCOE, Pune

Structure for Group-1(Mechanical, Civil, E&TC &Electrical)

F. Y. B. Tech

Academic Year -2020-2021 Semester -I

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks					Total	Credits
					Theory			Practical			
		TH	Tut	Lab	ISE (15)	MSE (25)	ESE (60)	TW	Lab		Total
ES1101	Engineering Mathematics I	3	1	-	15	25	60	25	-	125	**4**
ES1102 / ES1103	Engineering Physics / Engineering Chemistry	3	-	2	15	25	60	-	25	125	**4**
CE1101 / CE1102	Basic Civil and Environmental Engineering / Engineering Mechanics	3	-	2	15	25	60	-	25	125	**4**
ME1101 / ME1102	Engineering Drawing and Computer Aided Graphics / Basic Mechanical and Robotics Engineering	3	-	2	15	25	60	-	25	125	**4**
EE1101 / EC1101	Basic Electrical Engineering / Basic Electronics and Bio Medical Engineering	3	-	2	15	25	60	-	25	125	**4**
CS1101	Introduction to Computer Programming	-	1	2	-	-	-	25	25	50	**2**
ES 1104	Engineering Design and Development#	-	-	2	-	-	-	-	25	25	**1**
	OR										
HS1101 / HS1102/ HS1103 / HS1104	Language Proficiency-I English/ German/ Japanese/ French										
HS1108	Induction Training$	Non Credit									
Total		**15**	**2**	**12**	**75**	**125**	**300**	**50**	**150**	**700**	**23**

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

Structure for Group-1(Mechanical, Civil, E&TC &Electrical)

F. Y. B. Tech.

Academic Year – 2020-2021 Semester –II

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks					Total	Credits
					Theory			Practical			Total
		TH	Tut	Lab	ISE (15)	MSE (25)	ESE (60)	TW	Lab		
ES1105	Engineering Mathematics- II	3	1	-	15	25	60	25	-	125	**4**
ES1103 / ES1102	Engineering Chemistry / Engineering Physics	3	-	2	15	25	60		25	125	**4**
CE1102 / CE1101	Engineering Mechanics/ Basic Civil and Environmental Engineering	3	-	-	15	25	60		25	125	**4**
ME1102/ ME1101	Basic Mechanical and Robotics Engineering / Engineering Drawing and Computer Aided Graphics	3	-	2	15	25	60		25	125	**4**
EC1101 / EE1101	Basic Electronics and Bio Medical Engineering / Basic Electrical Engineering	3	-	2	15	25	60		25	125	**4**
CS1102	Introduction to Python Programming	-	1	2	-	-	-	25	25	50	**2**
ES 1104	Engineering Design and Development#	-	-	2	-	-	-	-	25	25	**1**
	OR										
HS1101 / HS1102 / HS1103 / HS1104	Language Proficiency-I English/ German/ Japanese / French										
Total		**15**	**2**	**12**	**75**	**125**	**300**	**50**	**150**	**700**	**23**

Dr. SMYadav
H.O.D,Engg.Science

Dr. S VKedar
DeanAcademics

Dr. R. K. Jain
Director RSCOE,Pune

Instructions:

1. Every student should appear for Engineering Physics, Engineering Chemistry, Basic Electronics Engineering, Basic Electrical Engineering, Basic Mechanical and Robotics Engineering, Engineering Drawing and Computer aided Graphics, Basic Civil and Environmental Engineering and Engineering Mechanics during the year.
2. # Every student should appear for language Proficiency-I and Engineering Design Development (EDD) during the year.
3. **$** For Induction training, the branch wise allocation in a group of 20-22 students is to be formed with one faculty as mentor for each group.
4. ISE, MSE and ESE indicates Internal Semester Evaluation, Mid Semester Evaluation and End Semester Evaluation respectively.

Dr. S M Yadav H.O.D, Engg. Science	Dr. S V Kedar Dean Academics	Dr. R. K. Jain Director RSCOE, Pune

Structure for Group 2 (Computer)

F. Y. B. Tech.

Academic Year – 2020-2021 Semester -I

Course Code	Course	Teaching Scheme			Examination Schemes						Credits
					Theory			Practical		Total	Total
		TH	Tut	Lab	ISE (15)	MSE (25)	ESE (60)	TW	Lab		
ES1106	Introduction to Probability, Statistics and Calculus	3	1	-	15	25	60	25	-	125	**4**
ES1107	Fundamentals of Physics	3	-	2	15	25	60	-	25	125	**4**
ES1108	Discrete Mathematics	3	1	-	15	25	60	25	-	125	**4**
EE 1102	Principles of Electrical Engineering	3	-	2	15	25	60	-	25	125	**4**
CS1103	Fundamentals of Computer Programming	3	-	4	15	25	60	-	50	150	**5**
HS1105	Business Communication and Value Science-I	-	-	2	-	-	-	-	25	25	**1**
ES1104 **HS1101/ HS1102 HS1103/ HS1104**	Engineering Design and Development **OR** Language Proficiency-I: # English / German / Japanese / French	-	-	2	-	-	-	-	25	25	**1**
HS1108	Induction Training$	Non Credit									
Total		**15**	**2**	**12**	**75**	**125**	**300**	**50**	**150**	**700**	**23**

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

Structure for Group 2(Computer)

F. Y. B. Tech.

Academic Year – 2021-2022 Semester -II

Course Code	Course	Teaching Scheme			Examination Schemes						Credits
		TH	Tut	Lab	Theory			Practical		Total	Total
					ISE (15)	MSE (25)	ESE (60)	TW	Lab		
ES1109	Linear Algebra	3	1	-	15	25	60	25	-	125	**4**
ES1110	Statistical Methods	3	1	-	15	25	60	25	-	125	**4**
CS1104	Data Structure and Algorithms	3	-	4	15	25	60	-	50	150	**5**
EC1102	Principles of Electronics Engineering	3	-	2	15	25	60	-	25	125	**4**
HS1107	Principles of Economics	3	-	-	15	25	60	-	-	100	**3**
HS1106	Business Communication and Value Science -II	-	-	2	-	-	-		25	25	**1**
CE1103	Environmental Studies	-	-	2	-	-	-	-	25	25	**1**
ES1104 **HS1101/ HS1102/ HS1103/ HS1104**	Engineering Design and Development **OR** Language Proficiency-I: # English / German / Japanese / French	-	-	2	-	-	-	-	25	25	**1**
	Total	**15**	**2**	**12**	**75**	**125**	**300**	**50**	**150**	**700**	**23**

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

Instructions:

1. # Every student should appear for language Proficiency-I and Engineering Design Development (EDD) during the year.
2. $For the Induction Training, the branch wise allocation in a group of 20-22 students is to be formed with one faculty as mentor for each group.
3. ISE, MSE and ESE indicates Internal Semester Evaluation, Mid Semester Evaluation and End Semester Evaluation respectively.

Dr. S M Yadav H.O.D, Engg. Science	Dr. S V Kedar Dean Academics	Dr. R. K. Jain Director RSCOE, Pune

Structure for Group 3 (Information Technology)
F. Y. B. Tech.
Academic Year – 2020-2021 Semester -I

Course Code	Course	Teaching Scheme			Examination Schemes						Credits
					Theory			Practical		Total	Total
		TH	Tut	Lab	ISE (15)	MSE (25)	ESE (60)	TW	Lab		
ES1106	Introduction to Probability, Statistics and Calculus	3	1	-	15	25	60	25	-	125	**4**
HS1107	Principles of Economics	3	-	-	15	25	60	-	-	100	**3**
ES1108	Discrete Mathematics	3	1	-	15	25	60	25	-	125	**4**
EE 1102	Principles of Electronics Engineering	3	-	2	15	25	60	-	25	125	**4**
CS1103	Fundamentals of Computer Programming	3	-	4	15	25	60	-	50	150	**5**
HS1105	Business Communication and Value Science -I	-	-	2	-	-	-	-	25	25	**1**
CE1103	Environmental Studies	-	-	2	-	-	-	-	25	25	**1**
ES 1104 **HS1101/ HS1102/ HS1103/ HS1104**	Engineering Design and Development **OR** Language Proficiency-I: # English / German / Japanese / French	-	-	2	-	-	-	-	25	25	**1**
HS1108	Induction Training$	Non Credit									
Total		**15**	**2**	**12**	**75**	**125**	**300**	**50**	**150**	**700**	**23**

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

Structure for Group 3 (Information Technology)
F. Y. B. Tech.
Academic Year – 2020-2021 Semester –II

Course Code	Course	Teaching Scheme			Examination Schemes						Credits
		TH	Tut	Lab	Theory			Practical		Total	Total
					ISE (15)	MSE (25)	ESE (60)	TW	Lab		
ES1109	Linear Algebra	3	1	-	15	25	60	25	-	125	**4**
ES1110	Statistical Methods	3	1	-	15	25	60	25	-	125	**4**
CS1104	Data Structure and Algorithms	3	-	4	15	25	60	-	50	150	**5**
EC1102	Principles of Electrical Engineering	3	-	2	15	25	60	-	25	125	**4**
ES1107	Fundamentals of Physics	3	-	2	15	25	60	-	25	125	**4**
HS1106	Business Communication and Value Science -II	-	-	2	-	-	-		25	25	**1**
ES 1104	Engineering Design and Development **OR**	-	-	2	-	-	-	-	25	25	**1**
HS1101/ HS1102/ HS1103/ HS1104	Language Proficiency-I: # English / German / Japanese / French										
Total		**15**	**2**	**12**	**75**	**125**	**300**	**50**	**150**	**700**	**23**

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

Instructions:

1.# Every student should appear for language Proficiency-I and Engineering Design Development (EDD) during the year.

2.$For the Induction Training, the branch wise allocation in a group of 20-22 students is to be formed with one faculty as mentor for each group.

3. ISE, MSE and ESE indicates Internal Semester Evaluation, Mid Semester Evaluation and End Semester Evaluation respectively.

4. All courses are same for both the Groups 2&3

5. In the Semester-I, Group 2 has Fundamentals of Physics[ES1107] of credit 04 and In Semester-II, Principle of Economics [HS1107] of credit 03 and Environmental studies [CS1103] of credit 01

6. In the Semester-I, Group 3 has Principle of Economics [HS1107] of credit 03 and Environmental studies [ES1103] of credit 01and in Semester-II Fundamentals of Physics[ES1107] of credit 04

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech
Academic Year – 2021-2022

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

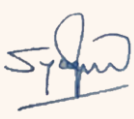
Syllabus for

Group1

Semester I

Civil Engineering, Mechanical Engineering,

Electronics and Telecommunication Engineering and Electrical Engineering.



Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester -I

[ES1101]: Engineering Mathematics-I

Teaching Scheme:	Credit	Examination Scheme:
TH: - 3 Hours/Week	TH:3	In Sem. Evaluation : 15 Marks
TU:- 1 Hour/Week	Tut:1	Mid Sem. Exam : 25 Marks
		End Sem. Exam : 60Marks
		Tutorial : 25Marks

Course Prerequisites : Determinants and Matrices, Differentiation, Integration, Maxima and 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 learn

CO1: 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 engineering.

CO2: Mean value theorems and its generalization leading to Taylor's and Maclaurin's series useful in the analysis of engineering problems.

CO3: The technique of Fourier series representation and harmonic analysis for design and analysis of continuous and discrete periodic system.

CO4: To deal with partial derivative of functions of several variables that are essential in various branches of engineering.

CO5: To 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	8 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, Diagonalization	7 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.

UNIT-III	Differential Calculus	8 Hours

Rolle's Theorem, Mean Value Theorems, Taylor's Series and Maclaurin's Series, Expansion of functions using standard expansions, Indeterminate Forms, L' Hospital's Rule, Evaluation of Limits and Applications.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

UNIT-IV	Fourier Series	7 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**	**8 Hours**
Introduction to functions of several variables, 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**	**8 Hours**
Jacobian and its applications, Errors and Approximations, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers**.**		

Guidelines for Tutorial and Term Work

1) Tutorial for the subject shall be engaged in minimum three batches (batch size of 22students maximum) per division.
2) Term work shall consist of six assignments on each unit-I to unit-VI and is based on performance and continuous internal assessment.

Text Books:

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

T2. Higher Engineering Mathematics by B.S. Grewal (Henna Publication, Delhi)

Reference Books:

R1. Advanced Engineering Mathematics, by Erwin Kreyszig (Wiley Eastern Ltd.)

R2. Advanced Engineering mathematics by M.D. Greenberg (Pearson Education)

R3. Advanced Engineering Mathematics,7e, by Peter V. O'Neil (Thomson Learning)

R4. Thomas's Calculus-Early Transcendental (Addison- Wesley, Pearson)

R5. Applied Mathematics (Volume I and II) by P.N. Wartikar and J.N. Wartikar Vidyarthi Griha Prakashan, Pune.

R6. Linear Algebra –An Introduction, Ron Larson, David C. Falvo.(Ceanage Learning, Indian Edition)

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester –I/II

[ES1102]: Engineering Physics

Teaching Scheme:	Credit	Examination Scheme:
TH: - 3 Hours/Week PR:- 2 Hours/Week	TH: 3 PR:1	In Sem. Evaluation: 15 Marks Mid Sem. Exam: 25 Marks End Sem. Exam : 60 Marks Lab Evaluation : 25 Marks

Course Prerequisites: Physical and Fundamental quantity and its units, Basics of sound, Types of light, State of materials, Semiconductor materials, Magnetism and magnetic moment, Simpleharmonic motion, Difference in quantum and classical mechanics and application of Nanotechnology.

Course Objective: The Objective of this course is to make students learn and understand basic concepts and principles of physics to analyze practical engineering problems and apply its solutions effectively and meaningfully. To understand building up of models, design issues, practical oriented skills and problem solving challenges are the great task of the course.

Course Outcome:

After successful completion of the course, students will able to

CO1: Apply the knowledge of physics to resolve problems in sound engineering.

CO2: Explain the laser operation and interaction of laser with matter and its use in low and high energy application

CO3: Explain the classification of materials, band structures, and calculation of carrier density and electrical conductivity

CO4: Explain classification of solids on the basis of magnetic properties. Discuss the superconducting phenomenon, their properties and concepts for various application

CO5: Apply the knowledge of quantum mechanics to study the motion and energy of Particle

CO6: Explain difference in between nanoscience and nanotechnology and to understand applications of nano technology.

Course Contents

UNIT-I	Acoustics and ultrasonic's	7 Hours

Introduction,echo,reverberation,reverberationtime,Sabine'sformula,remedies over reverberation, absorption of sound , sound absorbent materials, condition for good acoustics of building, noise, Types of noise remedies over noise .Ultrasonic waves, Production of ultrasonic waves by Piezoelectric oscillator, magnetostriction oscillator, properties of ultrasonic waves, Applications of ultrasonic waves Scientific, Engineering, Nondestructive testing, Medical applications.

