D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25 affiliated to

Savitribai Phule Pune University

Curriculum Structure and Syllabus
First Year Engineering (2024 Pattern)

(With effect from Academic Year 2024-25)

National Education Policy (NEP) based Curriculum

R5: 05 March 2025

Preface

D Y Patil College of Engineering, Akurdi, Pune (DYPCOE) has been recognized for providing quality education in Maharashtra for the past 40 years. With a commitment to academic excellence and a vision for the future, DYPCOE is now boarding a new journey towards Autonomy, in line with the latest educational reforms. The Institute is dedicated to the effective implementation of the New Education Policy (NEP) 2020, as per the guidelines by the Government of Maharashtra. This initiative is aimed at fostering the holistic development of our students, ensuring they are well-equipped to meet the challenges of the 21st century.

The present syllabus details the first-year engineering (FY) syllabus, meticulously designed to align with the NEP 2020 and effective from the academic year 2024-25. The curriculum is structured to provide a robust foundation through Basic Science Courses and Engineering Science Courses. It also integrates Vocational and Skill Enhancement Courses, Ability Enhancement Courses, the Indian Knowledge System, and co-curricular Liberal Learning courses. This comprehensive approach aims to cultivate well-rounded engineers who are adaptable to Internationalization.

One of the key highlights of this syllabus is its emphasis on Experiential Learning and hands-on experience. By integrating theoretical knowledge with practical laboratory sessions, we aim to enhance the learning process and foster a deeper understanding of core concepts. Additionally, the curriculum promotes research and innovation by encouraging students to engage in project-based learning.

The development of this curriculum has been a collaborative effort, and we owe a debt of gratitude to all those who have contributed to its creation. Our sincere thanks go to the Management, Steering Committee Members, Heads of Departments, and the Board of Studies chairpersons and members for their invaluable input and dedication. Their collective expertise and commitment have been instrumental in shaping this curriculum.

We are confident that this new curriculum will pave the way for our students to achieve academic excellence and holistic development, preparing them to thrive in an ever-evolving global landscape.

Dr.Mrs. P. Malathi
Principal

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

Programs Offered in Bachelor of Technology (B Tech)

1. Artificial Intelligence and Data Science
2. Civil Engineering
3. Computer Engineering
4. Electronics and Telecommunication Engineering
5. Information Technology
6. Instrumentation and Control Engineering
7. Mechanical Engineering
8. Robotics and Automation

Abbreviations and Definitions

NEP: National Education Policy

PEO: Program Educational Objectives

PO: Program Outcomes

PSO: Program Specific Outcomes

CO: Course Outcomes

BSC: Basic Science Courses

ESC: Engineering Science Courses

VSEC: Vocational and Skill Enhancement Courses

AEC: Ability Enhancement Courses

CC: Co-Curricular Courses

IKS: Indian Knowledge System

HSSM: Humanities Social Science and Management

PCC: Program Core Course

CCE: Continuous Comprehensive Evalution

ESE: End Sem Examination **Cr**: Credits
L: Lecture
T: Tutorial

P: Practical

FY: First Year

SY: Second Year
TY: Third Year
BY: Final Year

Group A: Computer, IT and AIDS
Group B: ETC, Instrumentation and Robotics and Automation,
Group C: Civil and Mechanical

Group I: Civil, Mech, Robotics and Automation, Instrumentation
Group II: Computer, IT, AIDS, ETC,

Cycle I: Computer, IT and AIDS
Cycle II: Civil, Mech, Robotics and Automation, ETC, Instrumentation

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Detailed Syllabus

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D Y Patil College of Engineering, Akurdi, Pune

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First Year Engineering FY B Tech Semester I												
Course Code	**Course Type**	**Course**	**Teaching Scheme**				**Evaluation Scheme**					
								Theory Marks			**Practical Marks**	
			L (Hr)	**T (Hr)**	**P (Hr)**	**Cr**	**Exam**	**Max %**	**Min Marks for Passing**		**Max %**	**Min Marks for Passing**
BSC2401L01-03/ BSC2401L04-06	BSC 1/2	Engineering Physics/Chemistry	3	0	0	3	CCE	50	20	40		
							ESE	50	20			
BSC2401P07/ BSC2401P08	BSC 1/2	Engineering Physics/Chemistry Lab	0	0	2	1	CCE				100	40
BSC2401L09-11	BSC 3	Linear Algebra and Differential Calculus	3	1	0	4	CCE	50	20	40		
							ESE	50	20			
ESC2401L01-02/ ESC2401L03	ESC 1/2	Applied Mechanics/Electrical and Electronics Engineering	3	0	0	3	CCE	50	20	40		
							ESE	50	20			
ESC2401P04-05/ ESC2401P06	ESC 1/2	Applied Mechanics lab/Electrical and Electronics Engineering Lab	0	0	2	1	CCE				100	40
ESC2401L07/ ESC2401L08	ESC 3/4	Engineering Graphics and Computer Aided Drafting /Programming and Problem Solving	2	0	0	2	CCE	50	20	40		
							ESE	50	20			
ESC2401P09/ ESC2401P10	ESC 3/4	Engineering Graphics and Computer Aided Drafting Lab/ Programming and Problem Solving Lab	0	0	2	1	CCE				100	40
VSC2401P01	VSE C1	Experiential Learning I	0	1	2	2	CCE				100	40
HSM2401P01	AEC 1	Professional and Technical Communication	0	1	2	2	CCE				100	40
LLC2401P01	CC1	Liberal Learning I/ Liberal Learning II	0	1	2	2	CCE				100	40
		Total Credits	**11**	**4**	**12**	**21**						
					Hrs							
			Theory		**15**							
			Pract/Lab		**12**							
			Total		**27**							

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First Year Engineering FY B Tech Semester II												
Course Code	Course Type	Course	Teaching Scheme				Evaluation Scheme					
			L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
								Max %	Min Marks for Passing		Max %	Min Marks for Passing
BSC2402L01-03/ BSC2402L04-06	BSC1/2	Engineering Physics/Chemistry	3	0	0	3	CCE	50	20			
							ESE	50	20	40		
BSC2402P07/ BSC2402P08	BSC1/2	Engineering Physics/Chemistry Lab	0	0	2	1	CCE				100	40
BSC2402L09-11	BSC4	Differential Equation and Integral Calculus	3	1	0	4	CCE	50	20			
							ESE	50	20	40		
ESC2402L01-02/ ESC2402L03	ESC1/2	Applied Mechanics/Electrical and Electronics Engineering	3	0	0	3	CCE	50	20			
							ESE	50	20	40		
ESC2402P04-05/ ESC2402P06	ESC1/2	Applied Mechanics Lab/Electrical and Electronics Engineering Lab	0	0	2	1	CCE				100	40
ESC2402L07/ ESC2402L08	ESC3/4	Engineering Graphics and Computer Aided Drafting /Programming and Problem Solving	2	0	0	2	CCE	50	20			
							ESE	50	20	40		
ESC2402P09/ ESC2402P10	ESC3/4	Engineering Graphics and Computer Aided Drafting /Programming and Problem Solving Lab	0	0	2	1	CCE				100	40
XXX2402L01	PCC1	Program Specific Core Course	2	0	0	2	CCE	50	20			
							ESE	50	20	40		
VSC2402P02	VSEC2	Experiential Learning II	0	1	2	2	CCE				100	40
HSM2402L02	IKS	Science and Engineering of Ancient India	2	0	0	2	CCE				100	40
LLC2402P02	CC2	Liberal Learning I/ Liberal Learning II	0	1	2	2	CCE				100	40
		Total Credits	**15**	**3**	**10**	**23**						
					Hrs							
			Theory		**18**							
			Pract/Lab		**10**							
			Total		**28**							

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First Year (FY) B Tech Semester I & II

Course Code: BSC2401L01, Course Title: Engineering Physics (Group A)

Category: Basic Science Course

		Teaching Scheme			Evaluation Scheme		
					Theory % Marks		
L	T	P	Cr	Exam	Max	Min for Pass	
3	0	0	3	CCE	50	20	40
39	0	0		ESE	50	20	

Prerequisites:

Properties of light, wave-particle duality, semiconductors

Course Objective

1. Engineering being a science of measurement, Physics plays basic role in understanding the Principles behind engineering systems and helps to yield more efficient and effective designs for sustainable developments.
2. Physics is called natural science since it has systematic explanation behind everything that happens in the universe. Hence it fosters temperament of searching cause effect relationship.
3. Proposed curriculum is the show case of combination of Photonics, Optoelectronics, solid state technology, which are closer to the industrial world.
4. The focus is on to inculcate the scientific temperament in the minds of budding engineers for their 360-degree development.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Apply** the properties of laser in various applications like material working and holography.
CO2	**Correlate** the principles in quantum mechanics with applications like dynamics of electrons and quantum computing.
CO3	**Estimate** electric load for fixing solar PV systems for the domestic application.
CO4	**Compare** the use of normal conductor and Superconductor for SQUID and MAGLEV Train.
CO5	**Select** optic fibre for intended communication system.

Syllabus

Unit I	PHOTONICS	8 hrs

Basic Mechanisms- absorption, emission, inverted population, metastable state,
Construction and working of laser cavity, CO_2 Laser, He-Ne Laser and Semiconductor Laser (Homo-junction and Heterojunction).
Applications of Laser: Material working, Laser Distance Meter (LDM), Holography

Unit II	INTRODUCTION TO QUANTUM THEORY	8 hrs

Introduction to Quantum Mechanics, De-Broglie hypothesis, phase and group velocity. Heisenberg's uncertainty principle with illustration, Wave function and its physical significance. Schrodinger wave equations, Illustration of particle in a rigid box using Schrodinger time independent equation.
Applications of Quantum Theory: Tunneling effect and its illustration with examples of Alpha particle decay, Tunnel diode, Scanning Tunneling Microscope.

Unit III	**SOLAR CELL DEVICES & SOLAR THERMAL TECHNOLOGY**	**8 hrs**
Principle, Construction, working of Solar Cells, I-V characteristics and Fill Factor of Solar Cells, Use of antireflection coating on solar cell to improve power output. **Application:** Basic PV System and its specifications (Load calculation, Backup time, Battery capacity, inverter capacity and Solar panel capacity). Principle of working of solar thermal system and its specifications **Application:** Domestic Solar thermal water heater.		
Unit IV	**SUPERCONDUCTIVITY**	**8 hrs**
Introduction to superconductivity, Properties of superconductors: zero electrical resistance, critical magnetic field, persistent current, Meissner effect, Type I and Type II superconductors, AC/DC Josephson effect, Construction and working of Superconducting Quantum Interface Device (SQUID). Applications of SQUID and superconductors,		
Unit V	**FIBER OPTICS**	**7 hrs**
Principle, Construction and Working of Optic Fiber, Numerical Aperture, attenuation and its causes, Types of optic fiber, Working of Optical communication system on the basis of block diagram		

Reference Books

1. Non-destructive tests and evaluation of Materials 2nd Edition, J. Prasad, C.G. Krishnadas Nair, Mc Graw Hill (2017)
2. Jenkin and White, Fundamentals of Optics, 4th Edition, Tata McGraw Hill (2017)
3. Solar Photovoltaic Technology and Systems: Manual for Technicians, Trainers and Engineers (2013)
4. Solar Thermal Energy, A. Sreekumar, New Age Publications(2020)
5. Laser and Non-Linear Optics, B.B. Loud (Oscar publication)(2022)
6. Engineering Physics R. K. Gaur, Dhanpatray and Sons Publication (2012)

Text Books

1. A Text book of sound- N Subhrannyam and Brijjlal (2018)
2. Engineering Physics, Avadhanulu, Kshirsagar, S. Chand Publications
3. A textbook of optics – N Subrahmanyam and BriLal , S. Chand Publications
4. Engineering Physics, Gaur, Gupta, Dhanpat Rai and Sons Publication

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3									1
CO2	3	3									1
CO3	3	3				1		1			2
CO4	3	3					2				1
CO5	3	3									1

3: High, 2: Moderate, 1: Low, 0: No Mapping

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First Year (FY) B Tech Semester I & II

Course Code: BSC2402L02, Course Title: Engineering Physics (Group B), Category: Basic Science Course

Teaching Scheme				Evaluation Scheme			
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks		
					Max %	Min marks for Passing	
3	0	0	3	CCE	50	20	40
39	0	0	Total: 39	ESE	50	20	

Prerequisites: Properties of light, wave-particle duality, semiconductors

Course Objective:

1. Engineering being a science of measurement, Physics plays basic role in understanding the Principles behind engineering systems and helps to yield more efficient and effective designs for sustainable developments.
2. Physics is called natural science since it has systematic explanation behind everything that happens in the universe. Hence, it fosters temperament of searching cause effect relationship.
3. Proposed curriculum is the showcase of combination of Photonics, Optoelectronics, solid-state technology, which are closer to the industrial world.
4. The focus is on to inculcate the scientific temperament in the minds of budding engineers for their 360-degree development..

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Apply** the properties of laser in various applications like material working and holography.
CO2	**Correlate** the principles in quantum mechanics with applications like dynamics of electrons and quantum computing.
CO3	**Estimate** electric load for fixing solar PV systems for the domestic application.
CO4	**Compare** the use of normal conductor and Superconductor for SQUID and MAGLEV Train.
CO5	**Analyse** the properties of nanomaterials based on characterization technique.

Syllabus

Unit I	PHOTONICS	8 hrs
Basic Mechanisms- absorption, emission, inverted population, metastable state, Construction and working of laser cavity, CO_2 Laser, He-Ne Laser and Semiconductor Laser (Homo-junction and Heterojunction). **Applications of Laser**: Material working, Laser Distance Meter (LDM), Holography		
Unit II	**INTRODUCTION TO QUANTUM THEORY**	**8 hrs**
Introduction to Quantum Mechanics, De-Broglie hypothesis, phase and group velocity. Heisenberg's uncertainty principle with illustration, Wave function and its physical		

significance. Schrodinger wave equations, Illustration of particle in a rigid box using Schrodinger time independent equation.
Applications of Quantum Theory: Tunneling effect and its illustration with examples of Alpha particle decay, Tunnel diode, Scanning Tunneling Microscope.

Unit III	**SOLAR CELL DEVICES & SOLAR THERMAL TECHNOLOGY**	**8 hrs**

Principle, Construction, working of Solar Cells, I-V characteristics and Fill Factor of Solar Cells, Use of antireflection coating on solar cell to improve power output.
Application: Basic PV System and its specifications (Load calculation, Backup time, Battery capacity, inverter capacity and Solar panel capacity).
Principle of working of solar thermal system and its specifications
Application: Domestic Solar thermal water heater.

Unit IV	**SUPERCONDUCTIVITY**	**8 hrs**

Introduction to superconductivity, Properties of superconductors: zero electrical resistance, critical magnetic field, persistent current, Meissner effect, Type I and Type II superconductors, AC/DC Josephson effect, Construction and working of Superconducting Quantum Interface Device (SQUID).
Applications of SQUID and superconductors,

Unit V	**Characterizations of Thin Films**	**7 hrs**

Purpose of characterization of material,
Surface Characterization: Contact Angle
Structural Characterization: X-ray diffraction (XRD) and Atomic Force Microscopy,
Electrochemical Characterization: Cyclic Voltammetry, Galvanostatic Charge Discharge, Electrochemical Impedance Spectroscopy.

Reference Books

1.Non-destructive tests and evaluation of Materials 2nd Edition, J. Prasad, C.G. Krishnadas Nair, Mc Graw Hill (2017)

2.Jenkin and White, Fundamentals of Optics, 4th Edition, Tata McGraw Hill (2017)

3.Solar Photovoltaic Technology and Systems: Manual for Technicians, Trainers and Engineers (2013)

4.Solar Thermal Energy, A. Sreekumar, New Age Publications(2020)

5.Laser and Non-Linear Optics, B.B. Loud (Oscar publication)(2022)

6.Introduction to Solid State Physics, C. Kittel (Wiley and Sons)(2012)

7.Fundamentals of Physics, Resnick and Halliday (John Wiley and Sons)(2021)

8.Thin Film Phenomena by K L Chopra McGraw -Hill Book Company, NY 1969.

9.Nanotechnology principle and practices by Sulabha K. Kulkarni (201

Text Books

1. Text book of sound- N Subhrannyam and Brijjlal (2018)

2.Engineering Physics, Avadhanulu, Kshirsagar, S. Chand Publications

3. A textbook of optics – N Subrahmanyam and BriLal , S. Chand Publications

4.Engineering Physics, Gaur, Gupta, Dhanpat Rai and Sons Publication

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3									1
CO2	3	2									1
CO3	3	3				1		1			2
CO4	3	3					2				1
CO5	3	3									1

3: High, 2: Moderate, 1: Low, 0: No Mapping

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First Year (FY) B Tech Semester I & II

Course Code: BSC2402L03, Course Title: Engineering Physics (Group C), Category: Basic Science Course

		Teaching Scheme			Evaluation Scheme		
					Theory % Marks		
L	T	P	Cr	Exam	Max	Min for Pass	
3	0	0	3	CCE	50	20	40
39	0	0		ESE	50	20	

Prerequisites:

Properties of light, wave-particle duality, semiconductors

Course Objective:

1. Engineering being a science of measurement, Physics plays basic role in understanding the Principles behind engineering systems and helps to yield more efficient and effective designs for sustainable developments.
2. Physics is called natural science since it has systematic explanation behind everything that happens in the universe. Hence, it fosters temperament of searching cause effect relationship.
3. Proposed curriculum is the showcase of combination of Photonics, Optoelectronics, solid-state technology, which are closer to the industrial world.
4. The focus is on to inculcate the scientific temperament in the minds of budding engineers for their 360-degree development.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Apply** the properties of laser in various applications like material working and holography.
CO2	**Correlate** the principles in quantum mechanics with applications like dynamics of electrons and quantum computing.
CO3	**Estimate** electric load for fixing solar PV systems for the domestic application.
CO4	**Analyze** acoustical aspects of auditorium.
CO5	**Evaluate** disorders in the material by using NDT for testing of various materials.

Syllabus

Unit I	**PHOTONICS**	**8 hrs**
Basic Mechanisms- absorption, emission, inverted population, metastable state, Construction and working of laser cavity, CO_2 Laser, He-Ne Laser and Semiconductor Laser (Homo-junction and Heterojunction). **Applications of Laser**: Material working, Laser Distance Meter (LDM), Holography		
Unit II	**INTRODUCTION TO QUANTUM THEORY**	**8 hrs**
Introduction to Quantum Mechanics, De-Broglie hypothesis, phase and group velocity. Heisenberg's uncertainty principle with illustration, Wave function and its physical significance. Schrodinger wave equations, Illustration of particle in a rigid box using Schrodinger time independent equation. Applications of Quantum Theory: Tunneling effect and its illustration with examples of Alpha particle decay, Tunnel diode, Scanning Tunneling Microscope.		

