



LOKMANYA TILAK JANKALYAN SHIKSHAN SANSTHA'S

PRIYADARSHINI COLLEGE OF ENGINEERING

(Recognised by A.I.C.T.E. New Delhi & Govt. of Maharashtra Affiliated to R.T.M. Nagpur University)

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AN AUTONOMOUS INSTITUTE



FIRST YEAR ENGINEERING

CURRICULUM

UNDER GRADUATE PROGRAMME

B.Tech First Year

(Chemical Engineering/ Biotechnology)

WITH EFFECT FROM THE ACADEMIC YEAR 2024-2025.

SCHEME OF EXAMINATION w.e.f. 2024-25 onwards

FIRST SEMESTER B. TECH. (CHEMICAL ENGINEERING/ BIOTECHNOLOGY)

Sr. No.	Course Code	Course Category	BOS/ Dept	Course	Contact Hours				Marks				Total Marks
					L	T	P	Credits	Theory		Practical		
									CE	ESE	CE	ESE	
1	24UFY1A1T	BSC	ASH	Basic Calculus & Differential Equations	3	0	0	3	40	60	--	--	100
2	24UFY1C2T	BSC	ASH	Applied Physics	2	0	0	2	20	30	--	--	50
3	24UFY1C2P	BSC	ASH	Lab: Applied Physics	0	0	2	1	--	--	25	25	50
4	24UFY1D3T	ESC	CV	Engineering Mechanics	3	0	0	3	40	60	--	--	100
5	24UFY1D3P	ESC	CV	Lab: Engineering Mechanics	0	0	2	1	--	--	25	25	50
6	24UFY1B4T	ESC	ME	Computer Aided Graphics.	1	0	0	1	20	30	--	--	50
7	24UFY1B4P	ESC	ME	Lab: Computer Aided Graphics	0	0	2	1	--	--	25	25	50
8	24UFY1A5P	ESC	ME	Lab: Engineering Workshop	0	0	2	1	--	--	25	25	50
9	24UFY1B6T	AEC	ASH	Communication Skills	1	0	0	1	20	30	--	--	50
10	24UFY1B6P	AEC	ASH	Lab: Communication Skills	0	0	2	1	--	--	25	25	50
11	24UFY1A7P	SEC1	ASH	Skill Enhancement in Analytical Techniques	0	1	2	2	--	--	25	25	50
12	24UFY1A8T	BSC	ASH	Applied Chemistry	2	0	0	2	20	30	--	--	50
13	24UFY1A8P	BSC	ASH	Lab: Applied Chemistry	0	0	2	1	--	--	25	25	50
14	24UFY111P	CC1	ASH	Liberal Learning Course: Yoga & Meditation	--	--	--	2	--	--	50	--	50
	24UFY112P			Liberal Learning Course: Physical Education (sports)									
	24UFY113P			Liberal Learning Course: Music									
	24UFY114P			Liberal Learning Course: National Service Scheme (NSS)									
					12	1	14	22	160	240	225	175	800

SECOND SEMESTER B. TECH. (CHEMICAL ENGINEERING/ BIOTECHNOLOGY)

Sr. No.	Course Code	Course Category	BOS/ Dept	Course	Contact Hours				Marks				Total Marks
									Theory		Practical		
					L	T	P	Credits	CE	ESE	CE	ESE	
1	24UFY2D1T	BSC	ASH	Advanced Calculus Fourier Series & Statistics	3	1	0	4	40	60	--	--	100
2	24UFY2C2T	BSC	ASH	Material Science	2	0	0	2	20	30	--	--	50
3	24UFY2C2P	BSC	ASH	Lab : Material Science	0	0	2	1	--	--	25	25	50
4	24UFY2A8T	BSC	ASH	Applied Physical Chemistry	2	0	0	2	20	30	--	--	50
5	24UFY2A8P	BSC	ASH	Lab: Applied Physical Chemistry	0	0	2	1	--	--	25	25	50
6	24UFY2A4T	ESC	EE	Basics of Electrical & Electronics Engineering	3	0	0	3	40	60	--	--	100
7	24UFY2A4P	ESC	EE	Lab : Basics of Electrical & Electronics Engineering	0	0	2	1	--	--	25	25	50
8	24UFY225T	PCC	CHE	Introduction to Chemical Engineering	2	0	0	2	20	30	--	--	50
	BIO		Fundamentals in Life Sciences										
9	24UFY2A5T	IKS	ASH	Indian Traditional Knowledge	2	0	0	2	20	30	--	--	50
10	24UFY2A6P	SEC2	ASH	Skill Enhancement in Instrumental Techniques	0	1	2	2	--	--	25	25	50
11	24UFY211P	CC2	ASH	Liberal Learning Course: Creative Arts	--	--	--	2	--	--	50	--	50
	24UFY212P			Liberal Learning Course: Professional Skill									
	24UFY213P			Liberal Learning Course: Photography & films									
	24UFY214P			Liberal Learning Course: Foreign Language (German or French)									
					14	2	08	22	160	240	150	100	650