UNIT-II	Laser, fiber optics and optoelectronic devices	7 Hours

MechanismofLaser,LaserProperties,Typesoflasers,Applications:Industry,MedicalandMilitary
Optical Fiber, Total Internal Reflection, Acceptance Angle and Cone, Fractional Refractive Index Change, Numerical Aperture, Modes of Propagation, Types of Optical Fibers, Losses in Optical Fiber, Applications: Fiber Optics Communication System.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-III	Solid State Physics	7 Hours
Band Theory of Solids, Classification of Solids, Conductivity of semi-Conductor and Hall Effect, Fermi Level, Fermi Dirac distribution Function, Fermi level in Photo-voltaic Effect, Construction working and I-V characteristics of Solar-cell		
UNIT-IV	**Magnetism and Superconductivity**	**7 Hours**
Origin of magnetic moments, magnetization, langevin's theory of dia and para Magnetism, curie-weiss law hysteresis, Introduction to superconductors, Properties superconductors, BCS theory, Types of superconductor, Josephson Effect, Applications of Superconductor.		
UNIT-V	**Quantum physics**	**7 Hours**
Wave Particle duality, De-Broglie hypothesis, Heisenberg's uncertainty principle with illustration, applications (non-existence of electron inside the nucleus), Wave function and its physical significance. Schrodinger wave equations, Application of Schrodinger time independent wave equation (particle in a rigid box).		
UNIT-VI	**Nanoscience and Nanotechnology**	**7 Hours**
Introduction, Difference between nanoscience and nano technology , Quantum Confinement ,Classification of nano structures, Nano scale in, 1D,2D,3D, Properties of nanoparticles applications of nanotechnology, and Limitations of nanotechnology.		

Lab Content

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	Determination of absorption coefficient of sound of given material.
2	Measurement of sound pressure level
3	To find a fault / crack n a solid using Echo-Sounding technique
4	Hall effect experiment
5	To plot I-V characteristics of solar cell and its fill factor
6	Determination of Band gap using four-Probe Method
7	Magnetic susceptibility using Quinines method.
8	Experiment based on laser
9	Counting the number of lines in a diffraction grating using laser
10	Synthesis of gold nanoparticle by colloidal route method.

Text Books:

T1. Basic Engineering physics by M. N. Avadhanlu, S CHAND PUBLICATION

T2. A text of optics by Brij Lal S CHAND PUBLICATION

T3. Engineering physics: D.K.Bhattacharya and Poonam Tandon**.**

T4. An introduction to Laser theory and applications: M N Avadhanhlu.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

Reference Books:

R1. Principles of Physics, J. Walker, D. Halliday, R. Resnick, *Wiley Student Edition* (10th Edition)
R2. Fundamentals of Physics, Resnick and Halliday (John Wiley and Sons)
R3. Introduction to Solid State Physics, Kittel C(Wiley and Sons)
R4. Laser and Non-Linear Optics, B.B. Loud (Oscar publication)
R5. Engineering Physics by GaurGupta
R6. Introduction to Nanotechnology, Sulabha Kulkarni.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester -I

[CE1101]: Basic Civil and Environmental Engineering

Teaching Scheme:	Credit	Examination Scheme:
TH: - 3 Hours/Week PR:- 2 Hours/Week	TH: 3 PR:1	In Sem. Evaluation: 15 Marks Mid Sem. Exam : 25 Marks End Sem. Exam : 60 Marks Lab Evaluation : 25 Marks

Course Prerequisites: Fundamentals of environmental science, basic knowledge of physical quantities with their units.

Course Objective: The main of the objective of this course is to focus on building components, building planning principles, modern tools for surveying knowledge associated with different are as of civil engineering with interdisciplinary approach. Also to make students aware of natural resources, environment protection and sustainability in construction.

Course Outcome:

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

CO1 : Explain role of civil engineers in different areas of civil engineering with interdisciplinary approach.

CO2 : Identify different construction materials and components of a structure.

CO3 : Make use of modern surveying tools and techniques.

CO4 : Utilize various principles of building planning and concept of green building.

CO5 : Categories types of energy and environmental pollution.

CO6 : Apply concept of environment and the role of civil engineers in sustainable development.

Course Contents

UNIT-I	Introduction to Civil Engineering	7 Hours

Basic Areas in Civil Engineering, Agencies involved in Civil Engineering, Smart city concept. Interdisciplinary approach in Civil Engineering Projects. Data management for infrastructural development like traffic management.

UNIT-II	Materials and Construction	7 Hours

Basic materials for construction. Recycling of materials, Identification of Eco-friendly materials and Smart materials in construction, Substructure and Superstructure, Earthquake concepts and precautions and construction techniques for earthquake resistance.

UNIT-III	Surveying	7 Hours

Principles of survey, types of Benchmarks and levelling, Determination of RLs by HI and Rise & Fal method Contours. Introduction to Modern tools and techniques for Surveying; Digital level, Theodolit EDM, Total station, Digital planimeter. Applications of GPS, GIS and Unmanned Aeria Vehicle(UAV)like Drone. Study of land related documents.

UNIT-IV	Planning for the Built Environment	7 Hours

Principles of planning, concept of Green buildings. Role of by-laws in regulating the environment, Concept of built up area, carpet area, plinth area. Plot area, FSI. Fire safety norms as per NBC.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-V	Energy and Environmental Pollution	7 Hours
Ecosystem, Conventional and non-conventional Energy Sources. Sources, causes, effects and remedial measures of Pollution. Introduction and Disposal methods of Solid waste management and Electronic wastes.		
UNIT-VI	**Sustainable Development for Environment protection**	**7 Hours**
Sustainable development. Urbanization and its effects on environment. Environmental ethics, human rights, value education, public awareness, role of modern technology Environmental Impact Assessment(EIA).Concepts of water conservation techniques and its management.		

Lab Content

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	Measurement of distance by Electronics Distance Measurement Instrument (EDMI).
2	Determination of Area of regular and Irregular plane surface using Digital Planimeter
3	Global Positioning system (GPS)
4	Measurement of Reduced Level (R.L.), Height and Distance in the field using Digital Level.
5	Determination of Reduced Level (R.L.) and Slope analytically between two points on the field using Digital Level.
6	Introduction to Total Station.
7	Demonstration of 3D reality modelling using Context Capture Software.
8	Demonstration of four Civil Engineering software's: Microstation, Open Roads, Water Gems and STAAD Pro
9	Demonstration of Unmanned Aerial Vehicle (UAV) such as Drone for Surveying.
10	To present a seminar in a group of four students related to Energy/Environment.

Text Books:

T1. Basic Civil and Environmental Engineering by C.P Kaushik, S.S. Bahavikatti, Anubha Kaushik.

T2. BasicCivilandEnvironmentalEngineeringbyM.PWagh,P.R.Modale,A.H.Shirke,SharadPagar.

Reference Books:

R1. Basic Civil Engineering by M.S. Palanichamy Tata McGraw Hill publishing Co.Ltd.

R2. Basic Civil Engineering by Shatheesh Gopi – Pearson.

R3. Building Construction by Arora S.P. and Bindra S.P. – Dhanpatrai and Sons, Delhi.

R4. Environmental Studies from Crisis to cure – Oxford Publication, Third edition, 2016.

R5. Environmental Studies by Dr. J.P. Sharma – University Science Press.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester -I

[ME1101]: Engineering Drawing and Computer Aided Graphics

Teaching Scheme:	Credit	Examination Scheme:
TH: - 3 Hours/Week PR:- 2 Hours/Week	TH: 3 PR:1	In Sem. Evaluation: 15 Marks Mid Sem. Exam : 25 Marks End Sem. Exam : 60 Marks Lab Evaluation : 25 Marks

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

Course Objective: This course will help students to develop imagination of physical objects to be represented on paper for engineering communication, manual drawing skills and drawing interpretation skills. Also This course imparts physical realization of the dimensions of the objects and inculcate drawing and design soft tools.

Course Outcome:

After successful completion of the course, students will able to

CO1: Identify reference, principal plane, Auxiliary plane and utilize fundamentals of Engineering Drawing to draw and interpret Projection of Lines and Planes.
CO2: Draw various types of Engineering Curves and identify its applications
CO3: Draw Projection of different types of Solids resting on Horizontal Plane (HP).
CO4: Draw and develop Lateral surfaces of Solids.
CO5: Draw Orthographic views of given pictorial view.
CO6: Draw Isometric views of given pictorial orthographic view.

Course Contents

UNIT-I	Fundamentals of Engineering Drawing:	7 Hours

Introduction to drawing instruments and their uses, dimensioning, Method of Projections **Projection of Point, Lines and Planes:** Theory of projection of Oblique lines (to Locate Only Horizontal traces and Vertical Traces.), Projection of planes in both reference planes.

UNIT-II	Engineering Curves	7 Hours

Conic section: Ellipse, Parabola, Hyperbola, by Focus- Directrix and Rectangle Method. Involute of circle, Cycloid, Archimedean Spiral, construction of Tangent and Normal to curves.

UNIT-III	Projections of Solids	7 Hours

Introduction to solids, types of solids, Projections of solid (Cube, Prisms, Cylinder, Cone, Pyramid only with maximum six sided base) inclined to tne reference plane(Problems on Solids re sting on Horizontal plane only)

UNIT-IV	Development of Lateral Surfaces and Conventions	7 Hours

Development of Cone, Prism and Pyramids, Frustum of Cone and Pyramid, Conventions of Machine Elements and symbols.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-V	Orthographic Projections	7 Hours
Orthographic Projections of given pictorial View, Types of Sections, Full Sectional Orthographic Projections.		
UNIT-VI	**Isometric Views**	**7 Hours**
Introduction to isometric axes, Difference between Isometric views and Projections, Construction of isometric view from given orthographic views.		

Lab Content

Guidelines for Assessment

1) Following listed Engineering Graphics Assignments shall be drawn using Auto CAD software.
2) Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
3)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 Assignments

1	Projections of Lines and Planes. (minimum two problems each)
2	Engineering Curves. (minimum two problems)
3	Projection of Solids. (minimum two problems)
4	Development of Lateral surfaces. (minimum two problems)
5	Orthographic projections. (minimum two problems)
6	Isometric views. (minimum two problems)
7	Mini Project to be done by students with respect to their circuit branches by using software for pertinent discipline.

Text Books:

T1. Textbook of Engineering Drawing by Reddy, K.Venkata , BS Publications

T2. Textbook of Engineering Drawing by Dr. R.K Dhawan, S. Chand Publications

T3. A Textbook of Engineering Drawing [Along with an introduction to AutoCAD 2015] by Rana Ramakant, Lal Roop.

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

Reference Books:

R1. N. D. Bhatt and V. M. Panchal, Engineering Drawing, Plane and Solid Geometry, charotar Publication House.

R2. K. Venugopal, Engineering Drawing and Graphics, New Age Publication.

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

R4. Basudeb Bhattacharya, Machine Drawing Includes Auto Cad Supplements, Oxford University Press, India.

R5. Dhananjay A. Jolhe, Engineering Drawing with an Introduction to Auto CAD, Tata McGraw-Hill \ Publishing Co. Ltd.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester –I/II

[EE1101]: Basic Electrical Engineering

Teaching Scheme:	Credit	Examination Scheme:
TH: - 3 Hours/Week	TH: 3	In Sem. Evaluation: 15 Marks
PR:- 2 Hours/Week	PR:1	Mid Sem. Exam : 25 Marks
		End Sem. Exam : 60 Marks
		TermWork : 25Marks
		Total : 125Marks

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

Course Objective: Impart a basic knowledge of electrical quantities to understand its effect on ever changing technology. Provide solution for the network by applying various laws and theorems. Provide working knowledge for the analysis of basic DC and AC circuits used in electrical devices. Understand fundamentals of single phase and poly-phase AC circuits. Apply the knowledge of magnetic circuits to electrical machines.

Course Outcome:

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

CO1: Recall the elementary concepts of electrical engineering.
CO2: Apply various laws and theorems to complex electricalnetworks
CO3: Demonstrate basics of Electromagnetism and Magnetic Circuits.
CO4: Illustrate different terms applicable to acfundamentals.
CO5: Relate single phase and poly phase ac circuits.
CO6: Explain fundamentals of single phase transformer and electrical drives.

Course Contents

UNIT-I	Introduction to Elementary concepts	7 Hours

Effect of temperature on resistance of conductors, insulators, semiconductors and alloys, Resistance temperature coefficient. Work, Power and energy calculations for thermal, mechanical and electrical systems, Concept of Earthing and safety precautions. Components of LT Switchgear: Fuse, MCB, MCCB and Contactor, Battery management Systems.

UNIT-II	D.C. Circuits	7 Hours

Ohm's law, Resistances in series and parallel, Classification of Electrical Networks & Energy sources, source transformation, Kirchhoff's law, Network Simplifications using star-delta/delta star transformations, Superposition theorem, Thevenin's theorem, Maximum power transfer theorem.

UNIT-III	Electromagnetism and Magnetic Circuits	7 Hours

Magnetomotive force and magnetic field strength, relative and absolute permeability, reluctance, series and parallel magnetic circuits. Electromagnetic induction, induced EMF, self and mutual inductance, coupling coefficient, energy stored in magnetic circuits.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-IV	AC fundamentals	7 Hours
Generation of alternating EMF, waveform terms and definitions, average value and RMS values for sinusoidal currents and voltages, peak factor, form factor, concept of phase and phase difference, phasor representation of an alternating quantity .Study of pure resistive, pure inductive and pure capacitive circuit.		
UNIT-V	**A.C. Circuits**	**7 Hours**
Single Phase A.C. Circuits: Single phase A.C circuit RL,RC,RL C series, and parallel, phasor diagram,Conceptofactive,reactive,apparentpowerandpowerfactor,Conceptofseriesresonanceandresonance frequency. **Three phase circuits:** Three Phase A.C. supply generation, phase sequence, concept of line and phase quantities, relationship between line and phase quantities for three phase Star and delta connected balanced load with phasor diagram. Active, reactive and apparent power.		
UNIT-VI	**Single phase Transformer**	**7 Hours**
Construction and principle of working, EMF equation, Different losses in transformer, Ideal and practical transformer, equivalent circuit, Voltage regulation and efficiency, condition for maximum efficiency. Autotransformer. Introduction to Electrical Drives and Control.		

Lab Content

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	Study of wiring components.
2	Effect of temperature on resistance of a conducting material.
3	Measurement of earth resistance
4	Verification of Kirchhoff's voltage & current laws
	Verification of Superposition Theorem.
6	Verification of Thevenin's Theorem.
7	Verification of maximum power transfer theorem.
8	Determination of efficiency & regulation for single phase transformer by direct loading method.
9	Lab Assignment: Calculation of Electricity bill considering domestic usage.
10	Verification of voltage and current relations in three phase balanced star/delta connected load
11	Study of RLC series circuit.