Unit III	SOLAR CELL DEVICES & SOLAR THERMAL TECHNOLOGY	8 hrs

Principle, Construction, working of Solar Cells, I-V characteristics and Fill Factor of Solar Cells, Use of antireflection coating on solar cell to improve power output.
Application: Basic PV System and its specifications (Load calculation, Backup time, Battery capacity, inverter capacity and Solar panel capacity).
Principle of working of solar thermal system and its specifications
Application: Domestic Solar thermal water heater.

Unit IV	Sound and Acoustics	8 hrs

Sound: Electroacoustic Transducers, Intensity and loudness of sound, Decibels, Intensity levels, musical notes, musical scale.
Acoustics of Indoor Area: Reverberation and time of reverberation, Absorption coefficient, Sabine's formula for measurement of reverberation time.
Application: Acoustic aspects of auditorium

Unit V	NONDESTRUCTIVE TESTING OF MATERIALS	7 hrs

Purpose of Materials Testing, Types of testing: DT and NDT, Classification of Non-destructive testing methods (Surface and Volumetric), Merits and demerits of NDT.
NDT Techniques: Penetrant testing (PT), Magnetic Particle Testing (MT), Ultrasonic Testing (UT), Eddy Current Testing (ET) and Corrosion Testing.
Overview of International Standards used in testing.

Reference Books

1.Non-destructive tests and evaluation of Materials 2nd Edition, J. Prasad, C.G. Krishnadas Nair, Mc Graw Hill (2017)

2.Jenkin and White, Fundamentals of Optics, 4th Edition, Tata McGraw Hill (2017)

3.Solar Photovoltaic Technology and Systems: Manual for Technicians, Trainers and Engineers(2013)

4.Solar Thermal Energy, A. Sreekumar, New Age Publications(2020)

5.Laser and Non-Linear Optics, B.B. Loud (Oscar publication)(2022)

6.Physics for Engineering (Vol 1)- P. K. Palanisany, Scitech Publications (India) Pvt Ltd(2013).

Text Books

1.A Text book of sound- N Subhrannyam and Brijjlal (2018)

2.Engineering Physics, Avadhanulu, Kshirsagar, S. Chand Publications

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Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3									1
CO2	3	3									1
CO3	3	3				2		1			1
CO4	3	3					2				1
CO5	3	3					1				1

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester I & II

Course Code: BSC2401P07, Course Title: Engineering Physics Lab (Group A, B and C), Category: Basic Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max	Min Marks for Passing		Max	Min Marks for Passing
0	0	2	1	CCE	-	-	-	100	40
0	0	26	Total: 26						

Prerequisites:

Properties of light, wave-particle duality, semiconductors

Course Objectives:

Being an engineering programme, in addition to cognitive skills psychomotor skills like measure, observe, operate etc. will be equally important. To cope up these skills following objectives are identified.

1. To set standard operating procedure to determine the respective parameters.
2. To analyze the changes in the calculated parameters by changing the variables.
3. To compare the theoretical and practically calculated values.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Compare** the theoretical and actual determined values of physical quantity
CO2	**Estimate** Fill Factor of Solar Cell used in PV System.
CO3	**Classify** materials for engineering applications.

Syllabus

PR1 Wavelength of Laser light
To determine wavelength of light by using diffraction pattern
PR 2 Use of LASER to study diffraction grating.
To determine grating element using laser.
PR 3 Plank's Constant
To determine Planck's constant using Light Emitting Diode
PR 4 Study of solar cell.
To determine fill factor of given solar cell
PR 5 Study of solar cell.
To study solar output power with variation in temperature.
PR 6 Study of band gap of semiconductor.
To determine the forbidden energy gap or band gap in eV for the given semiconductor.
PR 7 Hall effect experiment.

To determine the hall coefficient, sign of majority carriers, concentration of majority carriers and mobility of majority carriers in the given semiconductors.
PR 8 Numerical Aperture
To determine Numerical Aperture of optical Fibre
PR 9 Synthesis of thin film
To synthesise thin film using Chemical Bath Deposition
PR 10 Synthesis of thin film
To synthesise thin film using Successive Ionic Layer Adsorption and Reaction (SILAR)
PR 11 Synthesis of thin film
To synthesise thin film using Electrodeposition
PR 12 Ultrasonic interferometer
To determine velocity of ultrasonic waves in liquid using ultrasonic interferometer.
PR 13 Penetrant Testing of given material surface
To visualize surface disorders by using penetrant testing (PT)
PR 14 Demonstration experiment : Rebound hammer
To assess the uniformity and quality of given concrete.
PR 15 Sound Absorption
To determine coefficient of absorption of sound for given material
Text Books
1) A textbook of Engineering Physics-Dr. M.N. Avadhanulu, Dr. P.G. Kshirsagar- Revised edition 2015, S. Chand & Company Pvt. Ltd. 2) Engineering Physics-R.K. Gaur, S. L Gupta, -Eighth revised edition 2012, Dhanpatrai Publications (P) Ltd
Reference Books
1) Lasers & nonlinear Optics-B. B. Laud-Third edition, New Age International (P) Ltd. Publishers. 2) Fundamentals of Optics- Francis A. Jenkins, Harvey E. White, Fourth edition, McGraw Hill Education (India) Pvt. Ltd. 3) Fundamentals of Physics- Resnick & Halliday (John Wiley &sons) 4) An introduction to Laser's theory and applications – Dr. M. N. Avdhanulu, Dr. P.S. Hemne– Revised edition 2017-S. Chand & Company Pvt. Ltd. 5) Introduction to solid states Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd. 6) Electrochemical Supercapacitors, Scientific fundamentals and Technological Applications by B. E.Conway, Kluwer Academic/ Plenum Publishers, New York, Boston, Dordrencht, London, Moscow

D Y Patil College of Engineering, Akurdi, Pune

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Scheme for Practical Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evalution(CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	1					1		
CO2	3	3				1	1				1
CO3	3	2						1			

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech Semester I

Course Code: BSC2401L09, Course Title: Linear Algebra and Differential Calculus (Group A), Category: Basic Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical % Marks	
					Max %	Min Marks for Passing		Max	Min Marks for Passing
3	1	0	4	CCE	50	20	40	-	-
39	13	0	Total: 52	ESE	50	20			

Prerequisites: Differentiation, Integration, Maxima, Minima, Determinants and Matrices.	
Course Objective: Purposes of the course are	
1. To make the students familiarize with concepts and techniques in Calculus and Linear Algebra. 2.The aim is to equip them with the techniques to understand advanced level mathematics and 3. The aim is to use applications that would enhance analytical thinking power, useful in their disciplines	
Course Outcomes: After successful completion of the course units the student will	
CO1	**Apply** the essential tool of matrices and linear algebra in a comprehensive manner for analysis of systems of linear equations applicable to engineering problems.
CO2	**Apply** the essential tool of matrices and linear algebra in a comprehensive manner for finding linear and orthogonal transformations, Eigenvalues and Eigenvectors applicable to engineering problems.
CO3	**Implement** Mean value theorems, expansions of function using Taylor's and Maclaurin's series useful in the analysis of engineering Problems.
CO4	**Apply** the concept partial derivatives to find Jacobian used for functional dependence & estimating error and approximation
CO5	**Solve** Algebraic and Transcendental equation & System of linear Equations Using numerical techniques.

Syllabus

Unit I	**Elementary Linear Algebra**	**8 hrs**
Cramer's Rule, Rank of Matrix, Systems of linear equations, Linear Dependence and Independence, Applications to problems in Engineering		
Unit II	**Advanced Linear Algebra**	**8 hrs**
Linear Transformation , Orthogonal Transformation ,Eigenvalues and Eigenvectors of 2*2 and 3*3, Cayley Hamilton Theorem, Diagonalization of matrix		
Unit III	**Differential Calculus**	**8 hrs**
Lagrange's Mean Value Theorem, Rolle's Theorem, L' Hospital's Rule, Taylor's Series and Maclaurin's Series, Expansion of Functions		
Unit IV	**Function of Several Variables & its Applications**	**8 hrs**
Introduction to functions of several variables, Partial Derivatives, Euler's Theorem on Homogeneous functions, Partial derivative of Composite Function, Jacobians, Functional Dependence, Errors and		

Approximations		
Unit V	**Numerical Methods**	**7 hrs**
Numerical Solution of System of Equation: Gauss Elimination, Jacobi & Gauss Seidel Method. Numerical Solution of Algebraic and Transcendental equation: Bisection Method, Regula Falsi Method, Newton Raphson Method		
Text Book: 1. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi), 2019, 44th Edition, ISBN-978-81-933284-9-1. 2. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill), 2019,35th Edition,ISBN-978-0-07—063419-O.		
Reference Books		
1. Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.), 2022, 10th Edition, ISBN-978-81-265-5423-2. 2. Advanced Engineering Mathematics by M. D. Greenberg (Pearson Education), 2019, 2nd Edition, ISBN-978-81-7758-546-9. 3. Advanced Engineering Mathematics by Peter V. O'Neil (Thomson Learning), 2017, 7th Edition, ISBN-978-81-315-1752-9.		

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	-	-	-	-	1	-	-	1
CO2	3	3	-	-	-	-	-	1	-	-	1
CO3	3	3	-	-	-	-	-	1	-	-	1
CO4	3	3	-	-	-	-	-	1	-	-	1
CO5	3	3	-	-	-	-	-	1	-	-	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech Semester I

Course Code: BSC2401L10, Course Title: Linear Algebra & Differential Calculus (Group B), Category: Basic Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical % Marks	
					Max %	Min Marks for Passing		Max	Min Marks for Passing
3	1	0	4	CCE	50	20			
39	13	0	Total: 52	ESE	50	20	40	-	-

Prerequisites: Differentiation, Integration, Maxima, Minima, Determinants and matrices.

Course Objectives: Purpose of the course are

1. To make the students familiarize with concepts and techniques in Calculus and Linear Algebra.
2. The aim is to equip them with the techniques to understand advanced level mathematics.
3. The aim is to Use Applications of mathematics that would enhance analytical thinking power, useful in their disciplines

Course Outcomes: After successful completion of the course the student will

CO1	**Apply** the essential tool of matrices and linear algebra in a comprehensive manner for analysis of systems of linear equations applicable to engineering problems.
CO2	**Apply** the essential tool of matrices and linear algebra in a comprehensive manner for Evaluate linear and orthogonal transformations, Eigenvalues and Eigenvectors
CO3	**Implement** Mean value theorems, expansions of function using Taylor's and Maclaurin's series useful in the analysis of engineering.
CO4	**Calculate** the derivative of functions of several variables that are essential in various branches of Engineering.
CO5	**Examine** the Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems.

Syllabus

Unit I	**Elementary Linear Algebra**	**8 hrs**
Cramer's Rule, Rank of Matrix, Systems of linear equations, Linear Dependence and Independence, Applications to problems in Engineering.		
Unit II	**Advanced Linear Algebra**	**8 hrs**
Linear Transformation, Orthogonal Transformation ,Eigenvalues and Eigenvectors of 2*2 and 3*3 matrices Cayley Hamilton Theorem, Diagonalization of matrix		
Unit III	**Differential Calculus**	**8 hrs**
Lagrange's Mean Value Theorem, Rolle's Theorem, L' Hospital's Rule, Taylor's Series and Maclaurin's Series, Expansion of Functions		
Unit IV	**Function of Several Variables &Its Application**	**8 hrs**
Introduction to functions of several variables, Partial Derivatives, Euler's Theorem on Homogeneous functions, Partial derivative of Composite Function, Jacobians, Functional Dependence, Errors and Approximations		
Unit V	**Fourier Series**	**7 hrs**
Definition, Dirichlet's conditions, Full range Fourier series, Half range Fourier series, Harmonic analysis, Parseval's identity and Applications to problems in Engineering.		

Text Books:

1.Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill)(**2019,35th edition, ISBN-13978-0-07-063419-00)**

2. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi)(**2019,35th edition, ISBN-978-81-933284-9-1**)

Reference Books

1. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.)(2022,10th ISBN-978-81-265-5423-2)
2. Advanced Engineering Mathematics by M. D. Greenberg (Pearson Education)(2019-2nd ,ISBN-978-81-7758-546-9)
3. Advanced Engineering Mathematics by Peter V. O'Neil (Thomson Learning)(2017,7th ,ISBN-978-81-315-1752-9)

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	-	-	-	-	1	-	-	1
CO2	3	3	-	-	-	-	-	1	-	-	1
CO3	3	3	-	-	-	-	-	1	-	-	1
CO4	3	3	-	-	-	-	-	1	-	-	1
CO5	3	3	-	-	-	-	-	1	-	-	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

F Y B Tech for Group C (Mech, Civil) Semester I

Course Code: BSC2401L11, Course Title: Linear Algebra & Differential Calculus (Group C), Category: Basic Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical % Marks	
					Max %	Min Marks for Passing		Max	Min Marks for Passing
3	1	0	4	CCE	50	20			
39	13	0	Total: 52	ESE	50	20	40	-	-

Prerequisites: Differentiation, Integration, Maxima, Minima, Determinants and matrices.

Course Objective: Purpose of the course are

1. To make the students familiarize with concepts and techniques in Calculus and Linear Algebra.
2. The aim is to equip them with the techniques to understand advanced level mathematics
3. The aim is to Use Applications of mathematics that would enhance analytical thinking power, useful in their disciplines

Course Outcomes: After successful completion of the course , students will

CO1	**Apply** the essential tool of matrices and linear algebra in a comprehensive manner for analysis of systems of linear equations applicable to engineering problems.
CO2	**Apply** the essential tool of matrices and linear algebra in a comprehensive manner to evaluate linear and orthogonal transformations, Eigenvalues and Eigenvectors
CO3	**Implement** Mean value theorems, expansions of function using Taylor's and Maclaurin's series useful in the analysis of engineering.
CO4	**Apply** the concept partial derivatives to find Jacobian used for functional dependence & estimating error and approximation
CO5	**Apply** basics of complex numbers to calculate roots and logarithms and its applications

Syllabus

Unit I	**Elementary Linear Algebra**	**8 hrs**
Cramer's Rule, Rank of Matrix, Systems of linear equations, Linear Dependence and Independence, Applications to problems in Engineering		
Unit II	**Advanced Linear Algebra**	**8 hrs**
Linear Transformation , Orthogonal Transformation ,Eigenvalues and Eigen Vectors of 2*2 and 3*3, Cayley Hamilton Theorem, Diagonalization of matrix		
Unit III	**Differential Calculus**	**8 hrs**
Lagrange's Mean Value Theorem, Rolle's Theorem, L' Hospital's Rule, Taylor's Series and Maclaurin's Series, Expansion of Functions		
Unit IV	**Function of Several Variables & its Applications**	**8 hrs**
Introduction to functions of several variables, Partial Derivatives, Euler's Theorem on Homogeneous functions, Partial derivative of Composite Function, Jacobians, Functional Dependence, Errors and		

Approximations		
Unit V	**Complex Numbers**	**7 hrs**
Argand Diagram, Demoivre's Theorem and its application to find roots of algebraic equations. Logarithm of complex number, separation of real and imaginary parts , application to problems in Engineering		
Text Book: 1. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi),2019,44th Edition,ISBN No - 978-81-933284-9-1 2. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill) Advanced ,2019,35th Edition, ISBN No-13978-0-07-063419-0		
Reference Books		
1. Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.),2022,10th Edition, ISBN No - 978-81-265-5423-2 2.Advanced Engineering Mathematics by M. D. Greenberg (Pearson Education), 2019,2nd Edition, ISBN No -978-81-7758-546-9 3. Advanced Engineering Mathematics by Peter V. O'Neil (Thomson Learning), 2017,7th Edition, ISBN 13:978-81-315-1752-9, ISBN 10:81-315-1752-7		

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	-	-	-	-	1	-	-	1
CO2	3	3	-	-	-	-	-	1	-	-	1
CO3	3	3	-	-	-	-	-	1	-	-	1
CO4	3	3	-	-	-	-	-	1	-	-	1
CO5	3	3	-	-	-	-	-	1	-	-	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech Semester I & II

Course Code: ESC2401L01, Course Title: Applied Mechanics (Group I), Category: Engineering Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
					Max %	Min Marks for Passing		Max %	Min Marks for Passing
3	0	0	3	CCE	50	20			
39	0	0	Total: 39	ESE	50	20	40	-	-

Prerequisites: 12th Physics, Mathematics

Course Objectives:

Equip students with a thorough understanding of applied mechanics principles and their practical applications, enabling them to effectively analyze and solve engineering problems involving forces, loads, and moments, and to integrate these concepts within related engineering disciplines.

Course Outcomes: After successful completion of the course units the student will

CO1	**Understand** the basic concept of force, moment & couple to determine resultant of various force systems.
CO2	**Apply** conditions of Static equilibrium to free body diagram to solve engineering problem
CO3	**Analyze and solve** engineering problems involving friction, centroids and moments of inertia
CO4	**Analyze** rectilinear and curvilinear motion of particle
CO5	**Apply** Newton's second law, work energy and impulse momentum principles for particles

Syllabus

Unit I	**Force systems and its resultant**	**7 hrs**

Fundamental concept, force system, Resolution and composition of forces, Resultant of Concurrent forces. Moment of a force, Varignon's theorem, resultant of parallel force system, Couple, Resultant of general force system.

Unit II	**Equilibrium & Trusses**	**8 hrs**

Equilibrium: Introduction, Free body diagram, Equilibrium of concurrent, Equilibrium of two forces, three forces principle, parallel and general force system, type of load, type of support, type of beam and support reaction**.**

Trusses-Two force member, assumption, Analysis of plane trusses by Method of joints & method of section

Unit III	Friction, Centroid and Moment of Inertia	8 hrs

Friction- Introduction, sliding and rolling friction, laws of coulomb friction, coefficient of friction, angle of repose, angle of friction, cone of friction, Laws of friction, application of friction on inclined planes, belt friction and ladders friction.

Centroid: Introduction, centroid of basic figure, centroid of composite figure, Moment of area, Centroid of plane lamina.

Moment of Inertia: Moment of inertia of simple geometrical figure, parallel axis theorem, perpendicular axis theorem, moment of inertia of composite figure.

Unit IV	Kinematics of Particle	8 hrs

Introduction, basic concept, rectilinear motion: motion with uniform acceleration, gravitational acceleration and variable acceleration, Curvilinear motion: rectangular, normal and tangential component, projectile motion of a particle.

Unit V	Kinetics of Particle	8 hrs

Introduction, Newton's Second Law of motion, Application of Newton's Second Law to rectilinear and curvilinear motion, Work energy principle, Impulse Momentum principle and impact.

Recommended Books

Text Books:

1. Engineering Mechanics, Ferdinand Singer, 3rd edition, Harper and Row
2. Engineering Mechanics (Statics and Dynamics) by Hibbeler R. C., Pearson Education

Reference Books:

1. Engineering Mechanics, S Timoshanko and Young, Tata McGraw Hill Education Pvt. Ltd. New Delhi.
2. Vector Mechanics for Engineers – Statics, Beer and Johnston, Tata McGraw Hill
3. Vector Mechanics for Engineers – Dynamics, Beer and Johnston, Tata McGraw Hill.
4. Engineering Mechanics - Statics and Dynamics, Meriam J. L. and Kraige L.G., John Wiley and Sons.