 Principal
 Priyadarshini College
 of Engineering, Nagpur


 DEAN ACADEMICS
 PRIYADARSHINI COLLEGE OF ENGG
 NAGPUR

Dean Academic

Course Title- Basic Calculus and Differential Equations
Course Code- 24UFY1A1T
Teaching Scheme: L-T-P
3 -0- 0

Semester -I
Course Category : BSC
Total Credits:3

Course Outcome:

On successful completion of the course, the students will learn:

- CO1:**To apply knowledge of matrices and linear algebra in a comprehensive manner.
 - CO2:** To solve engineering problem by using knowledge of differentiation.
 - CO3:** To Use the derivatives of functions of several variables and develop the mathematical equation.
 - CO4:** To analyse sequence and series on basis of types and their convergence
 - CO5:** To distinguish and solve differential equation that model physical process
 - CO6:** To Solve higher order differential equation used in various engineering field.
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Course Title: Applied Physics
Course Code: 24UFY1C2T
Teaching Scheme: L – T – P
2 – 0 – 0

Semester I
Course Category: BSC
Total Credits: 2

Course Outcomes: On successful completion of the course, the students will be able to

CO	CO Statement
CO 1	Apply the basic concepts of viscosity and its technological applications.
CO 2	Apply the basic concepts of surface tension and its applications to technology
CO 3	Apply the concept of Quantum transition process to describe the working of lasers.
CO 4	Apply concepts of interference and diffraction and its relevant engineering applications.

Course Title: Applied Physics
Course Code: 24UFY1C2P
Teaching Scheme: L – T – P
0 – 0 – 2

Semester I
Course Category: BSC
Total Credits: 1

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

CO1: know and measure the surface tension of liquid using various methods.

CO2: know and determine the coefficient of viscosity using different methods.

CO3: know the phenomenon of wave nature of light like interference and diffraction and its applications.

Course Title: Engineering Mechanics
Course Code: 24UFY1D3T
Teaching Scheme: L – T – P
3 – 0 – 0

Semester I
Course Category: ESC
Total Credits: 3

COURSE OUTCOMES:

On successful completion of the course the students will be able to

1. Illustrate the concept of force, moment and apply the concept of mechanics for solving problems.
2. Apply the concept of equilibrium in two- and three-dimensional systems with the help of free body diagram.
3. Correlate real life application to specific type of friction and estimate required force to overcome friction.
4. Understand the properties of surface and can find centroid and moment of inertia.
5. Illustrate different types of motions and apply the principles of dynamics to solve the various engineering problems of particle.
6. Analyse body in motion using force and acceleration, work-energy, impulse-momentum principles.

Course Title: Lab Engineering Mechanics
Course Code: 24UFY1D3P
Teaching Scheme: L – T – P
0 – 0 – 2

Semester I
Course Category: ESC
Total Credits: 1

COURSE OUTCOMES:

On successful completion of the course the students will be able to

1. Prove the concepts related to engineering mechanics.
 2. Calculate lifting machine parameters.
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Course Title: Computer Aided Graphics
Course Code: 24UFY1B4T
Teaching Scheme: L – T – P
1 – 0 – 0

Semester: I
Course Category: ESC
Total Credits:1

COURSE OUTCOMES:After the completion of the course the student will be able to

- CO1: Construct** curves and draw the projections of points and straight lines located in first quadrant.
 - CO2: Interpret** multi view orthographic projections of different planes and solids by visualizing them in different positions and draw sectional views and develop surfaces of a given object.
 - CO3: Convert** pictorial view to orthographic views and prepare isometric drawings using the principles of isometric projection to visualize objects in three dimensions.
 - CO4: Practice** the use of CAD software tools to draw multi view orthographic projections and solid models of objects.
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Course Title: Lab: Computer Aided Graphics
Course Code: 24UFY1B4P
Teaching Scheme: L- T- P
0- 0- 2

Semester: I
Course Category: ESC
Total Credit: 1

COURSE OUTCOMES:

After the completion of the course the student will be able to

- CO1** Construct engineering curves and draw the projections of a point straight line plane located in first quadrant.
- CO2** Analyse multi view projection of different solid by visualizing them in different positions, draw sectional views and develop surfaces of solid by applying CAD software tool
- CO3** Convert pictorial view into orthographic views, visualize object in three dimensions and able to draw isometric drawing using the principle of isometric projection with the help of CAD software tool
- CO4** Apply the knowledge of CAD software tool to draw solid models of objects.