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 Technology: B. L. Thereja, S. Chand and Company Ltd, New Delhi.

R3. Electrical Technology: Edward Hughes, Pearson.

R4. Electrical power: S.L. Uppal.

R5. Solar Energy: Principles of Thermal Collection and Storage, 3e By S. P. Sukhatme.

Dr. S M Yadav H.O.D, Engg. Science	Dr. S V Kedar Dean Academics	Dr. R. K. Jain Director RSCOE, Pune

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

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester -I

[CS1101]: Introduction to Computer Programming

Teaching Scheme:	Credit	Examination Scheme:
TU:-1 Hour/Week	TU:1	TermWork : 25Marks
PR:-2 Hours/Week	PR:1	Practical : 25Marks
		Total : 50Marks

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

Course Objective: To get familiar with the fundamentals of computer system and concept of problem solving. To build the programming skills using 'C' to solve real world problems. To understand concept of control structures, array, structure and function.

Course Outcome:
After successful completion of the course, students will able to:
CO1: Use the knowledge of computer system.
CO2: Apply problem solving concepts.
CO3: Demonstrate logic development using C programming.
CO4: Implement the programs using control structures.
CO5: Use the concept of array and structure to solve real time problems.
CO6: Apply the real world problems using concept of functions and string.

Course Contents

UNIT-I	Introduction to Computer Architecture	3 Hours

Introduction to computer system: characteristics, generations, components of computer, memory and its types, types of software-system, application software), types of system software-operating system, editor, compiler, assembler, linker, loader.

UNIT-II	Introduction to Problem solving concepts	3 Hours

General Problem Solving Concepts-Types of problems, problems solving with computers, problem solving aspects, problem solving strategies, Introduction to program planning tools-algorithm, flow charts, pseudo-codes testing the solution, code the program, top down design.

UNIT-III	Introduction to C programming	3 Hours

Variables, Operators, control structures in 'C': if, if-else, nested if-else, cascaded if-else and switch statement, loop control structures: for, while, do-while loops, break and continue statement.

UNIT-IV	Array and Structure in C	3 Hours

Introduction to one-dimensional arrays, declaration, initialization and accessing array elements, two dimensional arrays. Introduction to structure, declaration of structure, initialization, declaration of structure variables and accessing members, array of structure.

UNIT-V	Functions in C	3 Hours

Introduction to Function, Standard library functions and user defined functions, function declaration, function definition and function call - call by value and call by reference.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-VI	Strings and File handling in C	3-- Hours
String handling operations using library functions and user defined functions, File structure and basic operations on file, functions used for text and binary file handling in C.		

Lab Content

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batchsizeof22students 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	Implementation in C for using operators.
2	Implementation in C for control statements.
3	Implementation in C for Arrays and Functions.
4	Implementation in C for Structures.
5	Implementation in C for handling Strings.
6	Implementation in C for File handling operations

Text Books:

T1. R. Gilberg,B.Forouzan,"DataStructures:ApseudocodeapproachwithC",CenageLearning,SBN 9788131503140.

T2. G. A.V, PAI , "Data structures and Algorithms ", Mc Graw Hill, ISBN -13: 978-0-07-066726-6

T3. Yashwant Kanetkar, "Let us C" and "Pointers in C" , BPB Publication

T4. "How to Solve it by Computer", R G Dromey ISBN 978-81-317-0562-9

T5. "Problem Solving and Programming Concepts", Maureen Spankle, ISBN81-317-0711-3

Reference Books:

R1. E. Balguruswamy, Tata McGraw-Hill Education, 2008 - C (Computer program language) Donald E. Knuth, "The Art of Computer Programming", Vols. 1, Addison-Wesley, ISBN-13: 978-0201485417,ISBN-10: 0201485419.

R2. T. E. Bailey, "Program design with pseudo code", Brooks/Cole Publisher, ISBN-10: 0534055745, ISBN-13: 978-0534055745.

R3. Brian W. Kernighan, Dennis M. Ritchie, "The C Programming Language", Prentice Hall, ISBN 0131103628, Second Edition.

R4. Yashavant Kanetkar" Let us c" BPB Publications, 01-Nov-2004 -C (Computer program language).

R5. Lamey Robert, "Logical problem solving", Prentice Hall, ISBN: 9780130618825.

R6. Henry Mullish, Herbert L. Cooper, "The Spirit of C", Thomson Learning, ISBN 0314285008.

R7. Carlo Ghezi, Mehdi Jazayeri, "Programming Language Concepts", John Wiley and Sons,ISBN-0471104264, Third Edition.

R8. IntroductiontoComputingSystems:FromBits&GatestoC&Beyond(ComputerEngineering)by Yale Patt (Author), Sanjay Patel(Author)

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

Syllabus for

Group1

Semester II

Civil Engineering, Mechanical Engineering,
Electronics and Telecommunication Engineering and Electrical Engineering.

Dr. S M Yadav H.O.D, Engg. Science	Dr. S V Kedar Dean Academics	Dr. R. K. Jain Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester -II

[ES1101]: Engineering Mathematics-II

Teaching Scheme:	Credit	Examination Scheme:
TH: - 3 Hours/Week TU:- 1 Hour/Week	TH:3 TUT:1	In Sem. Evaluation: 15 Marks Mid Sem. Exam : 25 Marks End Sem. Exam : 60Marks TermWork : 25Marks

Course Prerequisites : Integration, Differential Equation, Three-dimensional coordinate systems.

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 theirdisciplines.

Course Outcome:

After successful completion of the course, students will able to learn

CO1: 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: Advanced integration techniques such as reduction formulae, Beta function, Gamma function, Differentiation Under Integral Sign (DUIS) and Error function, needed in evaluation of multiple integrals and their applications.

CO3: To trace the approximate shape of curve for given equation and measure arc length of various curves.

CO4: The concept of solid geometry using equation of sphere, cone and cylinder in comprehensive manner.

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

Course Contents

UNIT-I	First Order Ordinary differential Equations	8 Hours
Exact differential equations, Equations reducible to exact form. Linear differential equations, Equations reducible to linear form, Bernoulli's equation.		
UNIT-II	**Applications of Differential Equations**	**8 Hours**
Applications of Differential Equations to Orthogonal Trajectories, Newton's Law of Cooling, Kirchhoff's Law of Electrical Circuits, Rectilinear Motion, Simple Harmonic Motion, One dimensional Conduction of Heat..		
UNIT-III	**Integral Calculus**	**8 Hours**
Reduction Formulae, Beta and Gamma functions, Differentiation Under Integral Sign and Error functions.		

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

UNIT-IV	Curve Tracing	7 Hours
Tracing of Curves – Cartesian, Polar and Parametric curves, Rectification of curves.		
UNIT-V	**Solid Geometry**	**8 Hours**
Cartesian, Spherical polar and cylindrical coordinate systems, Sphere, Cone and Cylinder.		
UNIT-VI	**Multiple Integrals and their Applications**	**8 Hours**
Double and Triple integrations, Change of order of integration, Applications to find Area, Volume, Mass, Centre of Gravity and Moment of Inertia.		

Guidelines for Tutorial and Term Work

1) Tutorial for the subject shall be engaged in minimum three batches (batch size of 22students maximum) per division.
2) Term work shall consist of six assignments on each unit-I to unit-VI and is based on performance and continuous internal assessment.

Text Books:

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

T2. Higher Engineering Mathematics by B.S. Grewal (Henna Publication, Delhi)

Reference Books:

R1. Advanced Engineering Mathematics, by Erwin Kreyszig (Wiley Eastern Ltd.)

R2. Advanced Engineering mathematics by M.D. Greenberg (Pearson Education)

R3. Advanced Engineering Mathematics,7e, by Peter V. O'Neil (Thomson Learning)

R4. Thomas's Calculus-Early Transcendentals (Addison- Wesley, Pearson)

R5. Applied Mathematics (Volume I and II) by P.N. Wartikar and J.N. Wartikar Vidyarthi Griha Prakashan, Pune.

R6. Differential Equations by S.L. Ross (3rd Ed Wiley, India 1984)

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester –I/II

[ES1103]: Engineering Chemistry

Teaching Scheme:	Credit	Examination Scheme:
TH: - 3 Hours/Week PR:- 2 Hours/Week	TH: 3 PR:1	In Sem. Evaluation: 15 Marks Mid Sem. Exam : 25 Marks End Sem. Exam : 60Marks Lab Evaluation : 25Marks

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

Course Objective: To acquire knowledge of chemical analysis and techniques for testing quality of water for its domestic and Industrial use. To understand electro analytical techniques for chemical analysis with reliability and reproducibility in measurements. To gain knowledge of structure, properties and applications of specialty polymers and nano materials. To study Fossil Fuels and alternative fuels with their properties and applications. To understand spectroscopic techniques like UV-Visible and IR for analysis of chemical compounds. To learn significance science of corrosion and preventive methods used for minimizing corrosion.

Course Outcome:

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

CO1: Utilize different methodologies for analysis of water, technique for softening water.
CO2: Utilize different analytical methods for analysis of various chemical compounds.
CO3: Demonstrate the knowledge of advanced engineering materials for various engineering applications.
CO4: Analyze fuel and suggest alternative fuel on the basis of their properties andapplications.
CO5: Identify nature of conjugation and functional group of chemical compounds using UV-Visible and IR techniques respectively.
CO6: Explain different causes for corrosion and suggest preventive methods.

Course Contents

UNIT-I	Water Technology	7 Hours

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 Electro dialysis.

UNIT-II	Electroanalytical Techniques	7 Hours

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 p^H meter, p^H metric titration of strong acid Vs strong base with titration curve and calculations.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

B] Conductometry–, Introduction, Conductivity Cell, Conductometric titrations of acid versus base with titration curve.

UNIT-III	Engineering Materials	7 Hours

A]Specialty Polymers:Introduction,Preparation,Propertiesandapplicationsofthefollowingpolymers: Engineering Thermoplastic: Polycarbonate, Conducting polymers -Polyacetylene, Biodegradable polymer – Polyhydroxybutyrate – hydroxyvalerate, Electroluminiscent Polymers - Polyphenevinylene, 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 grapheme and carbon nanotubes.

UNIT-IV	Fuels	7 Hours

Introduction: Definition of fuel, Classification of fuel based on chemical reactions and Characteristics of ideal fuels, Calorific Value (CV): Higher Calorific Value (HCV) and Lower Calorific Value (LCV) and its units, Determination of calorific value–Principle, construction and working of Bomb calorimeter and Boy's gas calorimeter and numerical. Solid fuel – Coal - proximate and ultimate analysis of coal and numerical, Liquid fuel–Petroleum, refining of petroleum/crude oil, composition, boiling point range and uses of various fractions. Gaseous fuel: Composition, properties and applications of CNG, Hydrogen gas as a future fuel. Alternative fuels: Power alcohol and Biodiesel.

UNIT-V	Spectroscopic Techniques	7 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.
B] **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	7 Hours

Introduction – Types of corrosion, Dry corrosion - mechanism – Pilling-Bedworth rule (PBR), Wet corrosion-mechanism–H_2 evolution and O_2absorption, 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).

Lab Contents

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batchsizeof22students 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 Experiment

1	Estimation of alkalinity of given water sample.
2	Determination of total hardness of water using EDTA method.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

3	Determination of normality of acid in a titration of strong acid and strong base using ^{PH} meter.
4	Conductometric titration of strong acid with strong base.
5	Preparation of Phenol formaldehyde or Urea formaldehyde resin.
6	Determination of moisture, volatile matter 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 in their solutions of unknown concentration.
8	Study of electroplating of copper on iron/stainless steel surface for corrosion protection.
9	Determination of molecular weight of Polyvinyl Alcohol (PVA) by using Ostwald's Viscometer.
10	Preparation of biodiesel from oil.
11	Analysis of IR Spectrum of chemical compounds.

Text Books:

T1. Engineering Chemistry by O. G. Palanna, Tata Mcgraw Hill Education Pvt. Ltd.
T2. Textbook of Engineering Chemistry by Dr. S. S. Dara, Dr. S. S. Umare, S. Chand & Company Ltd.
T3. 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, Jayadev Sreedhar, New Age International Publishers.
R7. Spectroscopy of Organic Compounds, 2 ed P. S. Kalsi, New Age-International Ltd., Publisher.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester –II

[CE1102]: Engineering Mechanics

Teaching Scheme:	Credit	Examination Scheme:
TH: - 3 Hours/Week PR:- 2 Hours/Week	TH: 3 PR:1	In Sem. Evaluation: 15 Marks Mid Sem. Exam : 25 Marks End Sem. Exam : 60Marks Lab Evaluation : 25Marks

Course Prerequisites: Elementary applied calculus- topics include graphs, derivatives and integral of 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. UseoflawofUniversalgravitationtoanalyzethebehavioroffallingobjectsandobjects in orbital motion.

Course Objective: The objectives 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 able to:

CO1: Understand basic concept of forces, moments and couples in two dimensions.
CO2: To apply concepts of centroid and to understand the concept of space force system.
CO3: To analyze rectilinear and curvilinear motion under action of constant and variable forces.
CO4: Apply concept of Free Body Diagram for static equilibrium in 2D force system.
CO5: Apply energy and momentum principles for various problems.
CO6: Analyze trusses, cables and to apply concept of friction.

Course Contents

UNIT-I	Fundamentals of Mechanics and Force systems	7 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 and centroid	7 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.

UNIT-III	Motion of Particles	7 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	7 Hours

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

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-V	Energy and Momentum	7 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	**Friction, Analysis of Trusses and Cables**	**7 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.		

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 location of Centroid of plane laminas
2	To locate the centroid for wire bend.
3	To determine Coefficient of restitution.
4	Verification of Lami's theorem.
5	To determine force in space frame system.
6	To determine mass moment of inertia of Circular Bodies.
7	To study Projectile Motion.
8	To determine coefficient of friction for various pairs of surfaces in contact.

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**.**

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

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester –I/II

[ME1102]: Basic Mechanical and Robotics Engineering

Teaching Scheme:	Credit	Examination Scheme:
TH: - 3 Hours/Week PR:- 2 Hours/Week	TH: 3 PR:1	In Sem. Evaluation: 15 Marks Mid Sem. Exam : 25 Marks End Sem. Exam : 60Marks Lab Evaluation : 25Marks

Course Prerequisites: Physical properties- Force, pressure, volume, stress, strain etc., Types of thermodynamics systems- open and closed system.

Course Objective: This course will help students to acquire knowledge of mechanical engineering and describe the scope of mechanical engineering with multidisciplinary industries. It gives information about basic domains and workflow in Mechanical Industry. Also it will help learner, to identify various Machine elements and power transmission devices with their functions. Students will come to knowthe concept of design, mechanisms and fundamentals of material science. Various manufacturingprocesses and machine tools are also discussed. This course also focuses on thermodynamics applied to industrial applications & basics of Robotics Engineering with its applications in Automation.