NPTEL Link :

1. https://archive.nptel.ac.in/courses/112/106/112106286/
2 https://onlinecourses.nptel.ac.in/noc19_me41/preview

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2		2				2	2		
CO2	3	2						2	2		
CO3	3	2						2	2		
CO4	3	2						2	2		
CO5	3	2	2					2	2	2	

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech Semester I & II

Course Code: ESC2402L02, Course Title: Applied Mechanics (Group II), Category: Engineering Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
					Max %	Min Marks for Passing		Max %	Min Marks for Passing
3	0	0	3	CCE	50	20	40		
39	0	0	Total: 39	ESE	50	20		-	-

Prerequisites: 12th Physics, Mathematics

Course Objectives: Purposes of the course are

Course Objectives:

Equip students with a thorough understanding of applied mechanics principles and their practical applications, enabling them to effectively analyze and solve engineering problems involving forces, loads, and moments, and to integrate these concepts within related engineering disciplines

Course Outcomes: After successful completion of the course units the student will

CO1	Understand the basic concept of force, moment & couple to determine resultant of various force systems.
CO2	Apply conditions of Static equilibrium to free body diagram to solve engineering problem
CO3	Analyze and solve engineering problems involving friction, centroids and moments of inertia
CO4	Analyze rectilinear and curvilinear motion of particle
CO5	Apply Newton's second law, work energy and impulse momentum principles for particles

Syllabus

Syllabus		
Unit I	**Force systems and its resultant**	**7 hrs**
Fundamental concept, force system, Resolution and composition of forces, Resultant of Concurrent forces. Moment of a force, Varignon's theorem, resultant of parallel force system, Couple, Resultant of general force system.		
Unit II	**Equilibrium & Trusses**	**8 hrs**
Equilibrium: Introduction, Free body diagram, Equilibrium of concurrent, Equilibrium of two forces, three forces principle, parallel and general force system, type of load, type of support, type of beam and support reaction**.** **Trusses**-Two force member, assumption, Analysis of plane trusses by Method of joints & method of section		
Unit III	**Friction, Centroid and Moment of Inertia**	**8 hrs**

Friction- Introduction, sliding and rolling friction, laws of coulomb friction, coefficient of friction, angle of repose, angle of friction, cone of friction, Laws of friction, application of friction on inclined planes, belt friction and ladders friction.
Centroid: Introduction, centroid of basic figure, centroid of composite figure, Moment of area, Centroid of plane lamina.
Moment of Inertia: Moment of inertia of simple geometrical figure, parallel axis theorem, perpendicular axis theorem, moment of inertia of composite figure.

Unit IV	**Kinematics of Particle**	**8 hrs**

Introduction, basic concept, rectilinear motion: motion with uniform acceleration, gravitational acceleration and variable acceleration, Curvilinear motion: rectangular, normal and tangential component, projectile motion of a particle.

Unit V	**Kinetics of Particle**	**8 hrs**

Introduction, Newton's Second Law of motion, Application of Newton's Second Law to rectilinear and curvilinear motion, Work energy principle, Impulse Momentum principle and impact.

Recommended Books

Text Books:
1. Engineering Mechanics, Ferdinand Singer, 3rd edition, Harper and Row
2. Engineering Mechanics (Statics and Dynamics) by Hibbeler R. C., Pearson Education

Reference Books:
1. Engineering Mechanics, S Timoshanko and Young, Tata McGraw Hill Education Pvt. Ltd. New Delhi.
2. Vector Mechanics for Engineers – Statics, Beer and Johnston, Tata McGraw Hill
3. Vector Mechanics for Engineers – Dynamics, Beer and Johnston, Tata McGraw Hill.
4. Engineering Mechanics - Statics and Dynamics, Meriam J. L. and Kraige L.G., John Wiley and Sons.

NPTEL Link :
1. https://archive.nptel.ac.in/courses/112/106/112106286/
2 https://onlinecourses.nptel.ac.in/noc19_me41/preview

Scheme for Theory Examination

Component	**Level**	**Unit 1**	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Total**	**Passing**
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2		2				2	2		
CO2	3	2						2	2		
CO3	3	2						2	2		
CO4	3	2						2	2		
CO5	3	2	2					2	2	2	

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech Semester I & II

Course Code: ESC2401P04, Course Title: Applied Mechanics Lab (Group I and II), Category: Engineering Science Course

Teaching Scheme				Evaluation Scheme				
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks		Practical Marks	
					Max %	Min Marks for Passing	Max %	Min Marks for Passing
0	0	2	1	CCE			100	40
Total Hours								
0	0	26	Total: 26					

Prerequisites: Fundamentals of Applied Mechanics	
Course Objectives: Purposes of the course are	
1. To Demonstrate principle of statics and hands on Microsoft excel/Programming. 2. To teach how to Apply Condition of equilibrium for the determination of forces in the member. 3. To impart knowledge of kinematics and kinetics of particle and give real life exposure.	
Course Outcomes: After successful completion of the course experiments the student will	
CO1	**Determine** resultant of the force system & coefficient of friction.
CO2	**Explain** Curvilinear Motion and Determine coefficient of restitution for given surface.
CO3	**Apply** principle of statics and determine the resultant of various force system by Microsoft excel & graphical Method.
CO4	**Produce** a chart of the force system, friction, and type of support using real-world examples.

List of Laboratory Experiments/Assignments/Micro Project

Group A (Any Six)

1. Verify law of polygon of forces/Law of triangle using Universal force table for given forces.
2. Verify Varignon's theorem of moments of forces using law of moment apparatus for given forces.
3. Determination of C.G of Planar figures.
4. Determination of forces developed in Jib and tie member of the jib crane.
5. Determination of coefficient friction of Rope/belt.

6. Determine coefficient of friction using friction apparatus for given block on inclined plane.
7. Study of curvilinear motion.
8. Determination of coefficient of restitution.

Group B (Any Two)

1. Determination of the resultant of general force system by graphical method.
2. Determination of the Position of resultant force by graphical method.
3. Determination of resultant of various force system by using Microsoft excel.

Group C (Any Two)

1. Prepare chart of types of forces showing real life examples.
2. Prepare chart showing all types of beams having types of support (roller, hinged, fixed) with sketches and corresponding photographs of real life examples.
3. Prepare photographic chart showing real life examples of uses of friction on horizontal (Walking, writing. etc.) and inclined plane (Slider in gardens, loading of heavy material in trucks etc.)
4. Market Survey: to identify the various steel rolled section used in construction Industry.

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evalution(CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2									
CO2	2	2									
CO3	2	2			1						
CO4	2	2						1			

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech Semester I & II

Course Code: ESC2401L07, Course Title: Engineering Graphics and Computer Aided Drafting (Common to All), Category: Engineering Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical % Marks	
					Max %	Min Marks for Passing		Max	Min Marks for Passing
2	0	0	2	CCE	50	20			
26	0	0	Total: 26	ESE	50	20	40	-	-

Prerequisites: Knowledge of Geometry and Computer basics	
Course Objectives: Purposes of the course are	
1. To create awareness and emphasize the need of Engineering Drawing for an engineer. 2. To follow basic drawing standards and conventions. 3. To inculcate the habits of logical analysis of the problem using engineering drawing. 4. To develop skills in visualizing 3-Dimensional engineering components and documenting related information by using computer software.	
Course Outcomes: After successful completion of the course units the student will	
CO1	Explain the fundamentals of engineering graphics and basic principles of geometric construction
CO2	Use the principles of drawing to draw projection of plane
CO3	Apply the concept of orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object.
CO4	Apply the visualization skill to draw a simple isometric projection from given orthographic views
CO5	Draw Fully Dimensioned 2D, 3D drawings using computer aided drafting tools.

Syllabus

Unit I	Introduction to Drawing and Projection of Line	4 hrs
Introduction to Drawing, Introduction to drawing Instruments, Types of Lines, Drawing Sheet sizes, Scale, Dimensioning, Symbols Construction of Polygon, Projection of point, Line		
Unit II	**Projection of Plane**	**5 hrs**
Introduction, Projection of plane when plane is parallel to one and perpendicular to other, Projection of plane when plane is inclined to one plane and perpendicular to other projections of planes when it is inclined to both reference planes.		
Unit III	**Orthographic Projection**	**6 hrs**
First angle and Third Angle Method of Projection, Introduction to different planes, Conversion of pictorial view of 3 dimensional object into orthographic view, Sectional Orthographic Projection , Drafting the same using CAD Software		

Unit IV	Isometric Projection	6 hrs
Concept of Isometric projection, isometric Scale and drawing, Conversion of orthographic view of simple 3D object into isometric drawing, Drafting the same using CAD Software.		
Unit V	**Introduction to CAD**	**5 hrs**
Introduction to 2 D modeling Software, Basic Commands Such as Line, Circle, and polygon Components and Assembly Drawing All fasteners and drawing of Simple Assembly including Fasteners (Limited to 4-5 components), Drafting the same using CAD Software		

Text Books

1. Bhatt N. D.. Engineering drawing, Charotar publishing house, ISBN-13 978-9380358963 ,2014
2. Shah P. J., Engineering Graphics, S. Chand and Company, 2013, ISBN-13. 978-8121997614

Reference Books

1. French, T.E. Vierck, C. J:, and Foster, R.J., Engineering Drawing, Tata-Mc Graw Hill, ISBN NO 0070223475, 2012.
2. Narayana K.L., Kannaiah. P., Engineering Drawing-Scitech Publications, Chennai, ISBN-13. 978-9385983177 2014.
3. Venugopal K., Engineering Drawing - New Age International, ISBN-13. 978-8122431452 2004
4. https://archive.nptel.ac.in/courses/112/102/112102304/#
5. https://archive.nptel.ac.in/courses/112/105/112105294/

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	03	02					01		02	02	02
CO2	03	02	03		03			03		02	02
CO3	03	02								02	02
CO4	03	02			03			03	02	02	02
CO5					03					02	02

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester I & II

Course Code: ESC2401P09, Course Title: Engineering Graphics and Computer Aided Drafting Lab (Common to All), Category: Engineering Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max %	Min for Passing		Max	Min for Passing
0	0	2	1	CCE	-	-	-	100	40
0	0	26	Total: 26		-	-			

Prerequisites: Knowledge of Geometry and Computer basics	
Course Objectives: Purposes of the course are	
1. To create awareness and emphasize the need of Engineering Drawing for an engineer. 2. To follow basic drawing standards and conventions. 3. To inculcate the habits of logical analysis of the problem using engineering drawing. 4. To develop skills in visualizing 3-Dimensional engineering components and documenting related information by using computer software.	
Course Outcomes: After successful completion of the course units the student will	
CO1	Demonstrate Projection of points, lines and planes inclined to both plane and practice on CAD
CO2	Practice the concept of orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object.
CO3	Practice the visualization skill to draw a simple isometric projection from given orthographic views on CAD
CO4	Practice the principles of drawing to draw the view of various solids on CAD

Syllabus

Practical Session	26 hrs
1. Sheet No 1: Minimum 4 problems on Projection of lines and planes	06 hr
2. Sheet No 2: Minimum 2 problems on Orthographic Projection	06 hr
3. Sheet No 4: Minimum 2 problems on Isometric Projection	04 hr
4. Sheet No 5: Minimum 2 problems on Component drawing on CAD	04 hr
5. Sheet No 6: Minimum 2 problems on Assembly drawing on CAD	06 hr

Text Books

1. Bhatt N. D.. Engineering drawing, Charotar publishing house, ISBN-13 978-9380358963 ,2014
2. Shah P. J., Engineering Graphics, S. Chand and Company, 2013, ISBN-13. 978- 8121997614

Reference Books

1. French, T.E. Vierck, C. J:, and Foster, R.J., Engineering Drawing, Tata-Mc Graw Hill, ISBN NO 0070223475, 2012.
2. Narayana K.L., Kannaiah. P., Engineering Drawing-Scitech Publications, Chennai, ISBN- 13. 978-9385983177 2014.
3. Venugopal K., Engineering Drawing - New Age International, ISBN-13. 978- 8122431452 2004
4. https://archive.nptel.ac.in/courses/112/102/112102304/#
5. https://archive.nptel.ac.in/courses/112/105/112105294/

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evalution(CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	03	02									02
CO2	03	02			03						02
CO3	03	02	03				02				02
CO4	03	02	03		03			03	02	03	02

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester I

Course Code: VSC2401P01, Course Title: Experiential Learning I (Common to All), Category: Vocational and Skill Enhancement Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max	Min for Passing		Max	Min for Passing
0	1	2	2	CCE	-	-	-	100	40
Total Hours					-				
0	13	26	Total: 39		-	-			

Prerequisites: No	
Course Objectives:	
1. To demonstrate various safety measures and equipment related to workshop and industry 2. To demonstrate various equipment related to machine shop in the workshop 3. To use and handle various day to day life equipment 4. Utilization of MS Office tools for various purposes. 5. Train students for Basic Life Support (BLS).	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Handle techniques for various tools and equipment commonly used in workshops are essential to reduce the risk of accidents and injuries during operation
CO2	Describe Centre Lathe, Drilling, Grinding, Milling, CNC, Refrigeration and Air Conditioning.
CO3	Assembly of Two-Wheeler, Sheet Metal Job, Fitting Job and PC/Laptop for different input values.
CO4	Creation of engaging presentations using MS PowerPoint, including slide design, multimedia integration, and delivery techniques.

Syllabus

A) **Safety and Safety Equipment/Accessories and Basic Life Support**

An expert session on Shop floor Safety and Safety Equipment/Accessories 02 hrs

Training Session on Land Safety and Water Safety under Basic Life Support (BLS)

B) Demonstration

No	Description	Operations	Hrs
1	Center Lathe	Facing, Turning, Knurling, Grooving and Taper Turning, Machine configuration as per ISO.	04
2	Drilling, Grinding, Milling Machine	Drilling and Boring, Surface and Cylindrical Grinding and Gear Cutting	04
3	CNC Machine	Facing and Turning	04
4	Refrigeration and Air Conditioning	Parts and Working Cycle.	04
		Total hrs	16

C) Hands on Experience

No	Description	Operations	Hrs
1	Two-Wheeler	Dismantle and Assembly of Spark Plug, Carburetor, Wheels,	06
2	Sheet Metal Job	Bending, Cutting, Piercing, Perforating, Punching, Riveting.	08
3	Fitting Job	Drilling, Tapping, Male and Female Joints, Close Tolerances	06
4	PC/Laptop Assembly	Dismantle and Assembly of SMPS, Hard Disk, Mother board etc.	06
		Total hrs	26

D) MS Office

No	Description	Hrs
1	Word, Excel, PowerPoint: Report and Presentations on above	08

Reference: Rashtriya Life Saving Society (India), https://www.lifesavingindia.org/

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evalution(CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO09	PO10	PO11
CO1			2						2	2	3
CO2	2	2		2	3	2	2		2		3
CO3	2	2			3	2			2		3
CO4	2	2			3	2		2	2		3

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester I

Course Code: HSM2401P01, Course Title: Professional and Technical Communication (Common to All),Category: Ability Enhancement Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
					Max %	Min for Passing		Max %	Min Marks for Passing
0	1	2	2	CCE	-	-	-	100	40
Total Hours					-				
0	13	26	Total: 39		-	-			

Prerequisites: Basic English Grammar Skills	
Course Objective: Purposes of Course are:	
1. Equip students with essential professional and technical communication skills necessary for success in the modern workplace. 2. Emphasize both written and verbal communication. 3. Cover topics in active listening, and public speaking.	
Course Outcomes: After Successful completion of course units, students will	
CO1	Analyze and evaluate spoken information critically for understanding the context and credibility of the source.
CO2	Demonstrate effective interpersonal communication skills for harmonious and productive interactions.
CO3	Articulate strategies for clear and coherent writing skills for personal & professional communication needs.
CO4	Develop skills for effective and authentic non-verbal communication to ace the professional communication needs.

Syllabus

Unit I	**Development of Listening and Speaking Skills**	**04 Hrs.**
Introduction to Listening skills, Barriers to Listening skills, active Listening techniques, listening for main ideas and details, Note taking strategies. Introduction to Speaking skills, Building vocabulary and fluency, Conversational Skills, Public speaking fundamentals. Speed and Fluency, Removing MTI.		
Unit II	**Development of Writing and Reading Skills**	**03 Hrs.**
Introduction to Effective Written Communication, fundamentals of grammar and punctuation, Paragraph Structure, Essay writing, Report writing, Formal letter writing. Importance of Reading, Comprehension and solving case studies, Synthesis writing		
Unit III	**Fundamentals of Communication**	**03 Hrs.**
What is communication? Importance of communication, Communication Types – Verbal, Non-verbal, why is non-verbal communication important? Making eye contact (or lack thereof), Shaking hands, - Crossing or uncrossing legs, Folding or unfolding arms, Fidgeting, Eye contact, Smiling or frowning, Communication styles.		