Course Title: Lab: Engg. Workshop
Course Code: 24UFY1A5P
Teaching Scheme: L – T – P
0 – 0 – 2

Semester: I
Course Category: ESC
Total Credits: 1

COURSE OUTCOMES:

After the completion of the course the student will be able to

- CO1** Read and interpret job drawing and plan operation.
- CO2** Identify and select proper materials, tools, equipment, machines and proper operational parameters.
- CO3** Set tools, work piece and machines for desired operations.
- CO4** Complete job of Carpentry, Fitting, Welding and Smithy and Plumbing as per job drawing in allotted time.

Course Title: Communication Skills
Course Code: 24UFY1B6T
Teaching Scheme: L – T – P

Semester I
Course Category: AEC
Total Credits: 11 – 0 – 0

Course Outcomes: On completion of the course, students will be able to-

1. Construct grammatically correct sentences
2. Identify and overcome barriers of communication.
3. Demonstrate public speaking and presentation skills.
4. Prepare effective presentations.

Course Title: Communication Skills
Course Code: 24UFY1B6P
Teaching Scheme: L – T – P
0 – 0 – 2

Semester I
Course Category: AEC
Total Credits: 1

COURSE OUTCOMES:

After the completion of the course the student will be able to

- CO1** Identify and overcome barriers of communication.
- CO2** Demonstrate public speaking and presentation skills.
- CO3** Prepare for effective Group Discussion.
- CO4** Develop interviews skills.

Course Title: Skill Enhancement in Analytical Techniques
Course Code: 24UFY1A7P
Teaching Scheme: L – T – P
0 – 1 – 2

Semester I
Course Category:SECI
Total Credits: 2

COURSE OUTCOMES:

After the completion of the course the student will be able to

- CO1** Emphasize the practical relevance of analytical technique in their professional field
- CO2** Develop the critical thinking, hands on learning and the ability to connect theoretical knowledge to real world scenario
- CO3** Handle major and minor equipment with safety measure

Course Title: Applied Chemistry
Course Code: 24UFY1A8T
Teaching Scheme: L – T – P
2 – 0 – 0

Semester - I
Course Category: BSC
Total Credits: 02

COURSE OUTCOMES:

After learning the course, the students will be able:

- CO 1: To demonstrate the knowledge of water treatment processes in industries.
- CO 2: To explain the principles & techniques of chromatographic techniques.
- CO 3: To demonstrate the knowledge of spectroscopic techniques in identification of compounds.
- CO 4: To demonstrate the knowledge of green chemistry in industries.

Course Title: Lab- Applied Chemistry
Course Code : 24UFY1A8P
Teaching Scheme: L – T – P
0 – 0 – 2

Semester I
Course Category: BSC
Total Credits: 01

Course Outcomes: After learning the course, students will be able:

- CO1:** To apply the principles studied in theory in practical and gain hands-on experience of analysis, observations and data interpretation.
 - CO2:** To develop skills in procedures relevant to quality control and analysis tasks in industry.
 - CO3:** To know and follow the proper procedures and regulations for safe handling and use of chemicals.
 - CO4:** To communicate the concepts and results of their laboratory experiments through effective writing and oral communication skills.
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SECOND SEMESTER B. TECH. (CHEM / BIOTECH)

Course Title-Advanced Calculus, Fourier Series & Statistics Semester -II
Course Code- 24UFY2D1T Course Category : BSC
Teaching Scheme: L-T-P Total Credits: 3+1
3 -1-0

Course Outcome: On successful completion of the course, the students will learn:

- CO1:**To analyse length area volume using knowledge of curve tracing.
- CO2:** To solve multiple integral problems and apply it to various engineering problem.
- CO3:** Apply the process of vector differential in real world.
- CO4:** To demonstrate various applications using vector integral theorem.
- CO5:** To apply concept of fourier series for learning advance engineering mathematics.
- CO6:** To interpret and analyse the statistical data.

Course Title: Material Science Semester II
Course Code:24UFY2C2T Course Category: BSC
Teaching Scheme: L – T – P Total Credits: 22 – 0 – 0

Course Outcomes:

After completion of this course, students will able to:

CO	CO Statement
CO 1	Apply the concepts of crystal structure and X-rays for determining characteristics of the materials.
CO 2	Apply the working of diodes and transistors in technology.
CO 3	Use the concepts of magnetism and superconductivity, and to classify and analyse various types of magnetic and superconducting materials.
CO 4	Apply the concepts and types of nanomaterials & compare its properties with those of bulk materials.

Course Title: Lab-Material Science Semester II
Course Code: 24UFY2C2P Course Category: BSC
Teaching Scheme: L – T – P Total Credits: 1
0 – 0 – 2

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

- CO1: know and analyze characteristics and applications of semiconductor devices like diodes and transistors.
- CO2: know and measure the energy band gap of a semiconductor material.
- CO3: study unit cell characteristics.