Course Outcome:

After successful completion of the course, students will ableto:

CO1: Compare different mechanical elements with itsapplication.
CO2: Explain different mechanisms and design process.
CO3: Determine material densities and atomic packing factors of different structures of materials.
CO4: Describe various manufacturing processes and machine tools suitable for particular industrial application
CO5: Explain the basic concepts of thermodynamics and its application, principle of energy conservation and modes of heat transfer.
CO6: Explain the basics of Robotics and its applications in industries.

Course Contents

UNIT-I	Introduction to Mechanical Engineering	7 Hours

Mechanical Engineering and its domains: Design, Production and Thermal Engineering, Introduction to Mechanical Industry: Design, Production, Quality control and Inspection departments, Mechanical Elements: Holding, Supporting and Power transmitting elements.

UNIT-II	Fundamentals of Design and Mechanisms	6 Hours

Design: Definition, Steps in Design process, Mechanical Properties, National/International design standards, Introduction to Machine & Mechanism.
Mechanism: Four Bar Mechanism, Slider Crank Mechanism.

UNIT-III	Fundamentals of Material Science	7 Hours

Fundamental concepts of Crystal, Unit Cells, Miller Indices, Metallic Crystal Structures, Crystal Systems, Linear and Planer Densities, Density computation, Classification of Engineering Materials and their properties.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-IV	Manufacturing Processes and Machine Tools	7 Hours
Manufacturing Processes: Classification, Sand Casting, Metal forming, Sheet metal working, Machining, Metal joining & Surface finishing processes. Machine Tools: Introduction to Conventional Lathe, CNC, VMC.		
UNIT-V	**Introduction to Thermal Engineering and Heat Transfer**	**7 Hours**
Thermal Engineering: Laws of Thermodynamics, their Limitations and applications, IC Engines, Refrigeration and air conditioning, Measurements of temperature and pressure. Heat Transfer: Conduction, Convection and Radiation.		
UNIT-VI	**Fundamentals of Robotics**	**7 Hours**
Laws of Robotics, Classification of Robots, Robot anatomy, Point to Point and Continuous path robotic systems, Joints, End Effectors, Grippers, Robot Specification, General considerations and Applications of Robot.		

Lab Contents

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batch size of 22students 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	Demonstration on performance of power transmitting devices: Gears, Belt drive and Chain drive.
2	Study of mechanisms: Four bar mechanism, slider crank mechanism and their inversions.
3	Use of ASTM/IS Standards for tensile testing
4	One job on CNC and VMC Machine.
5	One fabrication job using welding process.
6	To find mechanical efficiency of Diesel Engine.
7	To calculate Coefficient of Performance for domestic refrigerator setup.
8	Study and demonstration of an Industrial Robot
9	Mini Project/ Seminar on a topic related to Mechatronics. (group of 4 students)
10	Report on Visit to one Mechanical or Manufacturing Industry.

Text Books:

T1: G. Shanmugam, S. Ravindran“ Basic mechanical Engineering”, Tata McGraw- Hill Publication Co. Ltd
T2: Choudhari, Hajara“ Elements of Workshop Technology”, Volume I and II, Media Promoters and Publishers, Mumbai.
T3: R. K. Purohit “Foundation of Mechanical Engineering” , Scientific Publishers.
T4: C.S. Chetankumar, B.P.Mahesh, “Elements of Mechanical Engineering”, S.Chand Publications.

Reference Books:

R1. P. K. Nag “Thermodynamics” Tata McGraw- Hill Publication Co. Ltd
R2. V.B. Bhandari “Design of Machine elements” Tata McGraw-Hill Publishing Co. Ltd.
R3. S. S. Ratan “Theory of Machine” Tata McGraw- Hill Publication Co. Ltd
R4. Arora and Domkondwar “Thermal Engineering”, Dhanpat Rai and Sons.
R5. V. D Kodgire and S.V. Kodgire “Material Science and Metallurgy”, Everest Publications.
R6 . Choudhari, Hajara “Elements of Workshop Technology”, Volume I and II, Media Promoters and Publishers, Mumbai.
R7. S. P. Venkateshan “Heat transfer” , Ane books Pvt. Ltd.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester –I/II

[EC1101]: Basic Electronics and Biomedical Engineering

Teaching Scheme:	Credit	Examination Scheme:
TH: - 3 Hours/Week PR:- 2 Hours/Week	TH: 3 PR:1	In Sem. Evaluation: 15 Marks Mid Sem. Exam : 25 Marks End Sem. Exam : 60Marks Lab Evaluation : 25Marks

Course Prerequisites: 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 an introductory and broad treatment in the field of Electronics and biomedical Engineering to facilitate better understanding of the devices, instruments and sensors used in engineering applications.

Course Outcome:

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

CO1: Explain the basic concepts and working of electronic devices like diode, BJT.
CO2: Elaborate working of operational amplifier, IC 555 and various regulators
CO3: Describe the need and types of modulation Techniques.
CO4: Apply the concept of logic gates, microprocessor, microcontroller and Arduino in electronic circuits.
CO5: Recognize types of Sensors for different applications.
CO6: Identify electrodes for Bio signal measurements and describe function of medical instruments.

Course Contents

UNIT-I	Basics of Electronics Devices	7 Hours

Diode as a Rectifier, Half Wave and Full Wave Rectifiers with and without Filters, Zener Diode – Operation and Applications, Breakdown Mechanisms, LEDs, Photo Diode, BJT structure, configurations, Operating Point (DC Load Line), applications as amplifier and switch.

UNIT-II	Integrated Circuits	7 Hours

Introduction to Op-Amp (Block Diagram), Modes of operations, Parameters and applications to op-amp IC such as IC 741, Introduction to multivibrator IC such as IC 555(Block Diagram), modes of operation and application as A stable multivibrator. Block diagram of Fixed voltage regulator IC's 78XX, 79XX, and variable voltage regulator such as LM317, LM337.

UNIT-III	Electronic Communication Systems	7 Hours

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

UNIT-IV	Digital Systems	7 Hours

Number system-Binary, octal, hexadecimal,grey,Arithmetic operations and their conversions. Logic gates,Booleanalgebra,CombinationalcircuitssuchasAdder,MUX,DEMUX.Sequentialcircuits

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

such as Flip Flops (SR-flip flop, JK Flip-Flop, D & T Flip-Flop). BCD to Seven Segment display. Introduction to microprocessor, microcontroller (block diagram, comparison), Introduction to Arduino(block diagram, Integrated Development Environment).

UNIT-V	Sensor Technologies	7 Hours

Basic Instrumentation system, selection criteria of sensors, Classification of sensors, Types of sensors such as Linear Variable Differential Transducer, Load cell, Ultrasonic, Optical, semiconductor sensors, Piezoelectric, soil moisture, fingerprint, speed, gas sensors Temperature sensors such asThermocouple, Thermistor and RTD.

UNIT-VI	Biomedical signals and Modern Medical Systems	7 Hours

Sources of biomedical signals, Basic medical instrumentation system, recording electrodes, Skin contact impedance, Motion artefacts, Types of Electrodes to Measure Bio-signals-EEG, ECG, EMG Human Machine Interface (HMI), Brain Computer Interface (BCI), X-ray, CT-scan, Magnetic Resonance Imaging (MRI), ECG , EEG and EMG recorder.

Lab Contents

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batch size of 22students 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	Study of electronics components such as Resistors, Inductors, Capacitors Switches, Connectors, wires, cables etc
2	Study of different Electronics measuring Instruments such as a) Digital Multi Meter and controls b) Function / Signal Generator and controls c) Cathode Ray Oscilloscopes, measurements of frequency and amplitude of AC signal.
3	Build and Test single stage CE Amplifier and calculate voltage gain.
4	Verify the parameters of IC-741-CMRR, I/P bias current, slew Rate, Input offset voltage OR Design A stable multivibrator using IC 555
5	Perform AM generation technique, observe waveform and calculate modulation Index. OR Perform FM generation technique, observe waveform and calculate modulation Index.
6	Verify truth Tables of Logic Gates and BCD to 7 Segment display.
7	Interface LED/LCD to Arduino Development board. OR Interface Temperature Sensor /LDR/Smoke detector sensors to Arduino Development board.
8	Study and Identify various electrodes used to measure bio-signals OR Study of EEG and ECG recorder

Text Books:

T1. "Electronics Devices" by Thomas.L.Floyd 9thEdition, Pearson .
T2. R.P.Jain, Modern Digital Electronic, 3rd edition, 12th reprint TMH publication, 2007.
T3. R. S. Khandpur; Handbook of Biomedical Instrumentation; Third Edition, TMH Publication, 2012.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

T4. "Sensors and Transducers" by D. Patrnabis, 2nd Edition, PHI

Reference Books:

R1. H. S. Kalasi, "Electronic Instrumentation", TMH publication.

R2. Louis E. Frenzel (2006), Communication Electronics, Principles and Applications, Third Edition, TMH publication.

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

R4. The 8051 Microcontroller and Embedded Systems Using Assembly and C. Second Edition. Muhammad Ali Mazidi. Janice Gillispie Mazidi. Rolin D. McKinlay.

R5. J. M. Hughes (2016), Arduino: A Technical Reference A Handbook for Technicians, Engineers, and Makers, O'Reilly Media, Inc.

R6. "Sensors Handbook", by S. Soloman, 2nd Edition.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 1)

Academic Year – 2020-2021 Semester -II

[CS1102]: Introduction to Python Programming

Teaching Scheme:	Credit	Examination Scheme:
TU:-1 Hour/Week	TU:1	TermWork : 25Marks
PR:-2 Hours/Week	PR:1	Practical : 25Marks
		Total : 50Marks

Course Prerequisites: Introduction to Computer Programming, Analytical and Logical skills.

Course Objective: To know the basics algorithmic problem solving for reading and writing simple Python programs. To learn data types, input output statements, decision making, looping and functions in Python and also understand features of Object Oriented Programming and fileshandling using Python. To introduce data science.

Course Outcome:
After successful completion of the course, students will able to:
CO1: Use the knowledge of Python programming constructs.
CO2: Demonstrate logic development using Python.
CO3: Apply functions and string functions.
CO4: Use the concept of file handling and dictionaries.
CO5: Demonstrate Python program using object oriented concepts.
CO6: Understand the concept of data science.

Course Contents

UNIT-I	Introduction to Python	2 Hours
Features of python, Understanding python blocks, Understanding Python variables, Comments, Indentation, Writing a simple Python program, Data types: int, float, Python basic Operators.		
UNIT-II	**Python program flow control**	**3 Hours**
Conditional blocks-if, else and if-elif...else chain, for loop using ranges, string, and list. Use of while loops, break, continue statements in python		
UNIT-III	**Functions and Strings**	**4 Hours**
Need for functions, Function: definition, call, variable scope and lifetime, the return statement. Defining functions, Lambda or anonymous function, documentation string, Strings and Operations-concatenation, appending, slice operation. Defining list and list slicing.		
UNIT-IV	**File Handling and Dictionaries**	**3 Hours**
File path, types of files, opening –closing files, reading and writing files. Dictionary method. Dictionaries- creating, assessing, adding and updating values.		
UNIT-V	**Python Object Oriented Programming**	**3 Hours**
Features of OOP: classes, objects, methods and message passing, inheritance, polymorphism, containership, reusability, delegation, data abstraction and encapsulation.		

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

UNIT-VI	Introduction to Data Science	4 Hours
Overview of dataset, Introduction to data science life cycle, Statistical methods- min, mode, variance, std. deviation, Data Analysis techniques – T-test, Z-test.		

Lab Contents

Guidelines for Assessment

1) Practical for the subject's hall been engaged in minimum three batches (batchsizeof22students 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 program that demonstrate basic python block and operators.
2	Write a program that demonstrates concepts of list and list slicing and tuple.
3	Write a program that demonstrate decision control statements (using if, else , elif and while loops).
4	Write a program that demonstrate loop manipulation using pass, continue, break and else.
5	Write a program that demonstrates list manipulation using in-build methods.
6	Write an application that demonstrates dictionary manipulation.
7	Write an application that demonstrates the use of various file handling functions.
8	Write a program to implement string related functions.
9	Write a program to demonstrate data analysis using statistical methods.

Text Books:

T1. Allen B. Downey, Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers,2016

T2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Reference Books:

R1. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.

R2. John V Guttag, "Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013

R3. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.

R4. Paul Gries, Jennifer Campbell and Jason Montojo, "Practical Programming: An Introduction to Computer Science using Python 3", Second edition, Pragmatic Programmers, LLC,2013.

R5. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson IndiaEducationServicesPvt.Ltd.,2016.

R6. Research Methodology Methods & technique by C.R. Kothari

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

Syllabus for

Group2&3

Semester I

Information Technology Engineering and
Computer Engineering.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester -I

[ES1106]: Introduction to Probability, Statistics and Calculus

Teaching Scheme:	Credit	Examination Scheme:
TH: 03Hours/Week	TH:03	In Sem. Evaluation:15 Marks
TU: 01Hours/Week	TU:01	Mid Sem. Exam: 25 Marks
		End Sem. Exam: 60Marks
		TermWork: 25 Marks

Course Prerequisites : Permutation and Combinations, Differentiation, Definite and Indefinite Integration, Curves and Surfaces.

Course Objective: To make the students familiarize with concepts and techniques in Statistics, Probability, Differential and Integral calculus. The aim is to equip them with the tools to understand advanced level Statistics and its applications that would enhance thinking power in their discipline.

Course Outcome:

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

CO1: Classify Primary and Secondary data, Calculate Measures of Central tendency and Dispersion.

CO2: Explain thebasicconceptsofSampleSpaceandEvent.ApplyProbabilitytheorytostudysituations involving uncertainties useful in the field of design algorithm in machine learning.

CO3: Apply the concept of Mathematical Expectation, Moments and their properties, Moment Generating functions in probability distributions.

CO4: Apply advanced Integration techniques useful in evaluation of Multiple Integrals and its applications.

Course Contents

UNIT-I	Descriptive Statistics	07Hours
Introduction, Collection of Data, Primary and secondary Data, Frequency curves, Measure of central tendency, Measures of Dispersion. Bivariate data, marginal and conditional frequency distribution.		
UNIT-II	**Probability**	**07 Hours**
Experiments, Sample space, event, Conditional Probability, Bayes Theorem.		
UNIT-III	**Probability distributions**	**08 Hours**
Random variables, standard discrete & continuous distributions, Binomial, Poisson and Geometric distributions, Uniform, Exponential, Normal distributions, Hypothesis, Chi-square, t, F distributions.		
UNIT-IV	**Expected values and moments**	**07 Hours**
Mathematical Expectation, Variance and its properties, Moments and their properties, Moment generating function.		
UNIT-V	**Integral Calculus**	**07Hours**
Reduction Formulae, Gamma function, Beta function, Error function and Differentiation under integral sign.		
UNIT-VI	**Multiple Integrals and its Applications**	**08Hours**
Double and Triple integrations, change of order of integration, application to find Area and Volume.		