Unit IV	Business Communication	03 Hrs.
Business communication theory, Email Etiquette, Digital Communication, Presentation Skills, Ethics in Business Communication, Kinesics and Pitch modulation		

Practical/ Lab Sessions

Lab Session	Activities	Duration (Hrs.)
1	Listening Skills-Listen to the Audio and answer the questions (Language Lab Software & Linguaphone audios)	2
2	Listening Skills- Listen & Repeat Activity	2
3	Reading Skills- Communication Case studies	2
4	Reading Skills- Newspaper Article, Short Story, Research Article Review & Discussion	2
5	Writing Skills - Formal Letter writing (Application letter, Complaint Letter, Enquiry Letter)	2
6	Writing Skills - Story Writing, Paragraph Writing	2
7	Writing Skills - Report Writing (Technical Report, Accident Report, Progress Report)	2
8	Speaking Skills- Self Introduction	2
9	Speaking Skills- JAM Session	2
10	Speaking Skills- Debate	2
11	Speaking Skills-Role play	2
12	Presentation	2
13	Team Building	2

Reference Book

1. Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson),2011, ISBN - 8131799905, 9788131799901
1. Communication Skills for Technical Students by T.M. Farhathullah (Orient Longman)2002, ISBN - 9788125022473
2. Written Communication in English by Saran Freeman (Orient Longman) 1977, 8125004262
3. Essential English Grammar (Elementary & Intermediate) Raymond Murphy (CUP), 1990, ISBN 10-8175960299
4. Communication for Business: A Practical Approach by Shirley Tailor (Longman),2005, ISBN - 9780273687658
5. Developing Communication Skills by Krishna Mohan & Meera Banerji (Macmillan),2009, ISBN - 9780230638433
6. Business Correspondence and Report Writing, R. C. Sharma & Krishna Mohan (Tata McGraw Hill,2017, ISBN - 9789390113002
7. Technical communication: Principles and practice, Raman, Minakshi, and Sangita Sharma. 3rd ed. Oxford University Press, 2015, ISBN - 978-0199457496
8. https://ielts.org
9. NPTEL Course-Business English Communication IIT Madras Link https://youtu.be/GwF4ypDSr-A

11 NPTEL Course- Introduction to Effective Communication Link https://archive.nptel.ac.in/courses/109/104/109104030/

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

Scheme for Continuous Evaluation

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max	Min for Passing		Max	Min for Passing
-	1	2	2	CCE	-	-	-	100	40
Total Hours									
-	13	26	Total: 39						

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evalution(CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	1	1	3	-	2
CO2	-	-	-	-	-	1	1	1	3	-	2
CO3	-	-	-	-	-	-	-	2	3	-	2
CO4	-	-	-	-	-	1	-	2	3	-	2

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First Year (FY) B Tech Semester I

Course Code: LLC2401P01, Course Title: Liberal Learning - I (Common to All), Category: Co-Curricular Course

LLC2401P001-A- Liberal Learning-1- German Language	
Prerequisites: None	
Course Objectives:	
1. To promote the holistic development of students through engagement in various extra- curricular activities. 2. To enhance students' life skills through individual and group activities.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Understand and Apply Basic Phonetics and Vocabulary
CO2	Demonstrate Fundamental Grammar and Sentence Formation
CO3	Develop Conversational and Writing Skills
CO4	Enhance Listening and Comprehension Skills

Syllabus

Unit 1	**Introduction to the Language & Phonetics**	**9 hrs**
	Introduction to German Numbers, alphabets, days, months, seasons, formulate questions, conjugation of verbs in present tense, personal pronouns, the verb "to be", pronunciation, and basic greetings	
Unit 2	**Basic Grammar and Sentence Formation**	**10 hrs**
	Nouns: singular and plural forms, negation, definite and indefinite articles, questions starting with an interrogative pronouns, verbs, articles, and sentence structure. Conversation in a Café. Past tense of the verb "to be", accusative case, possessive articles in the nominative case, adjectives in a sentence. Verb conjugation (regular and irregular present tense). Cities, countries and languages, People and houses.	
Unit 3	**Reading and Writing**	**10 hrs**
	Reading short texts, writing simple sentences Appointments and orientations. Time asking questions related to time, prepositions, separable verbs.	
Unit 4	**Listening & Comprehension**	**10 hrs**
	Listening to simple German dialogues and responding. Audios to teach phonetic sounds of alphabets. Dialogues between students pairs, places directions & shopping	

LLC2401P001-B- Liberal Learning-1- Japanese Language
Prerequisites: None
Course Objectives:
1. To promote the holistic development of students through engagement in various extra- curricular activities.

2. To enhance students' life skills through individual and group activities.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Understand and Apply Basic Phonetics and Vocabulary
CO2	Demonstrate Fundamental Grammar and Sentence Formation
CO3	Develop Conversational and Writing Skills
CO4	Enhance Listening and Comprehension Skills

Syllabus

Unit 1	**Introduction to the Language & Hiragana script**	**11hrs**
	Introduction to Japanese Language and greetings Introduction to Hiragana Script and detailed study	
Unit 2	**Introduction of Katakana script**	**6hrs**
	Introduction to Katakana Script and study in detail	
Unit 3	**Introduction to Kanjis and sentence making**	**10 hrs**
	Introduction to Basic Kanjis (Just an introduction with number kanjis) Basic sentence construction with demonstrative concepts using particles.	
Unit 4	**Listening & Comprehension**	**12 hrs**
	Introduction to the basic concept like Clock, Calendar, numbers etc Introduction to the basic verbs and forms of verbs	

LLC2401P001-C- Liberal Learning-1- Sketching and Painting	
Prerequisites: None	
Course Objectives:	
1. To promote the holistic development of students through engagement in various extra-curricular activities. 2. To enhance students' life skills through individual and group activities.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Understand the importance of sketching in engineering and design.
CO2	Sketch geometric shapes and objects with proper proportions and perspective and Use shading techniques to create depth, volume, and realistic textures.
CO3	Apply Sketching Skills to Human and Object Representation
CO4	Create sketches of buildings, landscapes, and technical drawings.

Syllabus

Unit 1	**Introduction to Sketching**	**9 hrs**
	• Importance of sketching in engineering and design • Understanding basic tools: pencils, erasers, sketch pads • Line types and freehand sketching techniques • Warm-up exercises: line control and basic strokes	

Unit 2	**Drawing and Shading**	**10 hrs**
	• Drawing geometric shapes with accuracy • Basics of perspective (one-point, two-point, and three-point) • Still life sketching (objects like cubes, spheres, cylinders) • Understanding proportion and scale • Shading techniques: hatching, cross-hatching, stippling, blending • Creating depth and volume using light and shadows • Textures: wood, metal, fabric, glass • Application in technical and artistic sketches	
Unit 3	**Human and Object Sketching**	**10 hrs**
	• Basics of human anatomy and facial proportions • Gesture drawing and capturing movement • Sketching everyday objects with accurate proportions • Introduction to portrait sketching	
Unit 4	**Architectural and Technical Sketching**	**10 hrs**
	• Sketching simple buildings and landscapes • Basics of orthographic and isometric projections • Freehand technical sketching exercises • Engineering visualization through sketching	

LLC2401P001-D- Liberal Learning-1- Photography	
Prerequisites: None	
Course Objectives:	
1. To promote the holistic development of students through engagement in various extra- curricular activities. 2. To enhance students' life skills through individual and group activities.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Identify and utilize key camera and mobile photography settings, including aperture, shutter speed, ISO, and white balance.
CO2	Apply Composition and Framing Techniques
CO3	Apply light control and exposure control techniques,
CO4	Enhance Images through Basic Photo Editing.

Unit 1	**Introduction to Photography, Equipment and Setting**	**10hrs**
	• Evolution of photography and its importance • Differences between mobile and DSLR/mirrorless cameras • Understanding camera parts (lens, sensor, shutter, aperture) • Ethical considerations in photography • **Mobile:** HDR, manual mode, focus control, night mode • **Camera:** Aperture, shutter speed, ISO (Exposure Triangle) • Autofocus vs. manual focus • White balance and color temperature	
Unit 2	**Composition & Framing Techniques**	**9hrs**
	• Rule of thirds, leading lines, symmetry, golden ratio	

	• Foreground & background depth in mobile & camera shots • Using different perspectives and angles • Practical session: Framing and composition exercises	
Unit 3	**Lighting & Exposure Control**	**10 hrs**
	• **Mobile:** Using natural and artificial light effectively • **Camera:** Understanding light metering & exposure compensation • Golden hour, blue hour, and shadow play • Hands-on session: Capturing photos in different lighting conditions	
Unit 4	**Introduction to Editing**	**10 hrs**
	• **Mobile:** Using apps like Snapseed, Lightroom Mobile • **Camera:** Basic editing in Lightroom & Photoshop • Adjusting brightness, contrast, saturation, sharpness • Practical exercise: Editing a raw photo from mobile and camera	

LLC2401P001-E- Liberal Learning-1- Sports	
Prerequisites: None	
Course Objectives:	
1. To promote the holistic development of students through engagement in various extra- curricular activities. 2. To enhance students' life skills through individual and group activities.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Understand the Fundamentals of Sports, Fitness, and Well-being
CO2	Implement various basic techniques of Table Tennis
CO3	Apply Cognitive and Strategic Thinking through Mind Sports
CO4	Apply fundamental basic Cricket Skills and Gameplay Strategies

Unit 1	**Introduction to Sports & Fitness**	**9hrs**
	• Importance of sports for physical and mental well-being • Basic warm-up and stretching techniques • Rules, history, and benefits of major indoor sports (Badminton, Table Tennis, Chess. Carrom) • Safety measures in indoor sports. • Endurance, flexibility, and strength training • Importance of agility and hand-eye coordination • Yoga and breathing exercises for focus • Injury prevention and recovery	
Unit 2	**Table-Tennis -Basics and Skill Development**	**9hrs**
	• Equipment and grip techniques (shakehand, penhold) • Basic strokes: push, drive, smash, topspin, chop	

	• Serving techniques and spin control • Strategy for singles and doubles play	
Unit 3	**Mind Sports – Chess & Carrom**	**10 hrs**
	• Chess: Rules, opening principles, middle-game tactics, and endgame strategy • Carrom: Rules, board setup, striking techniques, and scoring • Enhancing concentration and decision-making skills • Friendly competitions for skill improvement	
Unit 4	**Cricket- Basic Skills & Gameplay**	**10 hrs**
	• Understanding the rules of the game . • Improving the stamina , gameplay . • Improving personal gameplay and fielding	

Rubrics for Continuous Evaluation

Rubrics for ISE (100)		
No	**Component**	**Marks**
1	Assignments	50
2	Oral Viva and Practical Exam	50

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2							2	2		3
CO2	2							2	2		3
CO3	2							2	2		3

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester I & II

Course Code: BSC2402L04, Course Title: Engineering Chemistry (Group A), Category: Basic Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
					Max %	Min marks for Passing		Max	Min marks for Passing
3	0	0	3	CCE	50	20			
39	0	0	Total: 39	ESE	50	20	40	-	-

Prerequisites: BSC2402L04 Volumetric Titration, Electrochemical Series, Periodic Table, Classification and properties of polymers, Structure properties relationship.	
Course Objectives: Purposes of Course are:	
1.To understand technology involved in analysis and improving quality of water as commodity. 2.To understand corrosion mechanisms and preventive methods for corrosion control. 3.To study conventional and alternative fuels with respect to their properties and applications. 4. To understand structure, properties and applications of specialty polymers. 5. To understand the computational chemistry and the smart materials required for societal usage.	
Course Outcomes: After Successful completion of course units, students will	
CO1	Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.
CO2	Identify the causes of corrosion and methods for minimizing corrosion
CO3	Relate fuel and suggest use of alternative fuels for minimizing emission of carbon.
CO4	Demonstrate the knowledge of advanced engineering materials for various engineering applications
CO5	Understand the computational chemistry techniques for material sciences, and properties and application of smart sensors to meet the technological challenges.

Syllabus

Unit I	**Water Technology**	**8 hrs**
Introduction, Types of hardness, Determination of hardness (EDTA method) and Alkalinity in Water, numerical. Water treatment: i) Zeolite method and numerical ii) Demineralization method. Purification of water: Reverse osmosis and Electro-dialysis.		
Unit II	**Corrosion and Corrosion Control**	**8 hrs**
Introduction, Mechanism of Dry Corrosion and Wet Corrosion, Pilling Bedworth Rule, Factors affecting rate of corrosion. **Corrosion Control:** Cathodic and Anodic Protection, Types of Metal Coating (Cathodic and Anodic Coating), Methods of Applying Coating - Hot dipping, Electroplating, Cementation.		
Unit III	**Fuels**	**8 hrs**

Calorific value (CV): Types of Calorific Value, Determination of Calorific value: Principle, construction and working of Bomb calorimeter and numerical, **Solid fuel:** Coal: Analysis of Coal-Proximate and numerical **Liquid fuel:** Petroleum: Refining of petroleum /crude oil and composition, boiling range and uses of various fractions. **Gaseous fuel:** Hydrogen gas as future fuels – production and storage. Fuel Cell (PEMFC). Alternative Fuels – Power Alcohol and Biodiesel		
Unit IV	**Polymers in Engineering**	**8 hrs**
Introduction, Compounding of plastics, Structure, properties and Applications of Biodegradable Polymer, Conducting Polymer, Electroluminescent Polymers, Thermoplastics Polymer and Polymer Composites (FRP)		
Unit V	**Computational Chemistry and Smart materials**	**7 hrs**
Computational Chemistry: Definition, Scope, Applications and benefits. **Materials for memory storage:** Introduction to materials for electronic memory, Types, Properties and Applications of organic, polymeric and hybrid materials. **RFID and IONT materials:** Introduction, Components of RFID, structure, properties and applications of substrates - Graphene oxide, carbon nanotubes (CNTs)		
Reference Books		
1. Textbook of Engineering Chemistry by Dr. S. S. Dara, Dr. S. S. Umare, S. Chand & Company Ltd. 2. Engineering Chemistry, Wiley India Pvt. Ltd. 3. Polymer Science and Technology, By Joel R. Fried, 3 ed, Prentice Hall Publisher 4. Functional and smart materials, Chander Prakash, Sunpreet Singh, J. Paulo Davim, 2020, CRC Press, ISBN: 978-036-727-510-5. 5. Computational Chemistry and Molecular Modeling: Principles and Applications by K. I. Ramachandran , Deepa Gopakumar , Krishnan Namboori, Springer Publications		

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2									2
CO2	3	1									2
CO3	3	2				1					2
CO4	3					1					2
CO5	3	2			2						2

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester I & II

Course Code: BSC2401L05, Course Title: Engineering Chemistry (Group B), Category: Basic Science Course

Teaching Scheme				Evaluation Scheme					
					Theory Marks			Practical Marks	
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Max%	Min marks for Passing		Max	Min marks for Passing
3	0	0	3	CCE	50	20	40	-	-
39	0	0	Total: 39	ESE	50	20			

Prerequisites: Course Code Volumetric Titration, Electrochemical Series, Periodic Table, Classification and properties of polymers, Structure properties relationship.	
Course Objectives: Purposes of Course are:	
1. To understand technology involved in analysis and improving quality of water as commodity. 2. To understand corrosion mechanisms and preventive methods for corrosion control. 3. To study conventional and alternative fuels with respect to their properties and applications. 4. To understand structure, properties and applications of specialty polymers. 6. To understand structure, properties and applications of nano material and acquire the knowledge of electro-analytical techniques that enables rapid and precise understanding of materials.	
Course Outcomes: After Successful completion of course units, students will	
CO1	Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.
CO2	Identify the causes of corrosion and methods for minimizing corrosion
CO3	Relate fuel and suggest use of alternative fuels for minimizing emission of carbon.
CO4	Demonstrate the knowledge of advanced engineering materials for various engineering applications
CO5	Select appropriate electro techniques and methods of material analysis.

Syllabus

Unit I	**Water Technology**	**8 hrs**
Introduction, Types of hardness, Determination of hardness (EDTA method) and Alkalinity in Water, numerical. Water treatment: i) Zeolite method and numerical ii) Demineralization method. Purification of water: Reverse osmosis and Electro-dialysis.		
Unit II	**Corrosion and Corrosion Control**	**8 hrs**
Introduction, Mechanism of Dry Corrosion and Wet Corrosion, Pilling Bedworth Rule, Factors affecting rate of corrosion. **Corrosion Control:** Cathodic and Anodic Protection, Types of Metal Coating (Cathodic and Anodic Coating), Methods of Applying Coating - Hot dipping, Electroplating, Cementation.		
Unit III	**Fuels**	**8 hrs**
Calorific value (CV): Types of Calorific Value, Determination of Calorific value: Principle, construction and working of Bomb calorimeter and numerical, **Solid fuel:** Coal: Analysis of Coal-Proximate and numerical		

Liquid fuel: Petroleum: Refining of petroleum /crude oil and composition, boiling range and uses of various fractions. **Gaseous fuel:** Hydrogen gas as future fuels – production and storage. Fuel Cell (PEMFC). Alternative Fuels – Power Alcohol and Biodiesel.		
Unit IV	**Polymers in Engineering**	**8 hrs**
Introduction, Compounding of plastics, Structure, properties and Applications of Biodegradable Polymer, Conducting Polymer, Electroluminescent Polymers, Thermoplastics Polymer and Polymer Composites (FRP)		
Unit V	**Nanomaterials and Instrumental Methods of Analysis**	**8 hrs**
Introduction, Classification of Nanomaterials, Properties of nanomaterials – Optical, Electrical, Thermal and Mechanical, Applications of Nanomaterials – Catalysis, Electronics and Telecommunications, Medicines and Composites, Structure, properties and applications of Graphene, CNT's and Quantum Dots. **Conductometry:** Introduction, conductivity cell, Conductometric titrations of acid versus base with titration curve. **pH-metry:** Introduction, standardization of pH meter, pH metric titration of strong acid versus strong base with titration curve.		
Reference Books		
1. Textbook of Engineering Chemistry by Dr. S. S. Dara, Dr. S. S. Umare, S. Chand & Company Ltd. 2.Engineering Chemistry, Wiley India Pvt. Ltd. 3.Polymer Science and Technology, By Joel R. Fried, 3 ed, Prentice Hall Publisher 4.Nano: The essentials – Understanding nanoscience and nanotechnology. 5.Instrumental Methods of Chemical Analysis, G. R. Chatwal& S. K. Anand, Himalaya Publishing House. 6.Basic Concept of Analytical Chemistry, 2ed , S. M. Khopkar, New Age-International Publisher		

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2									2
CO2	3	1									2
CO3	3	2				1					2
CO4	3					1					2
CO5	3	2									2

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester I & II

Course Code: BSC2401L06, Course Title: Engineering Chemistry (Group C), Category: Basic Science Course

Teaching Scheme				Evaluation Scheme					
					Theory Marks			Practical Marks	
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Max %	Min marks for Passing		Max	Min marks for Passing
3	0	0	3	CCE	50	20			
39	0	0	Total: 39	ESE	50	20	40	-	-

Prerequisites: BSC2401L02 Volumetric Titration, Electrochemical Series, Periodic Table, Classification and properties of polymers, Structure properties relationship.	
Course Objectives: Purposes of Course are:	
1. To understand technology involved in analysis and improving quality of water as commodity. 2. To understand corrosion mechanisms and preventive methods for corrosion control. 3. To study conventional and alternative fuels with respect to their properties and applications. 4. To understand structure, properties and applications of specialty polymers. 5.To study the properties and applications of surfactants and lubricant	
Course Outcomes: After Successful completion of course units, students will	
CO1	Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.
CO2	Identify the causes of corrosion and methods for minimizing corrosion
CO3	Relate fuel and suggest use of alternative fuels for minimizing emission of carbon.
CO4	Demonstrate the knowledge of advanced engineering materials for various engineering applications
CO5	Appreciate the knowledge of properties of surfactants and lubricants.