Course Title: Applied Physical Chemistry
Course Code: 24UFY2A8T
Teaching Scheme: L – T – P
2 – 0 – 0

Semester II
Course Category: BSC
Total Credits: 2

COURSE OUTCOMES: After the completion of the course, students should be able to

CO1: Implement the thermodynamic properties of gaseous phase and equilibrium conditions for chemical reactions.

CO2: Develop the concept of electronic structure, molecular dynamics and quantum computers using the Schrödinger equations..

CO3: Sketch the phase diagram for various solid systems and judge their metallurgical applications. Sketch the phase diagram for various solid systems and judge their metallurgical applications

CO4: Recognize the stability and importance of disperse systems

Course Title: Lab-Applied Physical Chemistry

Course Code : 24UFY2A8P

Teaching Scheme: L – T – P
0 – 0 – 2

Semester II
Course Category: BSC
Total Credits: 01

COURSE OUTCOMES: After the completion of the course, students should be able to

CO1: Acquire practical knowledge on the basic chemistry principles for apply in chemical engineering.

CO2: Explain the knowledge of phase diagrams and its application in metallurgy.

CO3: Summarize the analytical techniques like conductometric and spectroscopic techniques and solvent extraction process to deal with practical problems.

Course Title: Basics of Electrical & Electronics Engg.

Course Code: 24UFY2A4T

Teaching Scheme: L – T – P
3 – 0 – 0

Semester: II
Course Category: ESC
Total Credits: 03

Course Outcomes: After the completion of this course, the students shall be able to:

CO1: Acquire basic concepts of electric and magnetic circuit.

CO2: Analyze ac series circuits

CO3: Explain construction, working and applications of single-phase transformers and electric machines.

CO4: Discuss 3-phase power generation and basic power system.

CO5: Explain operation and applications of semiconducting devices – diode and BJT.

CO6: Comprehend with number system and logic gates.

Course Title: Lab Basics of Electrical & Electronics Engg.
Course Code: 24UFY2A4P
Teaching Scheme: L – T – P
0 – 0 – 2

Semester: II
Course Category: ESC
Total Credits: 01

COURSE OUTCOMES:

After the completion of the course, student should be able to

- CO1** Apply the fundamental concepts of Kirchoff's Laws and RLC series circuit to differentiate between AC and DC circuits.
- CO2** Determine efficiency and voltage regulation of transformer by direct loading test and behaviour of transformer material by B-H curve.
- CO3** Verify Truth table of Logic Gates and operation of Half wave and Full wave rectifier.
- CO4** Perform computer simulation practical based (virtual lab) on Basic Electronics circuit.

Course Title: Introduction to Chemical engineering
Course Code : 24UFY225T
Teaching Scheme: L-T-P

Semester : II
Course Category:PCC
Total Credits: 022-0-0

COURSE OUTCOMES:

Upon successful completion of the course, student should be able to:

- CO1.** Correlate day to day life with the principles of chemical Engineering, Types of reactions & Reactors
 - CO2.** Insight into the basics of fluid flow in Chemical engineering
 - CO3.** Have an insight into area's of energy & mass balance
 - CO4.** Acquire knowledge of the basics of mass & Heat transfer & its applications in unit operations Processes
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Course Title: Fundamentals of Life Sciences
Course Code: 24UFY226T
Teaching Scheme: L – T – P
2 – 0 – 0

Semester: II
Course Category: PCC
Total Credits: 2

COURSE OUTCOMES: AT THE END OF THE COURSE, THE STUDENT WILL BE ABLE TO:

CO1: Define the basic biological concepts of the structure and function of cells.

CO2: Elucidate the basics of the bio-molecule and enzyme.

CO3: Illustrate photosynthesis and energy generation and its utilization by metabolism.

CO4: Explain the fundamentals of Nucleic acids, chromosomes & Mendelian inheritance.

Course Title: Indian Traditional Knowledge
Course Code: 24UFY2A5T
Teaching Scheme: L – T – P
2 – 0 – 0

Semester: II
Course Category: IKS
Total Credits: 2

Course Outcomes: On completion of the course, students will be able to-

1. Interpret basics of Indian Knowledge system.
 2. Integrate the teaching of Indian culture and civilization.
 3. Appreciate Indian artistic tradition.
 4. Acquire the knowledge of Indian architectural system.
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Course Title: Skill Enhancement in Instrumental Techniques
Course Code: 24UFY2A6P
Teaching Scheme: L – T – P
0 – 1 – 2

Semester: II
Course Category: SEC2
Total Credits: 2

COURSE OUTCOMES: After completion of this course, students will be able to:

- 1] To strengthen the skill by hands-on experimentation using concepts and ideas in Physics to explain world around us.
- 2] To execute Experimental Physics which has the most striking impact on the industry and research because of its vast applications.
- 3] To craft Physics goals for students that boost natural curiosity for ease in real life.