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

Guidelines for Tutorial and Term Work
1) Tutorial shall be engaged in batches (batch size of 20 students maximum) per division. 2) Term work shall be based on continuous assessment of six assignments (one per each unit).
Textbooks: **T1:** S.M. Ross, "Introduction of Probability Models", Academic Press, N.Y. **T2:** A. Goon, M. Gupta and B. Dasgupta, "Fundamentals of Statistics", Vol I & II, World Press. **T3:** B. S. Grewal, "Higher Engineering Mathematics", Khanna Publication, Delhi.
Reference Books: **R1:** S. M. Ross, "A first course in Probability", Prentice Hall**.** **R2:** I. R. Miller, J.E. Freund and R. Johnson, "Probability and Statistics for Engineers", (Fourth Edition), PHI. **R3:** A. M. Mood, F.A. Graybill and D.C. Boes, "Introduction to the Theory of Statistics", McGraw Hill Education. **R4:** B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw-Hill.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester -I

[ES1107]: Fundamentals of Physics

Teaching Scheme:	Credit	Examination Scheme:
TH: 03Hours/Week	TH:03	In Sem. Evaluation:15 Marks
PR: 02Hours/Week	PR:01	Mid Sem. Exam :25 Marks
		End Sem. Exam :60Marks
		Lab Evaluation :25Marks

Course Prerequisites: Fundamentals of: optics, interference, diffraction polarization, wave-particle duality, crystal structure and magnetism

Course Objective: To teach students basic concepts and principles of physics, relate them to laboratory experiments and their applications.

Course Outcome:

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

CO1: Explain fundamental concepts, mathematical treatment and related phenomenon of periodic motion, SHM, resonance, damped harmonic oscillator

CO2: Analyze intensity variations of light due to interference and diffraction and their intended applications.

CO3: Infer the basic ideas of Electromagnetism and Maxwell's equations and extend it to analyse the light for its state of polarization

CO4: Explain concepts and principles of quantum mechanics, crystallography, semiconductor physics and its intended applications.

CO5: Explain basics principle construction and working of different types of Lasers and Optical fibers and its applications

CO6: Explain the basic ideas and laws of Thermodynamics, concept of Engine and Entropy.

Course Contents

UNIT-I	Waves and Oscillation	06 Hours

Periodicmotion-simpleharmonicmotion-characteristicsofsimpleharmonicmotion-vibrationofsimple spring mass system. Resonance-definition. Damped harmonic oscillator – heavy, critical and light damping,energydecayinadampedharmonicoscillator,qualityfactor,forcedmechanicalandelectrical oscillators.

UNIT-II	Interference and Diffraction	06 Hours

Theory of interference fringes-types of Interference-Fresnel's Prism-Newton's rings, Diffraction-Two kindsofdiffraction-Differencebetweeninterferenceanddiffraction-Fresnel'shalfperiodzoneand zoneplate-Fraunhoferdiffractionatsingleslit-planediffractiongrating.TemporalandSpatialCoherence

UNIT-III	Polarization and Electromagnetism	06 Hours

Polarization - Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction. Basic Idea of Electromagnetisms: Continuity equation for current densities, Maxwell's equation in vacuum and non-conducting medium.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-IV	Quantum Mechanics , Crystallography and Semiconductor Physics	06 Hours
Introduction-Planck's quantum theory-Matter waves, de-Broglie wavelength, Heisenberg's Uncertainty principle, time independent and time dependent Schrödinger's wave equation, Physical significance of wave function, Particle in a one dimensional potential box, Heisenberg Picture. Crystallography - Basic terms-types of crystal systems, Bravais lattices, miller indices, d spacing, Debye Scherrer powder method, laue Method-Atomic packing factor for SC, BCC, FCC and HCP structures. Semiconductor Physics - conductor, semiconductor and Insulator; Basic concept of Band theory		
UNIT-V	**Laser and Fiber optics**	**06 Hours**
Einstein's theory of matter radiation interaction, A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, CO2 and Neodymium lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles,applications of lasers in engineering. Fiber optics and Applications, Types of optical fibers.		
UNIT-VI	**Thermodynamics**	**07 Hours**
Zeroth law of Thermodynamics, first law of Thermodynamics, brief discussion on application of first law, second law of Thermodynamics and concept of Engine, entropy, change in entropy in reversible and irreversible processes.		

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) LabEvaluationisacontinuousassessmentbasedonexperimentsperformed,submissionofresultsof experiment in the form of report/journal, timely completion, attendance and understanding.

List of Laboratory Experiments

1	Magnetic field along the axis of current carrying coil – Stewart and Gee
2	Determination of Hall coefficient of semiconductor
3	Determination of Plank constant
4	Determination of wave length of light by Laser diffraction method
5	Determination of wave length of light by Newton's Ring method
6	Determination of laser and optical fiber parameters
7	Determination of Stefan's Constant

Text Books:

T1. A Beiser, "Concepts of Modern Physics", (Fifth Edition), McGraw Hill International.
T2. David Halliday, Robert Resnick and Jearl Walker, "Fundamentals of Physics", Wiley plus

Reference Books:

R1. Ajoy Ghatak , "Optics", (Fifth Edition), Tata McGraw Hill.
R2. Sears &Zemansky University Physics, Addison-Wesley.
R3. Jenkins and White, "Fundamentals of Optics", (Third Edition), McGraw-Hill.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester -I

[ES1108]: Discrete Mathematics

Teaching Scheme:	Credit	Examination Scheme:
TH: 03Hours/Week	TH:03	In Sem. Evaluation:15 Marks
TU: 01Hours/Week	TU: 01	Mid Sem. Exam : 25 Marks
		End Sem. Exam : 60Marks
		Term Work : 25 Marks

Course Prerequisites : Basic concept of Set, Permutations& Combinations and Matrix algebra.

Course Objective:

To make the students familiarize with concepts and techniques in Logic, Boolean algebra, Abstract algebra, Combinatorics and Graph theory. The aim is to equip them with the tools to understand discrete mathematics and its application that would enhance thinking power and useful in their discipline.

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

CO1: Explain concept of logic and logic gates and its applications in design of modern scientific computing machine.
CO2: Explain the concept of duality principle, canonical form, Karnaugh map using Boolean algebra.
CO3: Identify type of Equivalence and Partial ordered relations, Explain the concepts of algebraic structures such as Group, Ring and Field useful in cryptography.
CO4: Use the concept of Graph theory and trees in its application to network theory
CO5: Apply the concept of Combinatorics to solve problems related to computer based systems.

Course Contents

UNIT-I	Logic	07 Hours

Propositional calculus - propositions and connectives, syntax; Semantics – truth assignments and truth tables, validity and satisfiability, tautology; Adequate set of connectives; Equivalence and normal forms; Compactness and resolution; Formal reducibility - natural deduction system and axiom system; Soundness and completeness.

UNIT-II	Boolean algebra	08 Hours

Introduction, truth table, basic logic gate, basic postulates of Boolean algebra, principle of duality, canonical form, Karnaugh map.

UNIT-III	Abstract algebra	08 Hours

Set, Relations, Functions, Algebraic structures: Semigroup, Monoid, Group, Abelian group, Cyclic group, Ring and Field.

UNIT-IV	Graph Theory	08 Hours

Graphs, Types of Graphs, connectedness and reachability, Hand shaking lemma, adjacency and incidence matrix, isomorphism, Digraphs, Eulerian and Hamiltonian Graphs. Dijkstra's algorithm.

UNIT-V	Trees	08 Hours

Trees, Planar graphs, Euler's formula, dual of a planer graph, independence number and clique number, chromatic number, Graph coloring, Rooted tree, prefix code and Huffman coding method.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-VI	Combinatorics	07 Hours
Basic counting, balls and bins problems, Pigeonhole Principle, Generating functions, Recurrence relations, Principle of Mathematical induction.		
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.** KenethH.Rosen, "Discrete Mathematics and its applications", Tata MacGraw Hill. **T2.**A.R.Vashistha,"Modern Algebra", Krishna Prakashan **T3.** Alan Tucker, " Applied Combinatorics" , Wiley **T4.**C.V.Sastry,RakeshNaik, "A text book on discrete Mathematics"		
Reference Books: **R1.** C .Liu, "Elements of Discrete Mathematics" ,Tata MacGraw Hill. **R2.** NarsingDeo,"Graph Theory with Applications to Engineering and Computer Science",Prentice Hall of India **R3.**N.Herstein, "Topics in Algebra", John Wiley and Sons. **R4.** T.Veerarajan, "Discrete Mathematics", Tata MacGraw Hill. **R5.** M. Morris Mano, "Digital Logic & Computer Design", Pearson.		

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester -I

[EE1102]: Principles of Electrical Engineering

Teaching Scheme:	Credit	Examination Scheme:
TH: 03Hours/Week	TH:03	In Sem. Evaluation:15 Marks
PR: 02Hours/Week	PR:01	Mid Sem. Exam : 25 Marks
		End Sem.Exam : 60Marks
		Lab Evaluation : 25Marks

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

Course Objective: Objective of this course is to memorize the basic knowledge of electrical quantities& electrical wiring, installation systems. Provide solutions for the network by applying various laws & theorems. Apply the knowledge of magnetic circuits to electrical machines. Extract the knowledge of electrostatics. Understand fundamentals of ACcircuits. Relate different sensors& transducers in electrical systems

Course Outcome:

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

CO1: Recall the elementary concept of Electrical Engineering.
CO2: Simplify various laws and theorems to complex electrical networks**.**
CO3: Recognized the basics of electromagnetism and single-phase transformers.
CO4: Interpret the basics of electrostatics.
CO5: Illustrate different terms applicable to AC fundamentals.
CO6: Summarize measurement devices & transducers.

Course Contents

UNIT-I	Basic Concepts & Wiring Systems	06 Hours

Concept of Potential difference, voltage, current, Fundamental linear passive and active elements to their functional current-voltage relation, Concept of work, power, energy and conversion of energy. Basic layout of distribution system, Types of Wiring System &Wiring Accessories, Necessity of earthing, Types of earthing, Safety devices and system.

UNIT-II	DC Circuits	06 Hours

Terminology and symbols in order to describe electric networks, voltage source and current sources ,ideal and practical sources, Concept of dependent and independent sources. Kirchhoff's laws and applications to network solutions using mesh analysis and Nodal analysis, Simplifications of networks using series- parallel, Star/Delta transformation. Current-voltage of electric network by mathematical equations to analyze the network (Superposition theorem, Thevenin's theorem, Norton's Theorem Maximum Power Transfer theorem).

UNIT-III	Principle of Electromechanics	06 Hours

Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Magnetic material and B-H Curve, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVArating, efficiency and regulation, Electromechanical energy conversion

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-IV	Electrostatics	06 Hours
Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series & parallel, energy stored in capacitors, charging and discharging of capacitors, Principle of batteries, types, construction and application.		
UNIT-V	**AC Fundamentals**	**06 Hours**
AC waveform definitions, form factor, peak factor, study of R-L, R-C, RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, 3 phase Balanced AC Circuits (Star & Delta).		
UNIT-VI	**Measurements and Sensors**	**06 Hours**
Introduction to measuring devices/sensors and transducers (Piezoelectric & Thermo-couple) related to electrical signals, Basic concept of indicating and integrating instruments, Elementary methods for the measurement of electrical quantities in DC and AC systems (Current & Single-Phase power).		

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 resultsof experiment in the form of report/journal, timely completion, attendance and understanding.

List of Laboratory Experiment

1	Familiarization of electrical Elements, sources, measuring devices and transducers related to electrical circuits.
2	Determination of resistance temperature coefficient.
3	Verification of Network Theorem (Superposition, Thevenin's, Norton, Maximum Power Transfer theorem).
4	Simulation of R-L-C series circuits for XL> XC , XL< XC
5	Simulation of Time response of RC circuit.
6	Verification of relation in between voltage and current in three phase balanced star and delta connected loads.
7	Demonstration of measurement of electrical quantities in DC and AC systems.

Text Books:

T1. A.E. Fitzgerald, Kingsely Jr Charles, D. Unmans Stephen, "Electric Machinery",(Sixth Edition), Tata McGraw Hill"
T2.B.L.Theraja,"ATextbookofElectricalTechnology",(vol.I),ChandandCompanyLtd.NewDelhi"
T3. V. K. Mehta, "Basic Electrical Engineering", S. Chand and Company Ltd., New Delhi.
T4. J. Nagrath and Kothari, "Theory and problems of Basic Electrical Engineering", (Second Edition), Prentice Hall of India Pvt. Ltd.

Reference Books:

R1.T. K. Nagsarkar and M. S. Sukhija, "Basic of Electrical Engineering",Oxford University Press 2011"
R2. D. J. Griffiths, "Introduction to Electrodynamics", (Fourth Edition), Cambridge University Press.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

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

Academic Year – 2020-2021 Semester -I

[CS1103]: Fundamentals of Computer Programming

Teaching Scheme:	Credit	Examination Scheme:
TH: 03Hours/Week PR: 04Hours/Week	TH:03 PR:02	In Sem. Evaluation:15 Marks Mid Sem. Exam :25 Marks End Sem. Exam : 60 Marks TermWork :25Marks Lab Evaluation: : 25 Marks

Course Prerequisites : Basic mathematics and Science.

Course Objective: Introduction to the concepts of computer basics and programming with particular attention to Engineering examples. Emphasis on fundamental parts of programming language, so that the students will have a basic understanding of other programming languages.

Course Outcome:

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

CO1: Explain different programming paradigms, different data types and operators used in 'C' language.

CO2: Design algorithm, draw flowchart and write a program using decision structures and loops for given problem in 'C' language.

CO3: Solve complex problems using functions in 'C' language.

CO4: Solve complex problems using arrays, pointers and structures in 'C' language.

CO5: Develop a real time application using sequential file systems in 'C' language

CO6: Describe Unix system Interface.

Course Contents

UNIT-I	Data Types and Operators	04 Hours

Levels of programming language, Introduction to Programming Paradigms, Algorithm, Flowchart, for problem solving with Sequential Logic Structure, Introduction to imperative language; syntax and constructs of a specific language. Types Operator and Expressions: Variable Names, Data Type and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise, Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, variable naming, Hungarian Notation.