Syllabus

Unit I	**Water Technology**	**8 hrs**
Introduction, Types of hardness, Determination of hardness (EDTA method) and Alkalinity in Water, numerical. **Water treatment:** i) Zeolite method and numerical ii) Demineralization method. Purification of water: Reverse osmosis and Electro-dialysis.		
Unit II	**Corrosion and Surface Control**	**8 hrs**
Introduction, Mechanism of Dry Corrosion and Wet Corrosion, Pilling Bedworth Rule, Factors affecting rate of corrosion. **Corrosion Control:** Cathodic and Anodic Protection, Types of Metal Coating (Cathodic and Anodic Coating), Methods of Applying Coating - Hot dipping, Electroplating, Cementation.		
Unit III	**Fuels**	**8 hrs**
Calorific value (CV): Types of Calorific Value, Determination of Calorific value: Principle, construction and working of Bomb calorimeter and numerical,		

Solid fuel: Coal: Analysis of Coal-Proximate and numerical **Liquid fuel:** Petroleum: Refining of petroleum /crude oil and composition, boiling range and uses of various fractions. **Gaseous fuel:** Hydrogen gas as future fuels – production and storage. Fuel Cell (PEMFC). Alternative Fuels – Power Alcohol and Biodiesel		
Unit IV	**Polymers in Engineering**	**8 hrs**
Introduction, Compounding of plastics, Structure, properties and Applications of Biodegradable Polymer, Conducting Polymer, Electroluminescent Polymers, Thermoplastics Polymer and Polymer Composites (FRP)		
Unit V	**Surfactants and Lubricants**	**8 hrs**
Surfactants: Methods of preparation, cleaning mechanism, Critical micelle concentration and its determination. Hydrophobic and Hydrophilic interactions, Micelles and reverse micelles. **Lubricants:** Introduction, classification of lubricants - Solid, Semi –solid and Liquid Lubricants, Properties of lubricants: Physical properties and Chemical properties. **UV-Visible Spectroscopy**: Lambert-Beer's Law, Electronic transitions, Instrumentation of double beam spectrophotometer and applications of UV-visible spectroscopy.		
Reference Books		
1.Engineering Chemistry by O .G. Palanna, Tata Magraw Hill Education Pvt. Ltd. 2.Textbook of Engineering Chemistry by Dr. S. S. Dara, Dr. S. S. Umare, S. Chand & Company Ltd. 3.Polymer Science and Technology, By Joel R. Fried, 3 ed, Prentice Hall Publisher 4.Surfactants and Polymer in aqueous solution by K. Holmberg, B. Jonsson, V. Kronberg and B. Lindman		

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2									2
CO2	3	1									2
CO3	3	2				1					2
CO4	3					1					2
CO5	3	2									2

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester I & II

Course Code: BSC2401P08, Course Title: Engineering Chemistry Lab (Group A, B and C), Category: Basic Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max %	Min Marks for Passing		Max	Min marks for Passing
0	0	2	1	CCE	-	-	-	100	40
0	0	20	Total: 20		-	-			

Prerequisites: BSC2401P02 Volumetric Titration, Electrochemical Series, Periodic Table, Classification and properties of polymers, Structure properties relationship.	
Course Objectives: Purposes of Course are:	
1.To understand technology involved in analysis of various solutions or solid materials. 2.To understand preventive methods for corrosion control. 3.To synthesize the products which has wide applications in engineering.	
Course Outcomes: After Successful completion of course units, students will	
CO1	Distinguish the different methodologies for analysis of water or coal using numerous techniques involved.
CO2	Instrumental methods of analysis.
CO3	Relate the green way to synthesize the materials.

Syllabus

PR 1	**Hardness of Water**	**2 hrs**
To determine hardness of water by EDTA method		
PR2	**Alkalinity in Water**	**2 hrs**
To determine alkalinity of water		
PR 3	**Proximate analysis of coal**	**2 hrs**
.To determine the moisture content from coal using proximate analysis.		
PR 4	**Electroplating**	**2 hrs**
To coat copper and zinc on iron plate using electroplating.		
PR 5	**Rate of corrosion**	**2 hrs**
To study of rate of corrosion in different pH of the solution.		
PR 6	**Bomb Calorimeter**	**2 hrs**
To determine the calorific value of given coal sample.		
PR 7	**Molecular weight of Polymer**	**2 hrs**
To determine the molecular weight of polyvinyl alcohol using Oswald's Viscometer.		
PR 8	**Conductometry**	**2 hrs**
To determine the strength of mixture of strong acid and weak acid using conductometry.		

PR 9	**pH metry**	**2 hrs**
To determine the strength of strong acid using pH metry.		
PR 10	**Colorimeter**	**2 hrs**
To estimate the amount of copper from E-waste using Colorimeter.		
PR 11	**Viscosity of lubricant.**	**2 hrs**
To determine the viscosity of given lubricant using Redwood Viscometer.		
Reference Books		
1.Vogel's textbook of Quantitative chemical analysis by J Mendham, R C Denney, J D barnes, M J K Thomas , Pearson Education. **2.Laboratory Manual on Engineering Chemistry by Sudha Rani (Author), S.K. Bashin (Author), Dhanpat Rai Publishing Company Private Limited-New Delhi; Third edition**		

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evalution(CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2						1	1		1
CO2	3	2						1	1		1
CO3	3	2						1	1		

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech Semester II

Course Code: BSC2402L09, Course Title: - Differential Equation & Integral Calculus (Group A), Category: Basic Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max %	Min for Passing		Max	Min for Passing
3	01	0	4	CCE	50	20	40	-	-
39	13	0	Total: 52	ESE	50	20			

Prerequisites: BSC2401L13- Integration, Differential Equation, Three-dimensional coordinate systems

Course Objective: Purposes of the course are

1.To make the students familiarize with Mathematical Modeling of physical systems using differential equations

2. To make the students familiarize with advanced techniques of integration, tracing of curves, multiple integrals and their applications.

3. 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 Outcomes: After successful completion of the course units the student will

CO1	**Apply** the effective mathematical tools to solve first order differential equations to model physical processes such as Newton's law of cooling, electrical circuit etc
CO2	**Use** advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign needed in evaluating multiple integrals and their applications.
CO3	**Draw** the Cartesian, Polar, Parametric & Rose curve for a given equation.
CO4	**Evaluate** multiple integrals and its application to find area bounded by curves, volume bounded by surfaces.
CO5	**Solve** differential equations of first order and Integration using different numerical methods used in modern scientific computing.

Syllabus

Unit I	Ordinary Differential Equation & Its Applications	8 hrs
Exact differential equations, Equations reducible to exact form. Linear differential equations, Applications of Differential Equations to Orthogonal Trajectories, Newton's Law of Cooling, Kirchhoff's Law of Electrical Circuits, One dimensional Conduction of Heat		
Unit II	**Integral Calculus**	**8 hrs**
Reduction Formulae of standard trigonometric functions, , Beta function, Gamma functions, properties of Beta & Gamma function, Differentiation under integral sign		
Unit III	**Curve Tracing**	**8 hrs**
Type I: Properties of Cartesian curve ,Tracing of Cartesian Curve Type II: Properties of Parametric curves ,Tracing of Parametric curves, Type 3: Properties of Polar Curves, Tracing of Polar Curves, Rose curves		
Unit IV	**Multiple Integration**	**8 hrs**

Double Integration: Direct evaluation, limits are not given, transformation to polar & Change of order of integration , Applications to find Area Triple integrations: Spherical polar coordinate, Cylindrical polar coordinate , Applications to find Volume		
Unit V	**Numerical Methods**	**7 hrs**
Numerical Solution of Ordinary Differential Equation: Euler's Method Modified Euler's Method, Runge Kutta 4th Order Method Interpolation: Newton's Forward difference and Backwards Difference Method Numerical Integration: Trapezoidal And Simpson's Rule		
Text Book: 1. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi), 2019, 44th Edition, ISBN-978-81-933284-9-1. 2. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill), 2019,35th Edition,ISBN-978-0-07—063419-O.		
Reference Books		
1. Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.), 2022, 10th Edition, ISBN-978-81-265-5423-2. 2. Advanced Engineering Mathematics by M. D. Greenberg (Pearson Education), 2019, 2nd Edition, ISBN-978-81-7758-546-9. 3. Advanced Engineering Mathematics by Peter V. O'Neil (Thomson Learning), 2017, 7th Edition, ISBN-978-81-315-1752-9.		

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	-	-	-	-	1	-	-	1
CO2	3	3	-	-	-	-	-	1	-	-	1
CO3	3	3	-	-	-	-	-	1	-	-	1
CO4	3	3	-	-	-	-	-	1	-	-	1
CO5	3	3	-	-	-	-	-	1	-	-	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech Semester II

Course Code: BSC2402L10, Course Title: Differential Equation & Integral Calculus, Category (Group B): Basic Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max %	Min Marks for Passing		Max	Min Marks for Passing
3	01	0	4	CCE	50	20			
39	13	0	Total: 52	ESE	50	20	40	-	-

Prerequisites: BSC2401L15 Integration, Differential Equation, Three-dimensional coordinate systems

Course Objective: Purpose of the course are

1. To make the students familiarize with Mathematical Modeling of physical systems using differential equations
2. To make the students familiarize with advanced techniques of integration, tracing of curves, multiple integrals and their applications.
3. 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 Outcomes: After successful completion of the course ,students will

CO1	**Apply** the effective mathematical tools to solve first order differential equations to model physical processes such as Newton's law of cooling, electrical circuit etc
CO2	**Use** advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign needed in evaluating multiple integrals and their applications.
CO3	**Draw** the Cartesian, Polar, Parametric & Rose curve.
CO4	**Use** the concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner
CO5	**Evaluate** multiple integrals and its application to find area bounded by curves, volume bounded by surfaces

Syllabus

Unit I	**Ordinary Differential Equation & Its Applications**	**8 hrs**
Exact differential equations, Equations reducible to exact form. Linear differential equations, Applications of Differential Equations to Orthogonal Trajectories, Newton's Law of Cooling, Kirchhoff's Law of Electrical Circuits, One dimensional Conduction of Heat		
Unit II	**Integral Calculus**	**8 hrs**
Reduction Formulae of standard trigonometric functions, , Beta function, Gamma functions, properties of Beta & Gamma function, Differentiation under integral sign		
Unit III	**Curve Tracing**	**8 hrs**
Type I: Properties of Cartesian curve ,tracing of Cartesian curve Type II: Properties of parametric curves ,tracing of parametric curves, Type 3: Properties of polar curves, tracing of polar curves, rose curves		
Unit VI	**Coordinate Geometry**	**7 hrs**
Cartesian, Spherical polar and Cylindrical coordinate systems, Sphere, Right circular Cone		

and Right circular Cylinder.		
Unit V	**Multiple Integration**	**8 hrs**
Double Integration: Direct evaluation, limits are not given, transformation to polar & Change of order of integration , Applications to find Area Triple integrations: Spherical polar coordinate, Cylindrical polar coordinate , Applications to find Volume		
Text Book: 1. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi),2019,44th Edition,ISBN No - 978-81-933284-9-1 2. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill) Advanced ,2019,35th Edition, ISBN No-13978-0-07-063419-0		
Reference Books		
1. Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.),2022,10th Edition, ISBN No - 978-81-265-5423-2 2.Advanced Engineering Mathematics by M. D. Greenberg (Pearson Education), 2019,2nd Edition, ISBN No -978-81-7758-546-9 3. Advanced Engineering Mathematics by Peter V. O'Neil (Thomson Learning), 2017,7th Edition, ISBN 13:978-81-315-1752-9, ISBN 10:81-315-1752-7		

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	-	-	-	-	1	-	-	1
CO2	3	3	-	-	-	-	-	1	-	-	1
CO3	3	3	-	-	-	-	-	1	-	-	1
CO4	3	3	-	-	-	-	-	1	-	-	1
CO5	3	3	-	-	-	-	-	1	-	-	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech Semester II

Course Code: BSC2402L11, Course Title: Differential Equation & Integral Calculus, Category (Group C): Basic Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max %	Min for Passing		Max	Min for Passing
3	01	0	4	CCE	50	20	40	-	-
39	13	0	Total: 52	ESE	50	20			

Prerequisites: BSC2401L15 Integration, Differential Equation, Three-dimensional coordinate systems

Course Objective: Purpose of the course are

1. To make the students familiarize with Mathematical Modeling of physical systems using differential equations
2. To make the students familiarize with advanced techniques of integration, tracing of curves, multiple integrals and their applications.
3. 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 Outcomes: After successful completion of the course ,students will

CO1	**Apply** the effective mathematical tools to solve first order differential equations to model physical processes such as Newton's law of cooling, electrical circuit etc
CO2	**Use** advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign needed in evaluating multiple integrals and their applications.
CO3	**Draw** the Cartesian, Polar, Parametric & Rose curve.
CO4	**Find** the Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems
CO5	**Evaluate** multiple integrals and its application to find area bounded by curves, volume bounded by surfaces

Syllabus

Unit I	**Ordinary Differential Equation & Its Applications**	**8 hrs**
Exact differential equations, Equations reducible to exact form. Linear differential equations, Applications of Differential Equations to Orthogonal Trajectories, Newton's Law of Cooling, Kirchhoff's Law of Electrical Circuits, One dimensional Conduction of Heat		
Unit II	**Integral Calculus**	**8 hrs**
Reduction Formulae of standard trigonometric functions, , Beta function, Gamma functions, properties of Beta & Gamma function, Differentiation under integral sign		
Unit III	**Curve Tracing**	**8 hrs**
Type I: Properties of Cartesian curve ,tracing of Cartesian curve Type II: Properties of parametric curves ,tracing of parametric curves, Type 3: Properties of polar curves, tracing of polar curves, rose curves		
Unit IV	**Fourier Series**	**7 hrs**
Definition, Dirichlet's conditions, Full range Fourier series, Half range Fourier series, Harmonic analysis, Parseval's identity and Applications to problems in Engineering.		
Unit V	**Multiple Integration**	**8 hrs**

Double Integration: Direct evaluation, limits are not given, transformation to polar & Change of order of integration , Applications to find Area

Triple integrations: Spherical polar coordinate, Cylindrical polar coordinate , Applications to find Volume

Text Book:

1. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi),2019,44th Edition,ISBN No - 978-81-933284-9-1
2. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill) Advanced ,2019,35th Edition, ISBN No-13978-0-07-063419-0

Reference Books

1. Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.),2022,10th Edition, ISBN No - 978-81-265-5423-2
2.Advanced Engineering Mathematics by M. D. Greenberg (Pearson Education), 2019,2nd Edition, ISBN No -978-81-7758-546-9
3. Advanced Engineering Mathematics by Peter V. O'Neil (Thomson Learning), 2017,7th Edition, ISBN 13:978-81-315-1752-9, ISBN 10:81-315-1752-7

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	-	-	-	-	1	-	-	1
CO2	3	3	-	-	-	-	-	1	-	-	1
CO3	3	3	-	-	-	-	-	1	-	-	1
CO4	3	3	-	-	-	-	-	1	-	-	1
CO5	3	3	-	-	-	-	-	1	-	-	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester I & II

Course Code: ESC2401L03, Course Title: Electrical and Electronics Engineering, Category: Engineering Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max %	Min Marks for Passing		Max	Min Marks for Passing
3	0	0	3	CCE	50	20	40	-	-
39	0	0	Total: 39	ESE	50	20			

Prerequisites: Engineering Physics**,** electron theory, potential and kinetic energy, Diode fundamentals, Transistor.	
Course Objectives: 1 To understand the basic concepts of electrical and electronics engineering. 2 To provide knowledge of D.C circuits, A.C. fundamentals and single phase A.C circuits, structure of Electrical power system and tariff. 3 To understand and apply the knowledge of diodes, Transistors, sensors and logic circuits in the field of engineering applications.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Apply KVL, KCL and different network theorems under DC supply for simplification of D.C. networks.
CO2	Analyze pure R, L, C Series R-L, R-C, and R-L-C circuit for voltage, current, impedance and power with a.c supply along with phasor diagram .
CO3	Analyze Diode circuits for Rectifier and DC Power supply .
CO4	Apply the knowledge of Transistors as a amplifier, switch and logic gates for adder circuits
CO5	Apply different tariffs to calculate electricity bills for Residential and Commercial Load.

Syllabus

Unit I	D.C. Circuits	7 hrs
Classification of electrical networks, Energy sources – Ideal and Practical voltage and current sources, Simplifications of networks using series and parallel combinations and star-delta conversion formulae (No Derivation), Kirchhoff's laws and their applications for network solutions using Branch current method, Thevenin's theorem , Superposition Theorem and their applications.		
Unit II	**AC Fundamentals & Single Phase AC Circuits**	**7 hrs**
A) A.C. Fundamentals: Mathematical and graphical representation of Sinusoidal voltages and currents, average and r.m.s. values, peak factor and form factor. Concept of phase and Phase difference, lagging, leading and in phase quantities and phasor representation. **B) Single Phase AC Circuits :** Study of AC circuits consisting of pure resistance, pure inductance, pure capacitance, series R-L, R-C and R-L-C circuits, phasor diagrams, voltage, current and power waveforms, resonance in series RLC circuits.		

Unit III	Diodes and its Applications	7 hrs
PN Junction Diode: Operation, VI Characteristics, Diode as a switch Rectifier: HWR and Bridge Rectifier. Zener diode: Working and application as a Voltage Regulator. Diode Application: DC Regulated Power Supply.		
Unit IV	**Transistors , sensors and Digital Electronics**	**7 hrs**
BJT: Types, Working & BJT as an Amplifier, Sensor **:** Introduction and Selection Criterion for sensors , Sensor application: LVDT, Review of Number System, Logic Gates, De-Morgans Theorem, Half Adder, Full Adder, Simplification of logical expression for full adder using K-map. Introduction to Flip Flop(JK Flip Flop),		
Unit V	**Electrical Power System & Tariff**	**7 hrs**

A) Structure of Electrical Power system :

Structure of Electrical Power system , Load curve ,Concept of Base load and Peak load, Energy conversion

B) Tariff :

Introduction to Tariff , Tariff setting principles , desirable characteristics of Tariff, Residential and Commercial Tariff , Types of Tariff , Industrial consumers alongwith current electricity charges, Incentives and penalties of Tariff.

Text Books

1. B.L. Theraja, A text book on Electrical Technology Vol-I , 1st edition,S Chand & Company Ltd, New Delhi , ISBN – 81-219-2441-3

Reference Books

1. V.K. Mehta, Rohit Mehata Basic Electrical Engineering, S Chand Publications Ltd, New Delhi, ISBN - 978-8121908719
2. D.P Kothari,I.J. Nagrath, Theory and Problems of Basic Electrical Engineering, 14th Edition,PHI Publication. ISBN-978-81-203-1263-0
3. Thomas L Floyd, Electronic Devises, 10th edition, Pearson Publication , ISBN-978-1292222 998
4. R P Jain, Modern Digital Electronics 5th edition Tata McHill Publication.ISBN-978-9355321770
5. Ramakant Gaikwad , Op-Amp and Linear integrated circuits ,4th Edition , PHI publication ,ISBN – 978-9353949037

NPTEL Video Links

https://archive.nptel.ac.in/courses/108/105/108105112/
https://youtu.be/Yg6XsepGCKY
https://archive.nptel.ac.in/courses/108/105/108105159/
http://vlabs.iitkgp.ernet.in/be/index.html#
https://nptel.ac.in/courses/117107094

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester II

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	-	-	-	-	-	-	-	-	1
CO2	3	3	-	1	-	-	-	-	-	-	1
CO3	3	2	-	-	-	1	1		1	1	1
CO4	3	-	1	-	-	-	--	1	-	-	1
CO5	3	2		-	1	-	-	-	-	-	1

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester II
First Year (FY) B Tech Semester I & II

Course Code: ESC2401P06, Course Title: Electrical and Electronics Engineering Lab, Category: Engineering Science Course

Teaching Scheme				Evaluation Scheme				
					Theory % Marks		Practical % Marks	
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Max %	Min for Passing	Max	Min Marks for Passing
0	0	2	1	CCE	-	- -	100	40
Total Hours								
0	0	26	Total: 26					

Prerequisites: Engineering physics**,** electron theory, electricity, potential and kinetic energy, Diode fundamentals, Transistor types .