UNIT-II	Branching and Loop Statements	07 Hours

Control Flow with discussion on structured and unstructured programming: Statements and Blocks, If-Else-If, Switch, Loops: while, do, for, break and continue, Go to Labels, structured and un- structured programming

UNIT-III	Functions	07 Hours

Functions and Program Structure, standard library: Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialization, Recursion, Preprocessor, Standard Library Functions and return types

Dr. S M Yadav H.O.D, Engg. Science	Dr. S V Kedar Dean Academics	Dr. R. K. Jain Director RSCOE, Pune

UNIT-IV	Pointers and Array	07 Hours
Pointers and Arrays: Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multi-dimensional array and Row/column major formats, Initialization of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated.		
UNIT-V	**Structures and File System**	**07 Hours**
Structures: Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral Structures, Table look up, typed ef, Unions, Bit-fields. Input and Output: Standard I/O, Formatted Output – printf, Formated Input – scanf, Variable length argument list, file access including FILE structure, fopen, stdin, sdtout and stderr, Error Handling including exit, perror and error.h, Line I/O, related miscellaneous functions		
UNIT-VI	**Unix System Interface**	**04 Hours**
Unix system Interface: File Descriptor, Low level I/O – read and write, Open, create, close and unlink, Random access – l seek, Discussions on Listing Directory, Storage allocator. Programming Method: Debugging, Macro, User Defined Header, User Defined Library Function, make file utility.		

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) Continuousassessmentoflaboratoryworkisdonebasedonoverallperformanceandlabassignments performance of student.
3) Each lab assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include- timely completion, performance, innovation, efficient codes, punctuality and neatness.

List of Assignments

1	Write a C program to display a given pattern using loops.
2	Write a C program to print source code as program output.
3	Write a C program to demonstrate use of array and function (simple and recursive function).
4	Write a C program to count the lines, words and characters in a given text.
5	Write a C program to demonstrate the use of structure and pointers.
6	Write a program to demonstrate Multi file program and user defined libraries.
7	Write a program that accepts only single alphabetical characters. On encountering an non-alphabet it terminates after printing all the alphabets entered so far in sorted order.
8	Write a program to check a C program for rudimentary syntax errors like unbalanced parentheses, brackets and braces, quotes, both single and double, escape sequences and comments.
9	Write a complete well documented C program that accepts an integer from the command line and prints the prime factorization on screen and a file with filename as the input integer and extension as .txt.eg. If input number is 123, the file name should be 123.txt .For any invalid input, it should be able to print an error message and quit.

Text Books:

T1.B. W. Kernighan and D. M. Ritchi, “The C Programming Language”, Second Edition, PHI.
T2.B. Gottfried, “Programming in C”, Second Edition, Schaum Outline Series

Reference Books:

R1. Herbert Schildt, “C: The Complete Reference”, Fourth Edition, McGraw Hill.
R2. YashavantKanetkar, “Let Us C”, BPB Publications.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester -I

[HS1105]: Business Communication & Value Science – I

Teaching Scheme: PR: 2 Hours/Week	Credit PR: 1	Examination Scheme: Term Work: 25 Marks

Course Prerequisites :Basic knowledge of high school English.

Course Objective:

- Understand what life skills are and their importance in leading a happy and well-adjustedlife
- Motivate students to look within and create a better version ofself
- Introduce them to key concepts of values, life skills and businesscommunication

Course Outcome:

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

CO 1: Recognize the need for life skills and values.

CO 2: Recognize own strengths and opportunities.

CO 3: Apply the life skills to different situations.

CO 4: Describe the basic tenets of communication.

CO 5: Apply the basic communication practices in different types of communication.

Course Contents

UNIT-I	Self-Introduction	3 Hours

Class activity–presentation on favorite rick et captain in IPL and the skills and values they demonstrate Self-work with immersion – interview a maid, watchman, sweeper, cab driver, 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	3 Hours

Refresher on Parts of Speech –Applications of tenses in Functional Grammar,
Sentence formation (general & Technical), Common errors, Voices. Show sequence from film where a character uses wrong sentence structure.

UNIT-III	Communication Skills.	8 Hours

Barriers of communication, Effective communication. Types of communication-verbal and non–verbal – Listening Skills: Law of nature- Importance of listening skills, Difference between listening and hearing, Types of listening Activity:Skitbased on communication skills Evaluations on Listening skills – listen to recording and answer questions based onthem.

UNIT-IV	E-mails and Verbal Communication.	3 Hours

Email writing: Formal and informal emails, activity Verbal communication: Pronunciation, clarity of speech Vocabulary Enrichment: Exposure to words phrases, idioms, significant abbreviations formal business vocabulary – Group discussion using words learnt.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-V	Written Communication & C.V.	3 Hours
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-VI	**Introduction to life skills**	**3Hours**
Critical life skills, Multiple Intelligences, embracing diversity – Activity on appreciation of diversity, Life skill: Community services - work with an NGO and make 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 minimum three batches (batch size of 22students 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	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	Writing story.
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)

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

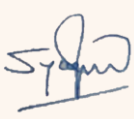
Dr. R. K. Jain
Director RSCOE, Pune

Syllabus for

Group2&3

Semester II

Information and Technology Engineering and Computer Engineering.



Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester -II

[ES1109]: Linear Algebra

Teaching Scheme:	Credit	Examination Scheme:
TH: 03Hours/Week	TH:03	In Sem. Evaluation:15 Marks
TU: 01Hours/Week	TU: 01	Mid Sem. Exam :25 Marks
		End Sem. Exam : 60Marks
		TermWork :25Marks

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

Course Objective:

To make the students familiarize with concept and techniques in System of linear equations, Vector Space, Eigenvalues and Eigenvectors, Linear transformation, Canonical forms& application and Inner ProductSpace.Theaimistoequipthemwiththetoolstounderstand Linearalgebraanditsapplications that would enhance thinking power and useful in their discipline.

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

CO1: Discuss consistency and solve the system of linear equations.

CO2: Explain the concept of vector space, Linear dependence & independence and Basis & Dimension.

CO3: Explain the concept of linear transformation and rank-nullity theorem.

CO4: Compute eigenvalues & eigenvectors and diagonalize the Matrix useful in Engineering Applications,

CO5: Express quadratic form to canonical form and use the concept of SVD and PCA in image processing and Machine Learning.

CO6: Apply the concept of inner product space to find orthonormal set of vectors by using Gram-Schmidt Method. Find QR decomposition of a Matrix.

Course Contents

UNIT-I	System of Linear Equations	08 Hours
Rank of a Matrix, System of Linear Equations, Gauss Elimination and LU Decomposition method		
UNIT-II	**Vector Space**	**07 Hours**
Vector space, Subspace, Spanning Set, Linear Dependence & Independence and Basis & Dimension.		
UNIT-III	**Linear Transformations**	**07 Hours**
Linear Transformations (Mapping), Matrix of Linear transformation, Range and Kernel, Non-singular linear transformation, Rank-Nullity Theorem, Orthogonal transformation.		
UNIT-IV	**Eigen Values and Eigen Vectors**	**07 Hours**
Eigen Values and Eigen Vectors, Cayley-Hamilton theorem and its Applications, Diagonalization, Inverse and power of matrix by modal matrix.		

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

UNIT-V	Quadratic Forms and Applications	08 Hours
Quadratic forms, Symmetric Matrices, Reduction of Quadratic forms to Canonical form, Definite & Semi- definite forms, Linear and Orthogonal transformation, Singular value decomposition (SVD) and Principal Component Analysis(PCA), Applications to Image Processing and Machine Learning.		
UNIT-VI	**Inner Product Space**	**07 Hours**
Inner Product Space, Norm of a Vector, Orthogonality, Orthogonal Projection, Gram-Schmidt orthonormalization and QR decomposition.		

Guidelines for Tutorial and Term Work

1) Tutorial shall be engaged in four batches (batch size of 20 students maximum) perdivision.
2) Term work shall be based on continuous assessment of six assignments (one per eachunit).

Text Books:

T1 . Larson, Edwards, Falvo, "Elementory Linear Algebra", HOUGHTON MIFFLIN HARCOURT PUBLISHING COMPANY *Boston New York.*
T2. Gilbert Strang, "Introduction to linear algebra", 5th Edition.
T3.Kenneth Hoffman, Ray Kunze,"Linear Algebra",Pearson

Reference Books:

R1. Seymour Lipschutz, "Linear Algebra", McGraw Hill
R2. David C Lay, "Linear Algebra and its Applications", Pearson
R3. Kenneth M Hoffman, "Linear Algebra", Prentice Hall India Learning Private Limited
R4. R C Gonzalez and R E Woods , "Digital Image Processing"

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 2 & 3)
Academic Year – 2020-2021 Semester -II
[ES1110]: Statistical Methods

Teaching Scheme:	Credit	Examination Scheme:
TH: 03Hours/Week	TH:03	In Sem. Evaluation:15 Marks
TU: 01Hours/Week	TU:01	Mid Sem. Exam : 25 Marks
		End Sem. Exam : 60Marks
		TermWork : 25Marks

Course Prerequisites: Collection, Classification and Representation of data, Measures of Central Tendency and Dispersion, Probability and Probability Distributions.

Course Objective: To make the students familiarize with concepts and techniques in Sampling distribution. Linear Statistical models, Estimation, Hypothesis testing ,Non Parametric Tests, Time series analysis, Forecasting and Statistical programming using R language. The aim is to equip them with the tools to understand advanced level Statistics and its applications that would enhance thinking power in their discipline.

Course Outcome:
After successful completion of the course, students will able to:
CO1: Explain the techniques of Sampling distributions of Sample mean, Sample proportion and Central limit theorem.
CO2: Apply statistical methods like Correlation, Regression in Fore casting and interpreting experimental data.
CO3: Construct the Point and Confidence intervals for Sample mean and Sample proportion and determine sample size using estimation methods.
CO4: Apply the concept of Type –I, Type-II Errors and compare more than two populations using ANOVA.
CO5: Use Non-Parametric tests for inferences in data analysis.
CO6: Explain Time Series trend by ARIMA Models for forecasting data.

Course Contents

UNIT-I	Sampling Techniques	07 Hours

Random sampling, Sampling from finite and infinite populations, Standard error of sampling with and without replacement, Sampling distribution of sample mean and proportion, stratified random sampling.

UNIT-II	Linear Statistical Models	07 Hours

Scatter diagram, correlation, Rank correlation, Linear regression, Least squares method, Multiple correlation and Multiple regression.

UNIT-III	Estimation	07 Hours

Point estimation, interval estimation, criteria for good estimates, unbiasedness, consistency, Sufficiency and Efficiency. Methods of estimation, moments, maximum likelihood, Sufficiency and their applications in estimation.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

UNIT-IV	Test of hypothesis	07 Hours
Concept & formulation of hypothesis, Type I and Type II errors, Neyman Pearson lemma, Analysis of variance ANOVA one-way, two-way (with and without interactions).		
UNIT-V	**Non-parametric Inference**	**08 Hours**
Non-parametric Inference, Comparison with parametric inference, order statistics, Tolerance region, Sign test, Wilcoxon signed rank test, Mann-Whitney test, Run test, Kolmogorov-Smirnov test. Spearman's and Kendall's test.		
UNIT-VI	**Basics of Time Series Analysis & Forecasting**	**08Hours**
Stationary, ARIMA Models: Identification, Estimation and Forecasting.		

Guidelines for Tutorial and Term Work:

1) Tutorial shall be engaged in batches (batch size of 20 students maximum) per division.
2) Term work shall be based on continuous assessment of six assignments (one per each unit).

Textbooks:

T1:I.R. Miller, J.E. Freund and R. Johnson, "Probability and Statistics for Engineers" (Fourth Edition), Prentice Hall India Learning Private Limited.

T2:A. Goon, M. Gupta and B.Dasgupta, "Fundamentals of Statistics" (vol. I & vol. II), World Press.

T3: Chris Chatfield, Chapman &Hall, "The Analysis of Time Series: An Introduction".

Reference Books:

R1:D.C. Montgomery and E.Peck, "Introduction to Linear Regression Analysis",Wiley-Interscience.

R2:A.M. Mood, F.A. Graybill and D.C. Boes, "Introduction to the Theory of Statistics", McGraw Hill.

R3:N. Draper and H. Smith, "Applied Regression Analysis", Wiley-Interscience.

R4: Sheldon Ross, "A First Course in Probability",Pearson.

R5:B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw-Hill.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester -II

[CS1104]: Data Structure and Algorithms

Teaching Scheme:	Credit	Examination Scheme:
TH: 03Hours/Week	TH:03	In Sem. Evaluation:15 Marks
PR: 04Hours/Week	PR:02	Mid Sem. Exam :25 Marks
		End Sem. Exam : 60Marks
		Lab Evaluation : 50Marks

Course Prerequisites : Fundamental of Computer Programming

Course Objective:

- To understand the memory requirement for various datastructure.
- To understand various sorting and searching methods with pros andcons.
- To understand various algorithmic strategies to approach the problemsolution.

Course Outcome:

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

CO1: Design the algorithms to solve the programming problems.
CO2: Write a program in 'C' language to solve complex problems using linear data structures.
CO3: Write a program in 'C' language to solve complex problems using non-linear data structures.
CO4: Apply appropriate sorting and searching technique for given problem.
CO5: Create a real time application using appropriate file organization technique in 'C' language.

Course Contents

UNIT-I	Basic Terminologies & Introduction to Algorithm and Data Organisation	06 Hours

Recursion, Performance analysis- Time Complexity and space Complexity, Asymptotic Notation - The Big-O, Omega and Theta notation, Programming Style, Refinement of Coding - Time-Space Trade Off, Testing, Data Abstraction

UNIT-II	Linear Data Structure	06 Hours

Array, Linked-list and its types, Stack, Queue, Various Representations, Operations & Applications of Linear Data Structures

UNIT-III	Non-linear Data Structure-Tree	06 Hours

Basic Terminology of Trees, Binary Tree, Threaded Binary Tree, Binary Search Tree, B & B+ Tree, AVL Tree, Splay Tree and Applications of Trees

UNIT-IV	Non-linear Data Structure -Graph	06 Hours

Basic Terminology of Graphs, Directed Graph, Undirected Graph, Various Representations, Operations on Graph (search and traversal algorithms and complexity analysis) & Applications of Graphs

UNIT-V	Searching & Sorting	06 Hours

Searching: Sequential Search, Binary Search, Breadth First Search, Depth First Search.
Sorting: Insertion Sort, Selection Sort, Shell Sort, Divide and Conquer Sort, Merge Sort, Quick Sort, Heap Sort

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

UNIT-VI	File	06 Hours
Introduction to Hashing, Sequential File Organization, Direct File Organization, Indexed Sequential File Organization, Hashed File Organization and various types of accessing schemes.		

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) Continuous assessment of laboratory work is done based on overall performance and lab assignments performance of student.
3) Eachlabassignmentassessmentwillassigngrade/marksbasedonparameterswithappropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include- timely completion, performance, innovation, efficient codes, punctuality and neatness.
4) Practical Examination would be based on practical's performed in lab.

List of Laboratory Assignments

1	Write a C Program for Towers of Hanoi using user defined stacks.
2	Write a C Program for Reading, writing, and addition of polynomials.
3	Write a C Program for Line editors with line count, word count showing on the screen.
4	Write a C Program to create a Binary Search Tree, take input from user and Perform following Operations on it. a. Insertion of a node in a tree b. Deletion of anode c. Searching of anode d. Display by using any one traversal method
5	Write a C Program to create an height balance tree by taking input from user and perform following operation on it. a. Insertion of anode b. Searching of anode c. Display by using any one traversal method
6	Write a C Program using Breadth First Traversal and Depth First Traversal for a user defined Graph.
7	Write a C Program to save, read a tree or graph data structure in a file.
8	Write a C Program to Sort the marks of students in ascending/descending order and find the topper of the class.

Text Books:

T1. Fundamentals of Data Structures, E. Horowitz and S. Sahni, 1977.
T2. Data Structures and Algorithms, Alfred V. Aho, John E. Hopperoft, Jeffrey D. UIlman.

Reference Books:

R1. The Art of Computer Programming: Volume 1: Fundamental Algorithms, Donald E. Knuth
R2. Introduction to Algorithms, Thomas, H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein.
R3. Open Data Structures: An Introduction (Open Paths to Enriched Learning), 31st ed. Edition , Pat Morin

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester -II

[EC1102]: Principles of Electronics Engineering

Teaching Scheme:	Credit	Examination Scheme:
TH: 03Hours/Week	TH:03	In Sem. Evaluation:15 Marks
PR: 02Hours/Week	PR:01	Mid Sem. Exam : 25 Marks
		End Sem. Exam : 60Marks
		Lab Evaluation : 25Marks

Course Pre requisites: Semiconductor materials, P-N junction diode, V-I characteristics of Diode, Rectifiers, Zener diode as a voltage regulator, Photodiode, Solar cell, I-V characteristics of LED, Transistor characteristics, Transistor as an amplifier (CE mode), Transistor as a switch, Logic gates (OR, AND, NOT, NAND, NOR), Boolean Algebra

Course Objective: The Principles of Basic Electronics Engineering syllabus is designed to get knowledge of the basic Electronics components and circuits for computer Engineering. The course begins with introduction of semiconductor devices, diodes and transistors, FET's, Op-amps and Oscillator circuits,along with digital systems.

Course Outcome:

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

CO1: Explain the basic concept and working of semiconductor materials with their types.
CO2: Apply the basics of diode for rectification operation.
CO3: Describe the structure of BJT with their configurations and applications
CO4: Explain the structure of MOSFET with their configurations and applications
CO5: Elaborate the open loop and closed loop configuration of op-amp with their applications
CO6: Explain Logic gates with Boolean algebra along with combinational and sequential circuit

Course Contents

UNIT-I	Semiconductors	06 Hours

Crystalline material: Mechanical properties, Energy band theory, Fermi levels; Conductors, Semiconductors and Insulators: electrical properties, band diagrams. Semiconductors: intrinsic and extrinsic, energy band diagram, P and N-type semiconductors, drift and diffusion.

UNIT-II	Diodes and Diode Circuits	07 Hours

Formation of P-N junction, energy band diagram, built-in-potential, forward and reverse biased P-N junction, formation of depletion zone, V-I characteristics, Zener breakdown, Avalanche breakdown and itsreversecharacteristics;Junctioncapacitance.Linearpiecewisemodel;Rectifiercircuits:halfwave,full wave, PIV, DC voltage and current, ripple factor, efficiency, idea of regulation.

UNIT-III	Bipolar Junction Transistors	07 Hours

Formation of PNP / NPN junctions; transistor mechanism and principle of transistors, CE, CB, CC configuration, transistor characteristics: cut-off active and saturation mode, transistor action, injection efficiency,basetransportfactorandcurrentamplificationfactorsforCBandCEmodes.BiasingandBias stability: calculation of stability factor.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

UNIT-IV	Field Effect Transistors	07 Hours
Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type; CS, CG, CD configurations; CMOS: Basic Principles.		
UNIT-V	**Feed Back Amplifier and Operational Amplifiers**	**07 Hours**
Properties, positive and negative feedback, loop gain, open loop gain, feedback factors; topologies of feedback amplifier; effect of feedback on gain, output impedance, input impedance, sensitivities (qualitative), bandwidth stability.Introduction to integrated circuits, operational amplified and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Adders,Subtractors, Constant-gain multiplier, Voltage follower, Comparator, Integrator, Differentiator		
UNIT-VI	**Digital Electronics Fundamentals**	**06 Hours**
Difference between analog and digital signals, Boolean algebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K- map, Logic ICs, half and full adder/subtractor, multiplexers, demultiplexers, flip-flops, shift registers, counters.		

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) Continuous assessment of laboratory work is done based on overall performance and lab assignments performance of student.
3) Each lab assignment assessment will assign grade/marks based on parameters with appropriate weightage.Suggestedparametersforoverallassessmentaswellaseachlabassignmentassessment include- timely completion, performance, innovation, efficient codes, punctuality and neatness.

List of Laboratory Experiments

1	StudyofvariouselectronicscomponentssuchasResistors,Inductors,CapacitorsSwitches,etc
2	Study of different Electronics measuring Instruments such as DMM,CRO, Function Generator
3	Diode VI characteristics in forward and reverse bias
4	Study of DC Regulated Power supply
5	Study of single stage BJT Common Emitter Amplifier
6	FET common source amplifier circuit to find voltage gain and cut off frequencies
7	Study of Op-amp based amplifiers circuits
8	OPAMP based Integrator and Differentiator circuits
9	Study of Digital circuits and verify truth tables of logic gates
10	Interfacing of LED, LCD and temperature sensor to Arduino

Text Books:

T1. Adel S. Sedra and Kenneth Carless Smith, "Microelectronics Circuits"
T2. Jacob Millman, Christos Halkias, Chetan Parikh, "Millman's Integrated Electronics"
T3. M. Morris Mano, "Digital Logic & Computer Design"

Reference Books:

R1. Robert L. Boylestad, Louis Nashelsky,"Electronic Devices and Circuit Theory"
R2. Ben Streetman, Sanjay Banerjee, "Solid State Electronic Devices, 6 th Edition"
R3. Albert Paul Malvino, "Electronic Principle"
R4.D Schilling, C Belove, T Apelewicz, R Saccardi,"Electronics Circuits: Discrete & Integrated"

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2019-2020 Semester -II

[HS1106]: Principals of Economics

Teaching Scheme:	Credit	Examination Scheme:
TH: 3 Hours/Week	03	In Sem. Evaluation:15 Marks Mid Sem. Exam : 25 Marks End Sem. Exam : 60 Marks

Course Prerequisites: Fundamentals of Economics, Understanding the fundamental concepts of Economics and find out the overall utilization of scarce resources.

Course Objective:

1. To equip the students with time tested tools and techniques of managerial economics to enable them to appreciate its relevance in decision making.
2. To explore the economics of information and network industries and to equip students with an understanding of how economics affects the business strategy of companies in these industries.
3. To develop economic way of thinking in dealing with practical business problems and challenges. 4.To understand the market structure and price determination
5.To describe the Break Even Analysis and its practical usage
6.To understand the concept of money market and capital market

Course Outcome:

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

CO 1: Comprehend the Basic Concepts of Micro Economics in Business decision making.

CO 2: Identify the theory of demand and its application in consumer market.

CO 3: Evaluating the Producer's Behavior in context of supply Analysis.

CO 4: Comprehend the concept of Break Even Point under Graphic Method.

CO 5: Examine the inter relationships between various facets of micro-economics from perspective of consumer, firms, industry and various Markets.

CO 6: Evaluating the role played by Reserve Bank of India.

Course Contents

UNIT-I	Basic Concept of Economics	6 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	6 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	6 Hours

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

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

UNIT-IV	Cost Analysis	6 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**	**6 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**	**6 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.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

F. Y. B. Tech (Group 2&3)
Academic Year – 2020-2021 Semester -II
[HS1106]: Business Communication &Value Science-II

Teaching Scheme: PR: 2 Hours/Week	Credit PR: 1	Examination Scheme: Term Work: 25 Marks

Course Prerequisites : Basic Knowledge of English (verbal and written)

Course Objectives:

- Develop effective writing, reading, presentation and group discussion skills.
- Help students identify personality traits and evolve as a better team player.
- Introduce them to key concepts of:
  a) Morality
  b) Behavior and beliefs
  c) Diversity& Inclusion

Course Outcome:

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

CO1:Use tools of structured written communication. Use electronic/social media to share concepts.
CO2:Apply effective techniques to make impactful presentations.
CO3: Develop materials to create an identity for an organization dedicated to a social cause.
CO4:Apply the basic concept of speed reading, skimming and scanning.
CO5: Articulate opinions on a topic with the objective of influencing others.

Course Contents

UNIT-I	The join hands movement	4 Hours

Each Individual chooses one particular social issue which they would like to address. Class to be divided in teams for the entire semester. All activities to be done in teams
Research on the social cause each group will work for.Group Practical – As a group, they will work on the social issue identified by them. Research, read and generate a report based on the findings.
Plan and design an E Magazine. Apply and assimilate the knowledge gathered from Sem-1 till date. Share objective & guideline. All members to contribute an article to the magazine, trainer to evaluate the content - Create the magazine.Class discussion- Good and Bad Writing. Common errors, punctuation rules, use of words.

UNIT-II	Forming and Branding your N.G.O.	4 Hours

SATORI – Participants share the personal take away acquired from GD, writing and reading skills activities captured in their handbookShare the most important learning points from the activities done so far and how that learning has brought a change.Launching an E Magazine.
Each group will form an NGO. Create Vision, Mission, Value statement, tagline and Design a logo. Groups to present their NGOs. Apply the learning gathered. Presentation to be recorded by the groups. Group to come back and share their findings from the recording. Post work- individual write up to be written and evaluated for the E- magazine - Prepare and publish the Second episode of the E Magazine. Introduction to basic presentation skills& ORAI app.

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar Dean
Academics

Dr. R. K. Jain
Director RSCOE, Pune

UNIT-III	Speed reading and Skit	5 Hours
Speed Reading session: Introduction to skimming and scanning; practice the same. SATORI–Join the dots- Participants to connect their learning gathered from with their existing curriculum. Design a skit- a) write the script articulating the message of their respective NGOs. Read out the script. (Skit time-5 minutes). Feedback of Theory. Promote the play through a social media and gather your audience. Enact the play. Capture the numbers of likes and reviews.		
UNIT-IV	**Leadership and Term work.**	**4 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 team work 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-V	**Diversity – Inclusion and Empathy**	**4 Hours**
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. Discussion on TCS values, Respect for Individual and Integrity. Discuss key take away of the film. Theory to connect the key take away of the film to the concept of empathy. Touch the target (Blind man) - Debriefing of the Practical. Film: "The fish and I'' by Babak Habibi far" (1.37mins). 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. Preparedspeech- Everystudentwillnarratethechallengesfacedbyamemberofadiversegroupin4minutes (speech in first person).		
UNIT-VI	**A day with an N.G.O.**	**4 Hours**
Each team to look for an NGO/social group in the city which is working on the issue their college group is supporting. Spend a day with the NGO/ social group to understand exactly how they work and the challenges they face. Render voluntary service to the group for one day. Invite the NGO/ social group to address their university students for couple of hours. Plan the entire event, decide a suitable venue in the university, gather audience, invite faculty members etc. (they need to get their plan ratified their professor). Outcome-- Host an interactive session with the NGO spokesperson. The groups to present their experience of a day with the NGO and inspire students to work for the cause.		

Lab Contents

Guidelines for Assessment

1) Assignment for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2) Continuous assessment of assignments based on overall performance of student.
3) Each lab assignment shall be assessed by assigning grade/marks based on timely completion, presentation, punctuality and neatness.

List of Assignments

1	Each group will form an NGO. Create Vision, Mission, Value statement, tagline and Design a logo. The students to present their N.G.O. using presentation skills learnt.
2	As a group, they will work on the social issue identified by them. Research, read and generate a report based on the findings.(Article 1)
3	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
4	Research on a book, incident or film based on the topic of your respective NGO- Write a review in a blog on the topics they are covering in their research. (Article 2)

Dr. SMYadav
H.O.D,Engg.Science

Dr. S VKedar
DeanAcademics

Dr. R. K. Jain
Director RSCOE,Pune

5	Lindgren's Team Players Roles Team Falcon activity.
6	Punctuation Exercise on Moodle. / Moodle Test.
7	Exercise on Speed Reading session: Introduction to skimming and scanning.
8	Design a skit- a) write the script articulating the message of their respective NGOs. Promote the play through a social media and gather your audience. Enact the play. Capture the numbers of likes and reviews.
9	Project specified by TCS to be completed and E magazine to be published as directed.
10	Write an article on How each of the Lindgren's Team Players Roles helps a team and explain the role played by you in various activities throughout the semester.

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)

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester -II

[CE1103]: Environmental Studies

Teaching Scheme:	Credit	Examination Scheme:
PR: -02 Hours/Week	PR:01	LabEvaluation :25Marks

Course Prerequisites : Fundamentals of Environmental Science.

Course Objective:

To make students aware about natural resources, environment protection and sustainability.

Course Outcome:

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

ELO1: Explain an ecology, ecosystem and sustainability.
ELO2: Explain different types of pollution.
ELO3: Measure different types of pollution level.

Lab Contents

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) perdivision.
2) Continuous assessment of laboratory work is done based on overall performance and lab assignments performance of student.
3) Each lab experiment assessment shall be assigned grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include- timely completion, performance, innovation, efficient codes, punctuality andneatness

List of Laboratory Experiments

1	Assignment on ecosystem
2	Assignment on understanding of sustainability concept.
3	Study of different types of pollution
4	To study norms and standards for potable water.
5	Ecological study of nearby water body.
6	Effect of noise on health by case study.
7	Study of traffic pollution in campus.
8	Application of Drone for aerial survey
9	To present a seminar in a group of four students related to Energy/Environment
10	Site visit to water treatment plant.

Text Books:

T1. Bharucha, E, "Textbook of Environmental Studies", Universities Press
T2. MahuaBasu, "Environmental Studies", Cambridge University Press

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

Syllabus of

Common Courses for

Group1

Group2

&

Group 3

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester -I/II

[HS1101]: English

Teaching Scheme:	Credit	Examination Scheme:
PR:-2 Hours/Week	PR: 1	TermWork : 25 Marks

Course Prerequisites: Knowledge of basic grammar. Interface with vocabulary used in day to day life. Strong will power to improve communication skills.