Course Objectives:

1 To make students aware of safety measures and protective devices while working on electrical systems and to analyze A.C and D.C circuits

2 To identify active components, analyze rectifier circuits and logic circuits .

Course Outcomes: After successful completion of the course the student will be able to

CO1	Identify need for safety precautions, Protective devices and Electrical wiring system for electric supply.
CO2	Analyze series R-L and series R-C circuit to find various parameters of series AC circuit like Voltage , Current ,Impedance and Power.
CO3	Design D.C circuits by using different laws and Theorems.
CO4	Analyze the rectifier circuits using source and measuring equipments.
CO5	Design half adder and full adder by using basic gates and verify truth table for Half adder and Full Adder.

List of Experiments

Experiment No 1		**2 hrs**
To study safety precautions while working on electrical systems, handling of various types of electrical equipments, Electrical Wiring systems.		
Experiment No 2		**2 hrs**
To measure the steady-state response of series RL and RC circuits on AC supply and observe voltage and current waveforms.		
Experiment No 3		**2 hrs**
To verify Kirchhoff's Voltage Law and Superposition theorem.		
Experiment No 4		**2 hrs**
To verify Thevenin's theorem in a DC network.		
Experiment No 5		**2 hrs**
To demonstrate different types of electrical protection equipment such as fuses, MCB, MCCB, ELCB, Megger.		
Experiment No 6		**2 hrs**
Study of active components (Semiconductor components, ICs)		
Experiment No 7		**2 hrs**
Study of electronic devices (Sources and measuring devices)		

First Year (FY) B Tech Semester II

Experiment No 8		**2 hrs**
Study of Rectifier Circuit		
Experiment No 9		**2 hrs**
Design and build Half adder circuits using logic gates		
Experiment No 10		**2 hrs**
Design and build Full adder circuits using logic gates		

Reference Books

1. B.L. Theraja, A text book on Electrical Technology Vol-I & II , 1st edition,S Chand & Company Ltd, New Delhi , ISBN – 81-219-2441-3
2. V.K. Mehta, Rohit Mehata Basic Electrical Engineering, S Chand Publications Ltd, New Delhi, ISBN - 978-8121908719
3. D.P Kothari,I.J. Nagrath, Theory and Problems of Basic Electrical Engineering, 14th Edition,PHI Publication. ISBN-978-81-203-1263-0
4. Thomas L Floyd, Electronic Devises, 10th edition, Pearson Publication , ISBN-978-1292222 998
5. R P Jain, Modern Digital Electronics 5th edition Tata McHill Publication.ISBN-978-9355321770
6. Ramakant Gaikwad , Op-Amp and Linear integrated circuits ,4th Edition , PHI publication,ISBN – 978-9353949037

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evalution(CCE)	Progressive Evaluation	Understanding Viva Voce	20	25	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	-	-	-	1	1	2	2	-	1
CO2	3	-	-	-	1	-	-	2	2	-	1
CO3	3	1	1	-		-	-	2	2	-	1
CO4	3	1	-	-	1	1	1	2	2	1	1
CO5	3	-	1	-	-	-	-	2	2	-	1

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester II
First Year (FY) B Tech Semester I & II

Course Code: ESC2401L08, Course Title: Programming and Problem Solving, Category: Engineering Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max %	Min Marks for Passing		Max	Min Marks for Passing
2	0	0	2	CCE	50	20			
26	0	0	Total: 26	ESE	50	20	40	-	-

Prerequisites: Fundamentals knowledge of computer programming.

Course Objectives: This course aims to build the basic introduction of C++ programming language. Purpose of Course are:

1. To learn program design tools and .
2. To understand the basics of C++ programming and conditional Statements in C++.
3. To learn the looping statements and arrays in C++.
4. To learn the concepts of strings in C++.
5. To learn how to create and implement the functions in C++.

Course Outcomes: After Successful completion of course units, students will

CO1	Use the program design tools like Algorithm, Pseudocode and Flowchart and basic concepts of C++ programming to write clean and efficient code for large applications.
CO2	Demonstrate the conditional Statements like if statement, if-else statement, if else-if ladder, Nested if statement and switch case statement for decision making.
CO3	Apply looping statements and Design C++ programs using arrays to implement the data structures.
CO4	Implement C++ programs using string operations and built in string functions for data manipulation.
CO5	Develop C++ programs using user defined and built in functions to implement the Abstraction in object oriented programming.

Syllabus

Unit I	Introduction to C++ Programming	6 hrs
Introduction to Programming, Stages in Program Development, **Program Design Tools:** Algorithms, Pseudocode, Flowcharts, Introduction to C++ Programming Language, History of C++ language, Features of C++, Applications of C++, Simple C++ Program, Input and Output statements in C++, Comments, Tokens, Keywords, Variables, constants.		
Unit II	**Basics of C++ and Conditional Statements**	**6 hrs**

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Basic Data Types, Operators, Expressions, Types of Expressions. **Conditional statements**: if statement, if-else statement, if else-if ladder statement, nested if statement, switch case statement.		
Unit III	**Looping Statements and Arrays in C++**	**5 hrs**
Looping Statements : for loop, while loop and do-while loop, break, continue, return**.** **Introduction to Arrays:** Array Concept, declaration, storage representation for array, Initializing Array, Types of Arrays- (1-D, 2-D).		
Unit IV	**Strings in C++**	**4 hrs**
Basic operations Strings: Declaration and Initialization, String operations: length, copy, reverse, String built-in function.		
Unit V	**Functions in C++**	**5 hrs**
Functions in C++, in-built and user defined functions, function prototype, Function Definition, Calling a Function. **Function Arguments: Formal and Actual Parameters, Parameter passing in functions, Call by Value, Call by Reference, Passing arrays to functions.**		

Text Books

1. E Balagurusamy, Object-Oriented Programming with C++, 7th edition, McGraw-Hill Publication, 2018, ISBN 10: 9352607996, ISBN 13: 9789352607990.
2. Robert Lafore, ―Object-Oriented Programming in C++, fourth edition, Sams Publishing, 2001, ISBN:0672323087 (ISBN 13: 9780672323089.

Reference Books

1. Herbert Schildt, ―C++ The complete reference‖, Eighth Edition, McGraw Hill Professional, 2011, ISBN:978-00-72226805.
2. Deitel, "C++ How to Program", 4th Edition, Pearson Education, ISBN:81-297-0276-2.

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	1	3	1	1	2	2	1	2
CO2	3	3	2	1	3	1	1	2	2	1	2
CO3	3	3	2	1	3	1	1	2	2	1	2
CO4	3	3	2	1	3	1	1	2	2	1	2
CO5	3	3	2	1	3	1	1	2	2	2	2

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester II
First Year (FY) B Tech Semester I & II

Course Code: ESC2401P10, Course Title: Programming and Problem Solving Lab, Category: Engineering Science Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
					Max %	Min for Passing		Max	Min Marks for Passing
0	0	2	1	CCE	-	-	-	100	40
0	0	26	Total: 26						

Prerequisites: Fundamentals knowledge of computer programming.	
Course Objectives: This course aims to build the basic introduction of C++ programming language. Purpose of Course are: 1. To learn program design tools and logic development using C++ programming. 2. To understand the control structures in C++. 3. To learn the concepts of arrays, strings and functions in C++. 4. To learn how to solve real world problems using C++.	
Course Outcomes: After Successful completion of course units, students will	
CO1	Demonstrate logic development using basics of C++ programming to write clean and efficient code for large applications.
CO2	Perform the programs using conditional Statements like if…else statements, switch Case statements and looping statements in C++ for decision making statements.
CO3	Create C++ Programs using arrays, strings and functions for Data Structure to manipulate the data.
CO4	Design real world problems using concepts of C++ Programming for the Game and Application development System.

Syllabus

Practical Sessions (Assignments)		26 hrs
1	Write C++ program to swap two numbers.	2 Hr
2	Write C++ program to calculate the salary of an employee given his basic pay (taken as input from the user). Calculate salary of an employee. Let HRA be 10 % of basic pay and TA be 5% of basic pay. Let employees pay professional tax as 2% of total salary. Calculate salary payable after Deductions.	2 Hr
3	Write C++ program to accept a student's five subject marks and compute His/her result. Student is passing if he/she scores marks equal to and above 40 in each course. If student scores aggregate greater than 75%, then the grade	2 Hr
	is a distinction. If aggregate is 60>= and <75 then the grade of first division. If aggregate is 50>= and <60, then the grade is second division. If aggregate is 40>= and <50, then the grade is third division.	

First Year (FY) B Tech Semester II

4	Write C++ Program To Check if the given number is Armstrong Number or not.	2 Hr
5	Write C++ Program to calculate the Average of all the elements present in an Array.	2 Hr
6	Write C++ Program to check if the string is Palindrome or not	2 Hr
7	Write a C++ program the count number of vowels and consonants present in the given string.	4 Hr
8	Write a C++ program to calculate factorial of a given number by using a user defined function.	2 Hr
9	Write C++ Program to check if the given number is Prime or not by using a user defined function.	4 Hr
10	Mini Project	4 Hr

Text Books

1. E Balagurusamy, Object-Oriented Programming with C++, 7th edition, McGraw-Hill Publication, 2018, ISBN 10: 9352607996, ISBN 13: 9789352607990.
2. Robert Lafore, ― Object-Oriented Programming in C++, fourth edition, Sams Publishing, 2001, ISBN:0672323087 ISBN 13: 9780672323089.

Reference Books

1. Herbert Schildt, ―C++ The complete reference‖, Eighth Edition, McGraw Hill Professional, 2011, ISBN:978-00-72226805.
2. Deitel, "C++ How to Program", 4th Edition, Pearson Education, ISBN:81-297-0276-2.

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evalution(CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	-	2	-	-	-	2	2	-	1
CO2	2	2	1	-	2	-	-	-	2	2	-	1
CO3	2	2	1	1	2	-	-	-	2	2	-	1
CO4	2	2	2	1	2	-	-	-	2	2	-	2

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester II

Course Code: VSC2402P02, Course Title: Experiential Learning 2 (Common to all), Category: Vocational and Skill Enhancement Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max	Min for Passing		Max	Min for Passing
0	0	4	2	CCE	-	-	-	100	40
Total Hours					-				
0	0	52	Total: 52		-	-			

Prerequisites: No	
Course Objectives:	
1. To demonstrate various safety measures and equipment related to workshop and industry 2. To demonstrate various equipment related to workshop 3. To use and handle various day to day life equipment 4. To apply the MS Office tools for various purposes.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Gain hands-on experience in using various engineering tools, equipment, and techniques relevant to their field of study or profession
CO2	Analyze plumbing problems, identify potential solutions, and implement effective problem-solving strategies.
CO3	Assemble Wood Working Job, Mobile Phone, LCD/LED TV, Domestic Electric Wiring, Soldering, Welding.
CO4	Understand report and procedures followed for a given task related To MATLAB Tool.

Syllabus

A) Safety and Safety Equipment/Accessories

An expert session on Shop Floor Safety and Safety Equipment/Accessories 02 hrs

B) Demonstration

No	Description	Operations	Hrs
1	Plumbing and Molding	Sand Casting, Mould Filling	04
2	3D Printing Machine	Fused Deposition Modelling (FDM)	04
3	Plastic Moulding	Type of Granules and Injection Moulding.	04
		Total hrs	12

First Year (FY) B Tech Semester II

C) Hands on Experience

No	Description	Operations	Hrs
1	WoodWorking Job	Wooden Joints, Pattern Making.	06
2	Mobile Phone	Assembly, Troubleshooting	04
3	LCD/LED TV	Assembly, Troubleshooting	04
4	Domestic Electric Wiring	Plug and Socket Connections and Other miscellaneous Electrical Parts	04
5	Soldering	PCB Soldering	04
6	Welding	Arc Welding, TIG Welding, MIG Welding	08
		Total hrs	30

D) MATLAB

No	Description	Hrs
1	MATLAB commands and operations with applications	08

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evalution(CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO09	PO10	PO11
CO1				2					2		3
CO2	2	2			3	2	2		2	2	3
CO3	2	2	2		3	2			2		3
CO4	2	2			3	2		2	2		3

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester II

Course Code: HSM2402L02, Course Title: Science and Engineering of Ancient India, Category: Humanities Social Science and Management, Indian Knowledge System (IKS)

Teaching Scheme				Evaluation Scheme				
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks		Practical % Marks	
					Max %	Min marks for Passing	Max %	Min marks for Passing
2	0	0	2	CCE	100	40	-	
Total Hours								
26	0	0	Total: 26					

Prerequisites: Not Required

Course Objectives:

1. To introduce the contributions Science and Engineering, ancient Indian systems and traditions to modern word.
2. To increase students' awareness in Indian culture and civilization, including its knowledge systems and traditions.
3. To help students understand the knowledge, art, creative practices, skills, and values of ancient Indian systems.
4. To facilitate the study of India's rich scientific heritage.

Course Outcomes: After successful completion of the course the student will be able to

CO1	Explain Vedic Period, Ancient Indian Science and Engineering
CO2	Demonstrate Concepts of Vedic Mathematics and Astronomy
CO3	Collect Literature of Indian Town Planning and Arts
CO4	Explain Artha shastra, Indian Agriculture, Religions and Languages
CO5	Discover Ayurveda for Health, Wellness, Psychology and Spirituality

Syllabus

Unit I	Vedic Period, Ancient Indian Science and Engineering	6 hrs

Introduction to IKS, Vedas and types-Upved, Significance, Historical importance. Vedangas, Upanishads and Darshanan-Six schools, Pancha mahabhuta

Physics: *Vaiśeṣika* Sūtra, Concepts of Space, Time, and Consciousness, Concept of Matter and Atom (*Anu*), Laws of Motion and Gravity, Electricity in Ancient India. Introduction to Maharshi *Kanad*, *Aryabhatta*. (2 hrs)

Chemistry: Outline of the contributions of ancient and medieval Indians in the area of chemistry and metallurgy. Case Study of Delhi Iron Pillar. Specific use, processing, and finishing of metals since the vedic times like mercury and zinc. Zinc distillation as mentioned in *Rasārṇava*. Bhasma; A nano-medicine of ancient India. Concept of Acid. (2 hrs)

Unit II	Vedic Mathematics and Astronomy	5 hrs

First Year (FY) B Tech Semester II

Overview of development of Mathematics in India during the ancient and early classical Period.
Mathematics-Sulbhasutra, Aryabhaattta, Lilavati. Vedic maths-Cube and cube roots, Pi value, Arthematic counting.

Astronomy in India Vedang Jyotish, Aryabhatta Siddhanta, Introduction to *Varahamihira*, *Brahmagupta*. Vedic calendar based on astronomy. Introduction to *Pañcāṅga* and five elements of it, *rāśi* and *nakṣatra* division. Case Study Jantar Mantar, New Delhi. (2 hrs)

Unit III	**Indian Town Planning and Arts**	**5 hrs**

Ancient Indian Architecture: Vastu Shastra and Temple Architecture, *Nagara* (northern style), *Vesara* (mixed style), and *Dravida* (southern style), Indian vernacular architecture, Temple style, cave architecture, rock cut architecture, Kalinga, Chandels, Rajput, Jain, Sikh, Maratha, Indo-Islamic architectural, Greco Buddhist style. Harappan Town Planning. Ancient Indian Craftsmanship (3 hrs)

Introduction to Indian Music and Musical Instruments: Swaras and Ragas**,** Veena, Ghatam, Flute, *Mridangam*, Harmonium, Sitar, Sarod, Shehnai, Tabla, Maddalam, Introduction to Indian Dances: *Bharatnatyam, Kuchipudi, Kathakali* etc. Indian Classical Dance (2 hrs)

Unit IV	**Artha shastra, Indian Agriculture, Religions and Languages**	**5 hrs**

Trade and Commerce in Ancient India, *Arthashastra* (2 hrs).

Ancient Indian Farming Practices, Role of Nakshatra and Agnihotra on Agriculture. Harappan and Traditional Water Management System of Gujarat. Soil Preparation, irrigation, Crop Protection (1 hr).

Ancient Indian Religions and Modern Indian Languages, Introduction to Ancient Indian Warfare and Weaponry (2 hrs)

Unit V	**Ayurveda for Health, Wellness, Psychology and Spirituality**	**5 hrs**

Charak & Sushrut Samhita, Ayurveda: Principles and Practices, Understanding composition of Human body through the concept of Dosha, Dhatu, Mala, Understanding Prakruthi, the Mind – Body Constitution Concept of saptadhatu & tridosh (3 hrs).
Definition, Meaning and objectives of Yoga, Relevance of yoga in modern age. Introduction of Hatha Yog, Raja Yog, Karma Yog, Gyana Yog, Bhakti Yog. Understanding eight steps of Ashtanga yoga, Understanding Consciousness (2 hrs).

Reference Books

1. Guidelines for Training/Orientation of Faculty on Indian Knowledge Systems, Published by: Secretary, University Grants Commission, Bahadur Shah, Zafar Marg, New Delhi-110002
2. Introduction to Indian Knowledge System: Concepts and Applications, Mahadevan, B., Bhat, Vinayak Rajat, Nagendra Pavana R.N., Publisher PHI Learning Pvt. Ltd., 2022, ISBN 9391818218, 9789391818210.
3. Vaisesika Sutra of Kanada, Translated by Debasish Chakravarty, D K Print World, ISBN 9788124602294
4. Līlāvatī of Bhāskarācārya: A Treatise of Mathematics of Vedic Tradition: with Rationale in Terms of Modern Mathematics Largely Based on N.H. Phadke's Marāthī Translation of Līlāvatī, Translated by Krishnaji Shankara Patwardhan, Publisher Motilal Banarsidass Publishe, 200, ISBN 812081777X, 9788120817777
5. Aspects of History of Agriculture in Ancient India, Author: La**l**anji Gopal, Publisher:

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Bharati Prakashan, 1980
6. Light on Yoga: The Classic Guide to Yoga by the World's Foremost Authority, Author B. K. S. Iyengar, Publisher Harper Collins India, 2006, ISBN 8172235011, 9788172235017
7. Chopra, D. (2000). Perfect Health: The Complete Mind Body Guide.: Three Rivers Press.
8. Lad, Vasant. Ayurveda: The Science of Self-healing a Practical Guide., Motilal Banarsidass, 2002.

Scheme for Theory Examination

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evalution(CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	3	-	-	-	-	3
CO2	-	-	-	-	-	3	-	-	-	-	3
CO3	-	-	-	-	-	3	-	-	-	-	3
CO4	-	-	-	-	-	3	-	-	-	-	3
CO5	-	-	-	-	-	3	-	-	-	-	3

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech Semester II

Course Code: LLC2402P02, Course Title: Liberal Learning II (Common to All), Category: Co-curricular Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max	Min for Passing		Max	Min for Passing
-	1	2	2	CCE	-	-	-	100	40
Total Hours									
-	13	26	Total: 39						

Prerequisites: Course Code	
Course Objectives:	
1. To promote the holistic development of students through engagement various extra-curricular activities. 2. To enhance students' life skills through individual and group activities.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	**Demonstrate** linguistic fluency in foreign or native languages through studying the cultural and historical contexts related to their chosen discipline, understanding its evolution, traditions, and the role it plays within various cultural settings and narratives.
CO2	**Demonstrate** enhanced ability to creatively express themselves and effectively communicate ideas, emotions, and, or by creating innovative and artistic art pieces.
CO3	**Express** creativity and individuality through their work, whether through artistic creations, musical performances, or athletic activities, and present and perform their skills confidently in various settings.

Syllabus

LLC2401P001-A- Liberal Learning-2- German Language		
Prerequisites: None		
Course Objectives:		
3. To promote the holistic development of students through engagement in various extra- curricular activities. 4. To enhance students' life skills through individual and group activities.		
Course Outcomes: After successful completion of the course the student will be able to		
CO1	Apply past and future tenses, modal verbs, and possessive articles in German.	
CO2	Utilize Professional and Technical Language in Communication	
CO3	Engage in Travel and Social Conversations Effectively	
CO4	Develop Reading, Writing, and Presentation Skills	
Unit 1	**Advanced Grammar and Sentence Formation**	**9 hrs**

	Past and future tense, modal verbs, possessive articles in accusative case, Profession and daily routine, talking about hobbies	
Unit 2	**Professional & Technical Vocabulary**	**10 hrs**
	Engineering-related vocabulary in German -the daily case, Writing emails and formal communication, making doctor appointments, booking tickets, invitations etc. Understanding job-related conversations	
Unit 3	**Travel and Social Conversations**	**10 hrs**
	Phrases for travel, ordering food, shopping, Food and dirnks, Weather, Preposition in Accusative	
Unit 4	**Reading, Writing & Presentations**	**10 hrs**
	• Reading and understanding short articles, prepositions • Writing short essays and reports • Writing CVs and applications in German • Watching and analyzing videos of native speakers	

LLC2401P001-B- Liberal Learning-2- Japanese Language	
Prerequisites: None	
Course Objectives:	
3. To promote the holistic development of students through engagement in various extra- curricular activities. 4. To enhance students' life skills through individual and group activities.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Demonstrate Proficiency in Advanced Grammar and Sentence Construction
CO2	Utilize Professional and Technical Language in Communication
CO3	Engage in Travel and Social Conversations Effectively
CO4	Develop Reading, Writing, and Presentation Skills

Unit 1	**Grammar (verb)**	**12hrs**
	Study of particles for Verbs, Verbs forms (~て、~ない、~た、~なかった)	
Unit 2	**Kanjis and Counter**	**16 hrs**
	• Kanjis study (around 100 Nos.), Counters study	
Unit 3	**Adjectives**	**5 hrs**
	• Adjectives with various forms	
Unit 4	**Casual Forms**	**6 hrs**
	• Casual forms (Verbs, Adjectives etc.)	

LLC2401P001-C- Liberal Learning-2- Sketching and Painting	
Prerequisites: None	
Course Objectives:	
3. To promote the holistic development of students through engagement in various extra- curricular activities. 4. To enhance students' life skills through individual and group activities.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Understand Color Theory and Painting Fundamentals

CO2	Develop Watercolor Painting Techniques and Composition Skills	
CO3	Apply Acrylic Painting Methods and Texture Creation	
CO4	Express Creativity Through Conceptual and Thematic Art	
Unit 1	**Introduction to Colors and Painting Mediums**	**11 hrs**
	• Color theory: primary, secondary, tertiary, and complementary colors • Introduction to painting mediums: watercolor, acrylics, oil • Brush handling and stroke techniques • Mixing colors and creating gradients	
Unit 2	**Watercolor Techniques and Composition**	**12 hrs**
	• Wet-on-wet, wet-on-dry, and dry brush techniques • Creating light and shadow in watercolor • Painting simple landscapes and still-life compositions • Understanding composition and balance	
Unit 3	**Acrylic Painting and Texture Creation**	**10 hrs**
	• Acrylic techniques: layering, impasto, glazing • Creating textures using palette knives and sponges • Painting abstract and impressionist compositions • Experimenting with mixed media (combining sketching and painting)	
Unit 4	**Conceptual and Creative Art**	**10 hrs**
	• Expressing ideas through art (technology, innovation, sustainability themes) • Storytelling through painting • Creating a thematic artwork • Understanding artistic movements and their relevance	

LLC2401P001-D- Liberal Learning-2- Photography		
Prerequisites: None		
Course Objectives:		
3. To promote the holistic development of students through engagement in various extra- curricular activities. 4. To enhance students' life skills through individual and group activities.		
Course Outcomes: After successful completion of the course the student will be able to		
CO1	Utilize professional camera and mobile settings, such as Pro mode, long exposure, and light trails, for creative motion shots.	
CO2	Develop Skills in Portrait and Street Photography	
CO3	Enhance Expertise in Product, Nature, and Macro Photography	
CO4	Apply Advanced Editing and Storytelling Techniques	
Unit 1	**Advanced Photography Techniques**	**10hrs**
	• **Mobile:** Pro mode, macro mode, burst mode • **Camera:** Manual mode, long exposure, light trails • Motion blur, panning, night photography techniques • Hands-on session: Capturing creative motion shots • White balance and color temperature	
Unit 2	**Portrait & Street Photography**	**9hrs**

	• **Mobile & Camera:** Capturing emotions and candid moments • Understanding lighting for portraits • Using portrait mode & depth effect on mobile • Hands-on session: Street and portrait photography exercises	
Unit 3	**Product, Nature & Macro Photography**	**10 hrs**
	• **Mobile & Camera:** Close-up photography techniques • Using external lenses for mobile photography • Indoor lighting setup for product photography • Hands-on session: Capturing detailed close-ups	
Unit 4	**Advanced Editing & Creative Storytelling**	**10 hrs**
	• Advanced color grading techniques • Using layers, masking & retouching in Photoshop • Creating a photo story using multiple images • Practical session: Editing a photo series for storytelling	

LLC2401P001-E- Liberal Learning-2- Sports		
Prerequisites: None		
Course Objectives:		
1. To promote the holistic development of students through engagement in various extra- curricular activities. 2. To enhance students' life skills through individual and group activities.		
Course Outcomes: After successful completion of the course the student will be able to		
CO1	Apply Advanced Strategies in Table Tennis	
CO2	Enhance Football Skills and Game Techniques	
CO3	Apply advanced chess and carrom tactics with strategic planning.	
CO4	Develop Leadership and Teamwork in Sports	
Unit 1	**Advanced Table Tennis Strategies**	**9hrs**
	• Spin variations and countering opponent strategies • Defensive and offensive strokes • Footwork drills for faster response • Mock tournaments and strategy discussions	
Unit 2	**Football-Skills Development**	**10hrs**
	• Football passing • Passing the ball with different parts of body • Saving the ball from opponent teams • Improving personal skills • Controlling the ball and scoring goals	
Unit 3	**Chess & Carrom-Competitive Play**	**10 hrs**
	• Chess: Advanced tactics (pin, fork, discovered attack), planning ahead • Carrom: Advanced striking techniques, rebound shots, and speed control • Tournament rules and match simulation	

	• Psychological preparation and decision-making under pressure	
Unit 4	**Team Sports & Leadership**	**10 hrs**
	• Importance of teamwork and communication • Understanding leadership in sports • Indoor relay and team-building activities • Strategy sessions and role-playing in doubles matches	

Rubrics for Continuous Evaluation

Rubrics for ISE (100)		
No	**Component**	**Marks**
1	Assignments	50
2	Oral Viva and Practical Exam	50

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2							2	2		3
CO2	2							2	2		3
CO3	2							2	2		3

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University,

First Year (FY) B Tech in Artificial intelligence and Data Science, Semester II

Course Code: AID2402L01, Course Title: Python for Data Science, Category: Program Core Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
					Max %	Min marks for Passing		Max %	Min marks for Passing
2	0	0	2	CCE	50	20			
26	0	0	Total: 26	ESE	50	20	40	-	-

Prerequisites: ESC2401L08 – Programming & Problem Solving	
Course Objectives: Purposes of the course are	
1. Equip students with foundational Python programming skills, including syntax, data types and control structures. 2. Familiarize students with essential data structures in Python such as lists, tuples, dictionaries, and sets. 3. Develop students' proficiency in creating and using functions, modules, and packages in Python programming. 4. Introduce students to key data manipulation and analysis libraries. 5. Introduce students for efficient handling, analysis, and manipulation and visualization of data.	
Course Outcomes: After successful completion of the course units the student will	
CO 1	Demonstrate proficiency in basic Python syntax, data types, and control structures.
CO 2	Use and manipulate python data structures, functions, packages and modules.
CO 3	Analyze the structure and components of a Python package and understand the module search path.
CO 4	Understand the fundamentals of data science and its applications.
CO 5	Create informative data manipulation for visualization using python libraries.

Syllabus

Unit I	Introduction to Python Programming	6 hrs

Introduction to Python and its features, Python installation and setup (Anaconda, Jupyter Notebook) **Basic Python syntax:** variables, data types, operators, and expressions, **Control structures:** if-else statements, loops (for and while), and conditional statements		
Unit II	**Python Data Structures**	**6 hrs**
Lists: creation, indexing, slicing, and operations, **Tuples:** creating, accessing elements, and tuple operations, **Dictionaries:** creating, accessing elements, and dictionary methods, **Sets:** creating, adding/removing elements, and set operations.		
Unit III	**Functions and Modules in Python**	**6 hrs**
Functions: defining functions, function arguments, return statements, and lambda functions. **Modules and packages:** creating modules, importing modules, and using built-in modules.		
Unit IV	**Fundamentals of data science, applications of data science, Numpy array.**	**4 hrs**
Introduction to NumPy arrays: creating arrays, indexing, slicing, and array operations. **Pandas Series:** creating Series, indexing, accessing elements.		
Unit V	**Pandas and Matplotlib**	**4 hrs**
Pandas Data Frames: creating Data Frames, data manipulation. **Matplotlib:** line plots, scatter plots		

Reference Books: -

1. **"How to Solve it by Computer", R. G. Dromey, Pearson Education India; 1st edition, ISBN-10: 8131705625, ISBN-13: 978-8131705629.**
2. **"Problem Solving and Programming Concepts", Maureen Spankle, Pearson; 9th edition, 2011, ISBN-10: 9780132492645, ISBN-13: 978- 0132492645.**
3. **"Learning Python", Romano Fabrizio, Packt Publishing Limited, 1st edition, 2015, ISBN: 9781783551712, 1783551712.**
4. **"Head First Python- A Brain Friendly Guide", Paul Barry, SPD O'Reilly, 2nd edition, 2016, ISBN:978-93-5213-482-3.**
5. **"Python: The Complete Reference", Martin C. Brown, McGraw Hill Education, 4th edition-2018, ISBN-10:9789387572942, ISBN-13: 978-9387572942.**

Text Book: -

1. **"Python Programming Using Problem Solving Approach" Reema Thareja, Oxford University Press, First edition, 2019, ISBN 13: 978-0-19-948017-6.**
2. **"Core Python Programming", R. Nageswara Rao, Dreamtech Press; Second edition, 2018 ISBN- 10: 938605230X, ISBN-13: 978-9386052308 ASIN: B07BFSR3LL**

Swayam / NPTEL/MOOC Course: -

1. **"Python for Data Science" by Prof. Ragunathan Rengasamy IIT Madras.**
2. **"Python for Data Science" - Infosys Springboard.**

YouTube Link: -

1. **Python Data Science Tutorial | Simplilearn- https://www.youtube.com/watch?v=mkv5mxYu0Wk**
2. **Learn Python libraries - https://www.youtube.com/watch?v=LHBE6Q9XlzI**

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20

End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	2	1	2	1	-	-	-	1	1
CO2	2	2	2	1	3	2	-	-	-	-	1
CO3	2	2	2	1	3	1	-	-	1	-	1
CO4	2	2	2	3	3	1	1	1	1	1	1
CO5	2	2	3	-	3	1	-	-	-	-	1

3: High, 2: Moderate, 1: Low, -: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech in Civil Engineering, Semester II

Course Code: CVE2402L01, Course Title: Basics of Civil Engineering
Category: Program Core Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
					Max %	Min marks for Passing		Max %	Min marks for Passing
2	0	0	2	CCE	50	20			
26	0	0	Total: 26	ESE	50	20	40	-	-

Prerequisites: No	
Course Objectives: Purposes of the course is,	
1. To use basic Civil Engineering knowledge in nation development. 2. To become acquainted with real-world construction materials used for building components. 3. To be aware of modern equipment's used in surveying.	
Course Outcomes: After successful completion of the course, students will be able to,	
CO1	**Describe** the importance of various branches and interdisciplinary approach in Civil Engineering for enormous understanding
CO2	**Identify and utilize** construction materials, concrete types, and sustainable practices for effective building construction.
CO3	**Identify and describe** the various types of foundations and superstructures
CO4	**Discuss** the importance of surveying, leveling to understand topography
CO5	**Interpret** the application of various construction equipment and automation technologies in the building process.

Syllabus

Unit I	**Introduction of Civil Engineering:**	**5 hrs**
A) Importance of civil engineering in society, branches of civil engineering, basic units used in civil engineering and its conversion B) Importance of interdisciplinary approach in civil engineering		
Unit II	**Materials**	**6 hrs**
Basic materials for construction: Cement, bricks, stone, natural and artificial sand, steel- mild, tor, high tensile steel. Concrete types - PCC, RCC, pre-stressed and pre-cast, Introduction to RMC plant, fundamental requirements of masonry, introduction to sustainable materials.		
Unit III	**Introduction to Construction**	**5 hrs**
A) Substructure: definition and function of foundation, Types of foundation (only Concept) B) Superstructure - load bearing and framed		
Unit IV	**Introduction to Surveying**	**6 hrs**

A) Introduction to Surveying-Types, Principles, Applications.
B) Introduction to levelling- HI, Rise and Fall method with change point.
C) Introduction to contour map

Unit V	**Construction Equipment's and Automation**	**4 hrs**

A. Construction Equipment-Introduction to Excavator, Paver Machine, Tower crane.
B. Introduction to Automation in Construction- Concept, Need, Examples related to different civil engineering projects

Reference Books

1. Basic Civil and Environmental Engineering by C.P Kaushik, S.S. Bahavikatti, Anubha Kaushik, Edition 2018
2. Surveying by N.N. Basak, Edition 2014 Tata Mc-Graw Hill
3. Building Construction and Drawing- Bindra and Arora, Edition 2012, Dhanapat Rai Publications.
4. Shah M.G., Kale C. M., Patki S. Y., "Building Drawing with an integrated approach to Built Environment", Tata McGraw-Hill publication, 2012.
5. Kanetkar T. P., Kulkarni S. V., "Surveying and Levelling (Vol. I)", Pune VidyarthiGrihaPrakashan, 2006.
6. Building Construction by Arora S.P. and Bindra S.P. – Dhanpatrai and Sons publications, Delhi. Edition 2016
7. National Building Code by Bureau of Indian Standards (2000)
8. Water Supply Engineering by S.K. Garg, 33rd edition 2019, Khanna Publishers, Delhi
9. Highway Engineering by Khanna, C.E.G Justo, A.Veersrsgavan, Edition 2018, Nem Chandand Bros Publication.
10. Irrigation and Water Power Engineering by B. C. Punmia, 16th edition 2019, Laxmi Publications.

NPTEL Link :

1. https://onlinecourses.nptel.ac.in/noc22_ce42/preview
2. https://nptel.ac.in/courses/105107122

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	1	1			1				
CO2	3			1		1					
CO3	3	1									
CO4	3	1		1							
CO5	3				1	1					

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech in Computer Engineering, Semester II

Course Code: CPE2402L01, Course Title: Object Oriented Programming, with C++, Category: Program Specific Core Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical % Marks	
					Max %	Min for Passing		Max	Min marks for Passing
2	0	0	2	CCE	50	20			
26	0	0	Total: 26	ESE	50	20	40	-	-

Prerequisites: ESC2401L08- Programming and Problem Solving

Course Objectives:

The course provides the basic foundations and in-depth understanding of object oriented Programming to develop programming skills which help students in software development.

- To understand the object-oriented programming paradigm and OOP concepts
- To understand and learn the basic constructions of C++
- To learn how inheritance and polymorphism work in C++
- To learn how to use file to maintain records with C++

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Understand** and **apply** basic object-oriented concepts to provide solutions for simple system.
CO2	**Design and implement a program** to **demonstrate** use of Inheritance in real time systems.
CO3	**Develop** an application using polymorphism for solving any complex problem.
CO4	**Understand** and **use** Pointer concept to **implement** Run Time Polymorphism
CO5	**Apply** file handling concept for creating software applications.

Syllabus

Unit I	Fundamentals of Object Oriented Programming	6 hrs
Procedure Oriented Programming (POP) verses Object Oriented Programming (OOP), Object Oriented Programming (OOP) Concepts C++ programming: Classes, Objects, array of object, Member functions, access specifiers, friend functions, friend class, static variables, static functions, inline function, this pointer, Namespaces, Constructor- Types of Constructors: Default constructor, Parameterized constructor, Copy Constructors, Destructors, Unit testing		
Unit II	**Inheritance**	**5 hrs**
Inheritance- Basic Concept, base class and derived class, protected members, Constructor and destructor in Derived Class, Types of Inheritance, Overriding Member Functions, Public and Private Inheritance, Ambiguity in Multiple Inheritance, Virtual Base Class, Abstract Class		
Unit III	**Compile Time Polymorphism**	**5 hrs**

Introduction to Polymorphism, Types of Polymorphism, operator overloading, Overloading Binary Operators, Function overloading,		
Unit IV	**Pointer and Run Time Polymorphism**	**5 hrs**
Pointers: Declaring and initializing pointers, modify pointers, pointer arithmetic, accessing Array using pointer, Arrays of Pointers, Run time polymorphism - Pointers to Base class, virtual function and its significance in C++.		
Unit V	**Files**	**5 hrs**
Stream and files, Stream Classes, Stream Errors, Disk File I/O with Streams, File Pointers, and Error Handling in File I/O, File I/O with Member Functions, Overloading the Extraction and Insertion Operators, Command-Line Arguments		

Text Books :

1. Robert Lafore, "Object-Oriented Programming in C++", 4th edition, Sams Publishing, 2008, ISBN:0672323087 (ISBN 13: 9780672323089
2. E. Balagurusamy, "Object-Oriented Programming with C++", 8th edition, Graw-Hill Publication, 2020, ISBN 10: 9352607996 ISBN 13: 9789352607990

Reference Books :

1. Herbert Schildt ,"C++ The complete reference", 4th Edition, McGraw Hill Professional, 2017, ISBN:978-00-72226805
2. Yashwant Kanetkar, "Let Us C++", 17th Edition BPB Publications, 2020, ISBN-10 : 9388176642
3. Richard Grimes, "Beginning C++ Programming", Packt Publishing Ltd., 2017, ISBN 978-1-78712-494-3

e-Contents :

1. NPTEL Course on Programming in C++ https://onlinecourses.nptel.ac.in/noc21_cs02/preview
2. NPTEL Course on Programming in Modern C++ https://onlinecourses.nptel.ac.in/noc24_cs44/preview
3. Programming in C++ https://www.shiksha.com/online-courses/programming-in-c-by-nptel-course-nptel23

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	2	3	1	2	3	3	1	3
CO2	3	3	3	3	3	1	2	3	3	1	3
CO3	3	3	3	3	3	1	2	3	3	1	3
CO4	3	3	3	3	3	1	2	3	3	1	3
CO5	3	3	3	3	3	1	2	3	3	1	3

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech in Electronics and Telecommunication Engineering, Semester II

Course Code: ETE2402L01, Course Title: Semiconductor Devices and Sensors, Category: Program Specific Core Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
					Max %	Min Marks for Passing		Max	Min Marks for Passing
2	0	0	2	CCE	50	20			
26	0	0	Total: 26	ESE	50	20	40	-	-

Prerequisites: Engineering Physics, ESC2401L03

Course Objectives: After successful completion of the course the student will be able to:

1. To impart knowledge of Diodes and Transistors with their characteristics and applications.
2. To design and configure combinational and sequential logic circuits.
3. To build a sensor based control system.

Course Outcomes : Student will:

CO1	Select rectifier diode for design of DC power supply, LED and Photodiode for opto-coupler circuits in counting applications.
CO2	Relate BJT, JFET and MOSFET for amplification and switching actions.
CO3	Design combinational circuits like MUX, De-MUX, Encoder, Decoder
CO4	Design sequential logic circuits like mod -N counter.
CO5	Analyse RTD for food processing unit and load cell for electronics weighing machine.

Syllabus

Unit I	**Diode Applications**	**6 hrs**
Diode current equation, Rectifier circuits with and without filter, Diode as clipper and clamper. 3-Pin IC voltage regulators, Working and application of Photodiode and LED**.**		
Unit II	**Transistor**	**5hrs**
BJT: configuration, characteristics & Load line concept. Introduction to JFET, DMOSFET and E MOSFET. Op-AMP: introduction, block diagram & Parameters.		
Unit III	Boolean Algebra & combinational circuits	**5 hrs**
Boolean Algebra and Standard representation of logical expression. Simplification of logic function (K map), Multiplexer, De multiplexer, Encoder, Decoder, Even Parity, Odd Parity, Parity Generator.		
Unit IV	Sequential logic circuits	**5 hrs**
D-Flip Flop & T-Flip Flop, Shift Registers: SISO, SIPO, PISO and PIPO, Counters: Asynchronous counter: Ring counter, Johnson counter, synchronous mod N counter.		
Unit V	**Sensors**	**5 hrs**
Strain Gauge and Load cell, Temperature Sensors: Thermocouple RTD and Thermistor. Biosensors		
Text Books		
1.Thomas Floyd, "Electronics Devices", Prentice hall, 10th Edition, 2018, ISBN-978-1292222998 2. R.P. Jain, "Modern Digital Electronics", Tata McGraw Hill Publication, 5th Edition 2022, ISBN- 978-9355321770. 3.D. Patrnabis, "Sensors and Transducers", PHI Learning, 2nd edition, 2003, ISBN- 978-8120321984		

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	3	-	-	-	-	-	1	-	-
CO2	3	-	-	-	-	-	-	-	1	1	-
CO3	3	2	2	1	2	-	-	1	-	-	-
CO4	3	2	2	-	2	1	1	1	-	1	1
CO4	3	2	1	-	-	-	-	-	1	-	1

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech in Information Technology, Semester II

Course Code: INT2402L01, Course Title: Fundamentals of Java Programming, Category: Program Core Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max	Min for Passing		Max	Min for Passing
2	0	0	2	CCE	50	20			
26	0	0	Total: 26	ESE	50	20	40	-	-

Prerequisites: ESC2401L08, Basics of C/C++ Programming	
Course Objectives: This course aims to build the basic introduction of Java programming language. Purpose of course are: 1. To learn object oriented program concepts and fundamentals of Java Programming. 2. To understand the concepts of classes and objects in Java Programming. 3. To learn the concepts of classes and objects in Java Programming. 4. To understand the concepts of exceptional handling in Java Programming. 5. To learn the concepts of multithreading in Java Programming.	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Apply the fundamental concepts of Java programming language including variables, data types, control structures, and methods.
CO2	Use the concepts of classes, objects, members of a class and the relationships among them to write a code for finding the solution to specific problems.
CO3	Demonstrate how to extend java classes and achieve reusability using Inheritance and Interfaces.
CO4	Apply the concepts of Exceptional handling to develop efficient and error free codes.
CO5	Construct robust and faster programmed solutions to problems using the concept of Multithreading .

Syllabus

Unit I	Fundamentals of Java	6 hrs
Overview of procedure and object-oriented Programming, Open Source Platform Features of Java Language. **Introduction to the principles of OOP**: Classes, Objects, Abstraction, Encapsulation, Inheritance, Polymorphism. Keywords, Data types, Variables, Operators, Expressions. Control Statements and Iteration Statements.		
Unit II	**Classes, Objects, Arrays and Strings**	**6 hrs**

Classes & Objects: Class Fundamentals: Assigning Object Reference Variables, Parameter passing for methods, Nested and Inner Classes. Constructors: Parameterized Constructors, Method overloading, Constructors overloading, Recursion, **String**: String functions. **Arrays**: One Dimensional array, Two Dimensional arrays.

Unit III	**Inheritance and Interfaces**	**6 hrs**

Inheritance: Inheritance and its types, Concept of Super and subclass, inheriting Data members and Methods, making methods and classes final, Method overriding. Abstract classes, and methods. **Interfaces:** Defining an interface, extending interfaces, implementing interfaces, Interfaces vs. Abstract classes.

Unit IV	**Exception Handling**	**4 hrs**

Exceptions: Need for exceptions,Checked Vs Unchecked exceptions, creating custom exceptions.

Unit V	**Multithreading**	**4 hrs**

Multithreading: Introduction, Priorities and scheduling, Inter-thread communication, Thread Synchronization and its life cycle. Thread class Methods, Implementing Runnable, Extending thread .

Reference Books

1. Herbert Schildt, “Java-The Complete Reference”, Tenth Edition, Oracle Press, Tata McGraw Hill Education.
2. Anita Seth, B.L.Juneja, “ Java : One Step Ahead”, oxford university press.
3 D.T. Editorial Services, “Java 8 Programming Black Book”, Dreamtech Press 2. Learn to Master Java by Star EDU Solutions
4.Core Java Volume I-Fundamentals “Cay S. Horstmann”, 11th Edition

Text Books

1. Yashvant Kanetkar, “Let Us Java” 4th Edition ,BPB Publications.
2.E. Balguruswamy, “Programming with Java A primer”, Fifth edition, Tata McGraw Hill Publication

NPTEL link:

https://onlinecourses.nptel.ac.in/noc22_cs47/preview
https://youtu.be/OjdT2l-EZJA?si=7YQM7RtLIH5Cj6ET
https://youtu.be/J_d1fJy90GY?si=h7z55TbwDy3TdXJW

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	1	-	2	-	-	-	1	-	2
CO2	2	2	2	-	2	-	-	-	1	-	2
CO3	2	2	1	-	2	-	1	1	1	-	2
CO4	2	2	2	1	2	-	-	-	1	1	2
CO5	2	2	1	1	2	1	-	-	1	1	2

3: High, 2: Moderate, 1: Low, 0: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech in Instrumentation and Control Engineering, Semester II

Course Code: ICE2402L01, Course Title: Measurements in Instrumentation, Category: Program Specific Core Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory % Marks			Practical % Marks	
					Max %	Min Marks for Passing		Max	Min marks for Passing
2	0	0	2	CCE	50	20			
26	0	0	Total: 26	ESE	50	20	40	-	-

Prerequisites: ESC2401L03.

Course Objectives: Purposes of the course are

1. To study of measuring instruments used in Instrumentation and Control Engineering.
2. To understand the various parameters using electrical and electronic measurements.
3. Oscilloscope and its usage for various measurements in Instrumentation Applications.

Course Outcomes: After successful completion of the course units the student will

CO1	Analyze static and dynamic characteristics of measurement instruments like voltmeters and ammeters for analysing loading effect.
CO2	Measure resistance, capacitance and inductance of electrical circuits for signal analysis.
CO3	Analyze measurements like voltage, current, frequency, phase of electrical circuits using cathode ray oscilloscope for signal conditioning requirements.
CO4	Use electronic instruments for analog and digital measurements for sensors signal conditioning.
CO5	Use recording instruments for recording and analyzing various process and electrical signals

Syllabus

Unit I	Fundamentals of Measurements	6 hrs

General Measurement System, Classification of Instruments, Static and Dynamic characteristics of instruments, Error: limiting error, Types of Errors. Loading effect: Input impedance, output impedance, loading effects of series and shunt connected instruments, Calibration: Definition, calibration report & certification, traceability and traceability chart.

Unit II	Electrical Measurement	7 hrs

General features and Classification of electro mechanical instruments. Principles of Moving coil, moving iron, dynamometer type. Low, high and precise resistance measurement, Megger, Ohmmeters, Classical AC bridges: Inductance and capacitance measurements.

Unit III	Oscilloscopes	7 hrs

General purpose oscilloscope Block Diagram, Cathode Ray Tube, deflection sensitivity, front panel controls, Oscilloscope Probes 1:1 and 10:1, Dual trace CRO, ALT and CHOP modes, measurement of electrical parameters like voltage, current, frequency and phase, frequency measurement. Demonstrations of Oscilloscope. Digital Storage oscilloscope block diagram, sampling rate, bandwidth, roll mode.

Unit IV	Electronic Measurements	6 hrs
Essentials of electronic instruments, advantages of electronic instruments, Electronic Multi-meters, Analog and digital multi-meters, Digital frequency meters. Digital LCR meter, Q-Meter, Digital wattmeter and energy meters.		
Unit V	**Recording Instruments**	**6 hrs**
Classification of recorder, Basic Strip chart recorder, Types of Strip chart recorder, XY Recorder, Different marking mechanism in recorder, Application of recorders		

Reference Books

1. A. K. Shawney, A course in Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai and Sons, 2015.
2. H. S. Kalsi, Electronic Instrumentation, McGraw Hill Education; 3rd Edition, 2017.
3. Albert D. Helfrick, William D. Cooper, Modern Electronic Instrumentation and Measurement Techniques, 1st Edition, Pearson, 2016.
4. Ernest O Doebelin and Dhanesh N Manik, MeasurementSystems: Application and design, McGraw Hill publication, 5th Edition.
5. David A. Bell, Electronic Instrumentation and Measurements, Oxford University Press India; 3rd Edition.

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	1				1		1	1	2
CO2	3	2		1						1	3
CO3	3	2	1		1					1	2
CO4	2	2				1		1		1	2

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

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D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

First Year (FY) B Tech in Robotics and Automation, Semester II

Course Code: RNA2402L01, Course Title: Elements of Mechanical Engineering, Category: Programme Specific Core Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
					Max %	Min Marks for Passing		Max	Min Marks for Passing
2	0	0	2	CCE	50	20			
26	0	0	Total: 26	ESE	50	20	40	-	-

Prerequisites: Physics, Mathematics, Electrical	
Course Objectives:	
1. To provide students with a solid understanding of the fundamental properties of fluids and the various types of fluid flows. 2. To enable students to explain the environmental and economic impacts of electric vehicles. 3.To familiarize students with different manufacturing processes, and to recognize safety measures in cutting processes. 4. To enable students to explain and differentiate between various additive manufacturing techniques	
Course Outcomes: After successful completion of the course the student will be able to	
CO1	Analyze and solve problems related to fluid properties, statics, and dynamics in engineering contexts.
CO2	Understand the structure, components, and economic aspects of electric vehicles.
CO3	Describe various manufacturing processes and identify associated safety measures and defects.
CO4	Demonstrate rapid prototyping techniques and their applications in modern manufacturing.
CO5	Demonstrate appropriate level of knowledge of Additive Manufacturing process

Syllabus

Unit I	Fluid Engineering	6 hrs
Introduction to Fluid Engineering, Properties of Fluids, types of fluids. Fluid statics: measurements of pressure and flow. Fluid Dynamics: Types of Fluid Flows, Bernoulli's Equation, Momentum Equation. Fluid properties, pressure, density and viscosity, viscous and turbulent flow, pump and compressor**.**		
Unit II	**Electric Vehicle**	**7 hrs**
Overview of Electric Vehicles, Environmental and Economic Impact, Electric Vehicle Components, electric Vehicle Drivetrain, Charging infrastructure and technology, Cost Analysis of production.		
Unit III	**Basic Manufacturing Processes**	**7 hrs**

Introduction to manufacturing, Classification of Manufacturing processes, Introduction to Carpentry, Lathe, milling and drilling, Micromachining, Grinding and finishing processes. Safety measures in cutting processes. Machining Defects in mentioned processes.		
Unit IV	**Introduction – Additive Manufacturing .**	**6 hrs**
Overview – History – Need-Classification -Additive Manufacturing Technology in product development Materials for Additive Manufacturing Technology – Tooling – Applications		
Unit V	**Rapid Prototyping**	**6 hrs**
Overview of Rapid Prototyping, Classification of RP, Materials for RP, Stereo lithography, 3D Printing, Selective Laser Sintering, Fusion Deposition Modelling, 7 AM Steps defined by ASTM		

Reference Books

1. Bansal R.K., "Fluid Mechanics and Hydraulic Machines", 9th Edition, Laxmi Publication, 1990, ISBN 81-7008-311-7.
2. Khurmi R. S. and Gupta J. K., "Textbook of Refrigeration and Air Conditioning", S. Chand and Co.
3. Jain R.K., "Production Technology", Khanna Publishers, ISBN 81-7409-099-1.
4. Rao P.N.," Manufacturing Technology & Foundry, Forming & Welding", Vol I, II, Tata McGraw Hill Publishing Co. ISBN-0 07 451863 1
5. Electric Vehicles: And the End of ICE age, by Anupam Singh, Adhyyan Books Publisher, 2019.
6. Andreas Gebhardt and Jan-Steffen Hötter, "Additive Manufacturing: 3D Printing for Prototyping and Manufacturing" Hanser Publishers, Munich, 2016.
7. D. T. Pham and S.S. Dimov, "Rapid Manufacturing" Springer, 2001.

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2		2		2		1	2		
CO2	3		2		2			2	2	2	
CO3	2	2			2		2		3		2
CO4	3		3	2			3		2		
CO5	3		3	2			3		2		

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

Course Code: MNE2042L01, Course Title: Basic Mechanical Engineering, Category: Program Core Course

Teaching Scheme				Evaluation Scheme					
L (Hr)	T (Hr)	P (Hr)	Cr	Exam	Theory Marks			Practical Marks	
					Max	Min Marks for Passing		Max	Min Marks for Passing
2	0	0	2	CCE	50	20			
26	0	0	Total: 26	ESE	50	20	40	-	-

Prerequisites: Basics of Chemistry and Physics of HSC level

Course Objectives: Purposes of the course are

1. To explain the basic concept of engineering thermodynamics and its application
2. To get acquainted with vehicle systems.
3. To introduce manufacturing processes applying proper method to produce components.
4. To be able to select and compare domestic appliances

Course Outcomes: After successful completion of the course units the student will

CO1	Apply basic laws of thermodynamics, heat transfer for day-to-day life applications.
CO2	Understand the basic modes of heat and mass transfer.
CO3	Illustrate various basic parts and transmission system of a road vehicle
CO4	Discuss several manufacturing processes and identify the suitable process for various industrial applications
CO5	Interpret various types of mechanisms and its applications for household usage.

Syllabus

Unit I	Introduction to Thermodynamics	4 hrs
Introduction To Thermodynamics, Laws of Thermodynamics (Zeroth, First, Second Law), Heat Engine, Heat Pump, Refrigerator (Numerical)		
Unit II	**Heat Transfer**	**3 hrs**
Modes of heat transfer: conduction, convection and radiation, Fourier's law, Newton's law of cooling, Stefan Boltzmann's law. (Numerical),Boiler		
Unit III	**Automobile Engineering**	**7 hrs**
Introduction to IC Engine, two stroke and Four stroke engines (Petrol, Diesel), Engine Components and their specification, Chassis, Steering System, Suspension System, Braking, Fuel, Tyre, Clutch, Propeller Shaft, Gear Box, Axle. Introduction of Electric and Hybrid Vehicles. Systems and subsystems of electrical and hybrid vehicles.		
Unit IV	**Manufacturing Processes**	**6 hrs**
Casting, Forging, Metal forming (Drawing, Extrusion, etc.), Sheet metal working, Metal joining, etc. Metal cutting processes and machining operations Turning, Milling and Drilling, etc. 3D printing, rapid prototyping, IOT.		
Unit V	**Components and Mechanism of Household devices**	**6 hrs**
Gears - Printers, etc.; Valves - Water tap, etc.; Application of levers - Door latch. Electric/Solar energy - Geyser, Water heater, Electric iron, etc. Introduction of pump, compressor, Compressors - Refrigerator, Water cooler, AC unit; Pumps - Water filter, Blower - Vacuum cleaner,		

Kitchen Chimney; Motor -Washing machines

Introduction of pump, compressor, Compressors - Refrigerator, Water cooler, AC unit; Pumps - Water pump for overhead tanks, Water filter, Blower - Vacuum cleaner, Kitchen Chimney; Motor - Washing machines
Text Books
1. Agrawal, Basant and Agrawal, C. M., (2008), "Basics of Mechanical Engineering", John Wiley and Sons, USA ,ISBN 13 978-8126518784 2. Rajput, R.K., (2007), "Basic Mechanical Engineering", Laxmi Publications Pvt. Ltd , ISBN-13: 978-8131803592
Reference Books
1. Khurmi, R.S. ,and Gupta, J. K.,"A Textbook of Thermal Engineering", S. Chand & Sons, ISBN 13 9788121913379 2. Incropera, F. P. and Dewitt, D.P., (2007), "Fundamentals of Heat and Mass Transfer, 6th Ed., John Wiley and Sons, USA , ISBN 13: 9780470881453. 3. Groover, Mikell P., (1996), "Fundamentals of Modern Manufacturing: Materials, Processes, and Systems", Prentice Hall, USA , ISBN-13: 978-0133121827 4. Norton, Robert L., (2009), "Kinematics and Dynamics of Machinery", Tata McGrawHill, ISBN 13: 978-1-269-374507 6. Juvinal, R. C., (1994), "Fundamentals of Machine Component Design", John Wiley and Sons, USA, ISBN-. 13: 978-1118012895 7. Ganeshan, V., (2018), "Internal Combustion Engines", McGraw Hill, ISBN: 9788189928469 8. https://onlinecourses.nptel.ac.in/noc24_me104/preview

Scheme for Theory Examination

Component	Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total	Passing
Continuous Comprehensive Evalution(CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	03	03							03		03
CO2	03	03								02	03
CO3	03	03			02			02	03		03
CO4	03	03	03							02	03
CO5	03	03	03							02	03

3: High, 2: Moderate, 1: Low, 0: No Mapping