Course Objective: To enhance the systemic and specific knowledge and skills of the learners in the use of English language by improving their ability to listen, speak, read, and write.

Course Outcome:

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

CO1: Acquire knowledge of basic and fundamental grammar in English including reading and listening comprehension, writing, and speaking skills.

CO2: Construct different types of sentences using effective and new vocabulary to create a good Impression.

CO3: Write, precisely, and competently in different scenarios.

CO4: Acquire structure and written expression required for their profession and enable them to acquire proper behavioral skills

CO5: Present themselves well in front of a large audience on a variety of situations related to group communication and presentation in a relevant scenario. Moreover, they will get the knack for the structured conversation to make their point of view clear to the listeners.

Course Contents

UNIT-I	Sentence Structure	5 Hours

Orientation, Parts of speech- Introduction to Noun, Pronoun, Verbs, Adverbs, Adjectives, Prepositions, Conjunctions, Interjections, Use present, past, and future tenses (2-3) with appropriate time markers .Recognize present perfect, past perfect and future perfect tenses and their progressive forms .Use perfect tenses with increasing accuracy.

UNIT-II	Fundamentals of Communication (Vocabulary Building)	5 Hours

Vocabulary-Synonyms, Antonyms, Root words, Technical Vocabulary Words Idioms and Phrases, Idioms, and Phrasal Verbs. searching the internet, for English resources; reading office, documents; reading safety signs and reading professional texts.

UNIT-III	Nature and Style of Writing	5 Hours

E-mail Writing and etiquettes, Email Writing.Writing Cover Letters. Resume Writing, Report Writing, Creative Writing, writing and communicating through e-mails; writing minutes of meetings.

UNIT-IV	Oral Communication	5 Hours

Orientation about grooming, Fluency, body language, Non-verbal communication, Expressions, Group Discussion, Debate Extempore-Orientation and MockGD, Debate,Extempore rounds.SpeakingSkills, Professional Role Plays Interview Skills, Product/Model/Poster/Company Presentations,Situational

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

Tasks and Case Studies On-Floor Communication and Signboards, Telephone Etiquette, Delivering oral presentations; 12.Conversation Skills, Fluency, Voice and accent.

UNIT-V	Presentation	4 Hours

PPT presentation/ Poster making, group presentations to boost stage confidence and to inculcate team building skills, practice and implement communication skills practices to gain fluency while communicating.

Guidelines for Assessment

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

List of Assignments

1	Assignment on Parts of speeches and tenses
2	Assignment on Idioms and Phrasal Verbs
3	Assignment on Prepositions
4	Assignment on Email Writing
5	Assignment on Reading Comprehension.

Text Books:

T1. English for Engineers. Dr.K.Anbazhagan, Dr.B.Cauveri&Dr.M.P.Devika, Cengage Publications. 2016.

T2. Dhanavel, S.P. English and Communication Skills for Students of Science and Engineering. Units 1-5.Chennai: Orient, Blackswan Ltd., 2009.

T3. Raman, Meenakshi, and Sangeetha Sharma. Technical Communication-Principles and Practice. Oxford University Press. 2009.

T4. Day, R A. Scientific English: A Guide for Scientists and Other Professionals. 2nd ed. Hyderabad: Universities Press, 2000

Reference Books:

R1. K.R.Laxminarayanan, English for Technical Communication, Scitech, Sixth Edition, 2008

R2. William Sanborn Pfeiffer, T.V.S. Padmaja, Technical Communication: A Practical Approach, Pearson, Sixth Edition 2012

R3. A.K.Jain, Praveen Bhatia, A.M.Shaikh, Professional Communication Skills, S. Chand and Co: Fifth edition,2009

R4. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hills Publishing Company 2006

R5. F.T.Wood, Remedial English Grammar, Macmillan, 2007

R6. Andrea J.Rutherford, Ph.D. Basic Communication Skills for Technology, Pearson Education Asia,2001

R7. Exercises in Spoken English, Parts 1 and II CIEFL, Hyderabad, Oxford University Press

R8. Sanjay Kumar, Pushplata, Communication Skills, Oxford University Press, First edition,2012

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year - 2020-2021 Semester -I/II

[HS1102]: German

Teaching Scheme: PR: 2 Hours/Week	Credit PR: 1	Examination Scheme: Term Work : 25 Marks

Course Prerequisites: Desire to get acquainted to German language.

Course Objective: Introduction of Germany, Greetings, phrases, vocabulary, Understanding of numbers, Grammar- Introductory Sentence Formation, Articles, Pronouns, Tense, Prepositions

Course Outcome:
After successful completion of the course, students will able to:
CO1: Understand the basic information of Germany
CO2: Recognize and identify German letters and numbers
CO3: Describe and introduce themselves
CO4: Formulate basic questions

Course Contents

UNIT-I	Start auf Deutsch: (Begin in German) / Guten Tag! (Good day)	8 Hours

To learn to spell in German; introducing and giving information about oneself and others; to talk about oneself and others. **Grammar** - W-questions; simple statements; basic verbs and personal pronouns. **Vocabulary** - Alphabets; numbers 1 -20; greetings; countries and their languages.

UNIT-II	Freunde, Kollegen und Ich (Friends, Colleagues and Me)	8 Hours

To talk about hobbies;to make appointments; to talk about work, profession, work timings; total kabout seasons of theyear;tocreateone'sprofile.**Grammar**-Genderarticles*der,die,das,dieandthesingular plural form sa noun*; personal pronouns II; yes- no questions; verbs *haben* and *sein.* **Vocabulary-** Hobbies; days of the week; months and seasons of the year; numbers 21-100; Professions

UNIT-III	Städte, Länder, Sprachen: (Cities, Countries, Languages)	8 Hours

To name places and buildings; to ask questions about a place; to match texts with images; to enquire about things;to name modes of transport;toaskfororderdescriberoutes;tounderstandinternationalwords **Grammar** - Definite articles *der, die, das*; indefinite articles *ein, eine, ein*; negative articles *kein,keine, kein*; exclamatory sentences with *Sie* **Vocabulary** - Places and buildings; modes of transport;directions

Guidelines for Assessment

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

List of Assignments

1	Multiple choice questions online assessment after completion of every unit to evaluate the understanding of the grammar.
2	Spoken exercises to evaluate the learning in the conversational aspect of the language.

Text Books:
T1. Funk, Kuhn, &Demme. Studio d A1. Deutsch alsFremdsprache. 2011. Goyal Publishers & Distributors Pvt. Ltd. Delhi, India

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

Academic Year - 2020-2021 Semester -I/II

[HS1103]: Japanese

Teaching Scheme: PR:-2 Hours/Week	Credit PR: 1	Examination Scheme: TermWork : 25Marks

Course Prerequisites: Desire to get acquainted to Japanese language.

Course Objective: To meet the needs of ever growing industry with respect to language support, to get introduced to Japanese society and culture through language.

Course Outcome:

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

CO1: Acquire basic communication skills.
CO2: Read basic Japanese script.
CO3: Acquire basic reading , writing and listening skills

Course Contents

UNIT-I	Introduction to Japanese Language	8Hours
Hiragana basic Script, colors, Days of the week.		
UNIT-II	**Hiragana**	**8 Hours**
Modified Kana, double consonant, Letters combined with ya, yu, yo Long vowels, Greetings and expression		
UNIT-III	**Self Introduction, Introducing other person,**	**8 Hours**
Numbers, Months, Dates, Telephone numbers, Stating one's age.		

Lab Contents

Guidelines for Assessment

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

List of Assignments

1	Two written Assignments based on Script, oral – Self introduction, Quiz
2	Oral – Self introduction and Quiz

Reference Books:

R1 . Minna No Nihongo, "Japanese for Everyone", Elementary Main Text book 1 (Indian Edition),Goyal Publishers & Distributors Pvt. Ltd.

Dr. S M Yadav	Dr. S V Kedar		Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics		Director RSCOE, Pune

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

Academic Year – 2020-2021 Semester –I/II

[HS1104]: French

Teaching Scheme:	Credit	Examination Scheme:
PR: 2 Hours/Week	PR: 1	TermWork : 25Marks

Course Objective:

1. To make the students understand the importance of learning a foreign language.
2. This module will help students learn the basics of French Language.
3. The learners would be able to greet people, talk about self, talk about where they live, about their family members and likes and dislikes
4. This A1.1 level will lay the foundation to the next A1.2 level learning of the language.

Course Outcome:

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

CO 1: Read/Write and understand French at an elementary level

CO 2: Listen to basic spoken French and demonstrate understanding by responding appropriately

Course Contents

UNIT-I	Vocabulary	6 Hours

Alphabet, Numbers, Family name & Given Name, Residence, Personal items, Classroom objects, Nationalities, Professions, Marital status (married / single),Countries & Cities, Hobbies

UNIT-II	Grammar Topics	6 Hours

Personal subject pronouns, Tonic pronouns, Present tense – State and Description, Common verbs: be, have, do, to be called ER Verbs: to live, to work, to talk, Verb: to understand (I and You forms), Condition for politeness (I would like to), Interrogation(the3forms), Interrogative words: Do you, what do you, Interrogative pronouns: Where, When, How much, Interrogative adjectives (what), It is / Thisis / Here is, Use of definite and indefinite articles in the sentence, Zero article for professions, Cardinal numbers, Demonstrative adjectives Masculine/Feminine & Singular/Plural concept, Agreement of Adjectives (for nationalities), Some descriptive adjectives (big, small,) ,Position of adjectives

UNIT-III	Speaking Topics	6 Hours

First encounters: Greet somebody, take leave of somebody, ask news or Give your news, Introduction Tell about yourself or somebody else, give your name, spell your name, Tell your age, Tell your ,nationality,Tellyourprofession3.Talkaboutyourdailylife Give your address/email, Give your phone number, Talk about your family, Talk about your hobbies ,Describe an object / a person, Tell about something or someone , Say the price of an object, Talk about ownership, Talk about quantity, Describe the weather , Ask for an information, Ask for personal information ,Ask about the date Ask about the time, Ask about a service

UNIT-IV	Sociocultural Knowledge	6 Hours

Greetings (when meeting people), Simple expressions to express politeness: excuse me, please, sorry, thank you, Informal you and Formal you .

Guidelines for Assessment

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

Assessment is a continuous assessment based on submission of the assignments, timely completion, attendance and understanding.	
List of Assignments	
1	Multiple choice questions online assessment after completion of every unit to evaluate the understanding of the grammar.
2	Spoken exercises to evaluate the learning in the conversational aspect of the language.
Textbook: **T1.** Saison 1 (méthode de Français- Livre de l'eleve)(textbook)	
Reference Books: **R1.** Saison 1 (cahier d'activités)(workbook) **R2**. Collins dictionary (French-English) (French-French)	

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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

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

Academic Year – 2020-2021 Semester –I/II

[ES1104]: Engineering Design and Development

Teaching Scheme:	Credit	Examination Scheme:
PR:-2 Hours/Week	PR: 1	TermWork : 25Marks

Course Prerequisites: Basic knowledge of mathematics and sciences.

Course Objective: Project Based Learning(PBL)connects students to the real world. It prepares students to accept and meet challenges in the real world, mirroring what professional do everyday. The objective is to improve student's attitude towards education by building intrinsic motivation. The course will inculcate values like critical thinking, problem solving, collaboration, self-learning ability, awareness about social issues andcommunication.

Course Outcome:
After successful completion of the course, students will able to:
CO1: Apply science and mathematical principles to solve real life problems.
CO2: Use of modern tools and technologies to find solution for the problems.
CO3: Develop an ability to function in multidisciplinary team and communicate effectively.
CO4: Recognize moral, ethical, legal and social issues and responsibility.

Project Groups:

- Interdisciplinary group of students should be formed (4-5 students pergroup).
- One Mentor is assigned to individualgroup.
- To strengthen team spirit, each group is assigned, task like puzzles, activities etc. underthe observation offacilitator.

Selection of problem for project:
Problem based learning (PBL)is a student centered, inquiry based instructional model in which learners engage to solve real world problems. PBL research begins with small group brain storming sessions where students define, study and investigate the problem. The problem should refer to a particular practical, scientific, social and/ or technical domain. The problem should be designed in accordance with outcomes like deeper understanding of concept, self-directed learning, critical reasoning and development of domain specific and interdisciplinary skills with collaborative approach and use of modern tools/technology.

Guidelines for Assessment And Evaluation

Assessment:

- The facilitator/Mentor is committed to assessing and evaluating students' performance during PBL Weekly review of work assigned during PBL should be monitored and continuous assessment should be done bymentor/supervisor.
- Students must maintain an institutional culture of authentic collaborations, self–motivation, peer –learning and personal responsibility.
- Every group should demonstrate their work and skills by developing it her prototype

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

model/Product and/ or report and/or presentation**.**

- Individual assessment (Understanding individual capacity, role and involvement in project).
- Group assessment (Useofrubricstodeterminewhetherstudentshaveclearlycommunicatedthe problem, background, research methods, solutions (feasible and research based) and resources and to decide whether group members participated meaningfully).
- Report preparation and Presentation.

Evaluation:

Continuous assessment sheet is to be maintained by all mentors of the department.

Parameters for assessment, evaluation and Weightage:

- Defining the problem (10%).
- Outcome of PBL/Problem solving skills/Solution provided/ Final product /Prototype model (50%).
- Documentation (literature survey, gathering requirements, designing/modelling ,implementation execution, use of modern technology and final report(20%).
- Demonstration(Presentation) (10%)
- Patent/Publication (5%)
- Awareness of Environment /social/ethics/safety/legal measures.(5%)

Text Books:

T1. Allen B. Downey, Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016

T2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Reference Books:

R1. Arduino 101 Beginners Guide: How to Get Started with your Arduino by Erik Savasgard published by Create space Independent Pub.

R2. Internet of things a hands on approach by Arshdeep Bahga, Vijay Madisetti-5 copies published by Arshdeep Bagga.

R3. Modeling and Simulation using MATLAB - Simulink , second edition, by Shailendra Jain, Willey publication.

R4.'Let us C' by YashwantKanetkar, BPB Publications.

R5. Theory of Machines by S.S. Ratan, Tata McGraw-Hill Education.

Dr. S M Yadav	Dr. S V Kedar	Dr. R. K. Jain
H.O.D, Engg. Science	Dean Academics	Director RSCOE, Pune

F. Y. B. Tech Semester-I (Group 1,2&3)
[HS1108]: 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:

CO 1: Incorporate importance of health, fitness, outdoor activities and develop a sense of aesthetics and enhance creativity.

CO 2: Explore one self, experience the joy of learning, take decisions with courage, built relationships between teachers and students and be sensitive to others.

CO 3: Interact with the people who are eminent in industry, social service or in public life.

CO 4: 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	

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

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	
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**.**	

Dr. S M Yadav
H.O.D, Engg. Science

Dr. S V Kedar
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune