



SSN School of Engineering

DEPARTMENT OF CHEMICAL ENGINEERING

**Bachelor of Technology
Chemical Engineering**

CURRICULUM

REGULATIONS 2026

VISION AND MISSION OF THE DEPARTMENT

VISION

- ❖ To be a globally recognized Chemical Engineering department with excellence in teaching, research and consultancy services.

MISSION

- ❖ To prepare our students to become successful professional Chemical Engineers and capable of undertaking advanced studies and life-long learning.
- ❖ To produce Chemical Engineers who will contribute to the process industries worldwide.
- ❖ To provide the students with a strong fundamental technical education that makes them capable of catering to the needs of a changing technological environment and the society.
- ❖ To nurture the innovative capabilities of students by providing them with a research platform and exposure to current technologies

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Career Achievement: Our graduates will have a successful career in chemical and allied industries by demonstrating their skills in facing the challenges posed by the ever-changing chemical industrial and research sector.

PEO2: Professionalism: Our graduates will exhibit their leadership qualities by taking suitable decisions and work with multidisciplinary teams also where they will discharge their social responsibilities as engineers by following ethical practices.

PEO3: Life-long Learning: Our graduates will continue to expand their technical competence by developing their knowledge, skills and engaging themselves in learning activities throughout their life.

PROGRAM OUTCOMES (POs)

Program outcomes are the skills and knowledge which the students should have acquired at the time of graduation. A program outcome indicates what a student can do from course-wise knowledge acquired during the program. Students who graduate from this program shall exhibit the following:

PO	Graduate Attribute	Programme Outcome
1	Engineering Knowledge	Apply the knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization to develop to the solution of complex Engineering problems (WK 1 to 4).
2	Problem Analysis	Identify, formulate, review research literature, and analyze complex Engineering problems reaching substantiated conclusions with consideration for sustained development (WK 1 to 4).
3	Design/Development of solutions	Design creative solutions for complex Engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required (WK5).
4	Conduct Investigations of Complex Problems	Conduct investigations of complex Engineering problems using research-based knowledge including design of experiments, modelling, analysis and interpretation of data to provide valid conclusions (WK8).
5	Engineering Tool Usage:	Create, select, and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling, recognizing their limitations to solve complex Engineering problems (WK2 and WK6).
6	The Engineer and The World	Analyze and evaluate societal and environmental aspects while solving complex Engineering problems for their impact on sustainability with reference to economy, health, safety, legal framework, culture and environment (WK1, WK5 and WK7).
7	Ethics	Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws (WK9).
8	Individual and Collaborative Teamwork.	Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
9	Communication	Communicate effectively and inclusively within the engineering community and the society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.

10	Project Management and Finance	Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multi-disciplinary environments.
11	Life-long learning	Recognize the need for and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change (WK8).

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1	Apply chemical engineering principles to design, simulate, analyze, control, and optimize chemical processes for efficient and sustainable operation.
PSO2	Develop safe, sustainable, and innovative engineering solutions to current and emerging societal needs by leveraging modern chemical engineering tools and technologies.

PEO - PO/PSO Mapping

PEO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
PEO1	3	3	3	3	3	2	3	2	3	3	2	3	3
PEO2	2	2	2	2	2	3	3	3	3	3	2	2	2
PEO3	2	2	2	2	2	2	3	2	3	2	3	2	3

Mapping Programme Outcomes with Graduate Attributes

Programme Outcomes	NBA's GAs
PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop the solution of complex engineering problems.	GA1
PO2: Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4).	GA2
PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society, and environment as required. (WK5).	GA3
PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).	GA4
PO5: Engineering Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6).	GA5
PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture, and environment. (WK1, WK5, and WK7).	GA10
PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity, and inclusion; adhere to national & international laws. (WK9).	GA10
PO8: Individual and Collaborative Teamwork: Function effectively as an	GA6

individual, and as a member or leader in diverse/multi-disciplinary teams	
PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.	GA8
PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.	GA7
PO11: Life-Long Learning: Recognize the need for and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8).	GA9, G11

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Washington Accord Knowledge Levels (WK)	Attributes
WK1	Natural sciences and social sciences
WK2	Conceptually based mathematics
WK3	Engineering fundamentals
WK4	Engineering specialist knowledge
WK5	Engineering design and operations
WK6	Engineering Practice (Technology)
WK7	Engineering knowledge in society, public safety and sustainable development
WK8	Research based knowledge
WK9	Professional ethics, inclusive behaviour and conduct

Complex Engineering Problems (WP)	Attributes
WP1	Depth of knowledge required
WP2	Range of conflicting requirements
WP3	Depth of analysis required
WP4	Familiarity of issues
WP5	Extent of applicable codes
WP6	Extent of stakeholder involvement and conflicting requirements
WP7	Interdependence

Complex Engineering Activities (EA)	Attributes
EA1	Range of resources
EA2	Level of interactions
EA3	Innovation
EA4	Consequences to the society and environment
EA5	Familiarity

Sustainable Development Goals (SDG)	Details	Sustainable Development Goals (SDG)	Details
SDG 1	No poverty	SDG 10	Reducing inequality
SDG 2	Zero hunger	SDG 11	Sustainable cities and communities
SDG 3	Good health and well-being	SDG 12	Responsible consumption and production
SDG 4	Quality education	SDG 13	Climate action

SDG 5	Gender equality	SDG 14	Life below water
SDG 6	Clean water and sanitation	SDG 15	Life on land
SDG 7	Affordable and clean energy	SDG 16	Peace, justice and strong institutions
SDG 8	Decent work and economic growth	SDG 17	Partnerships for the goals
SDG 9	Industry, innovation and infrastructure		

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COURSE SUMMARY

The listed courses in the curriculum are broadly classified as per the recommendations from the UGC.

Sl. No	Broad Category of Course	Minimum Credit Requirement
1	Major Core (MC)	80
2	Minor Stream (MS)	32
3	Multidisciplinary (MD)	09
4	Ability Enhancement Course (AEC)	08
5	Skill Enhancement Course (SEC)	09
6	Value Added Courses (VAC)	08
7	Summer Internship (SI)	02
8	Project Dissertation (PD)	12
Total		160

The semester wise credit breakup of the Curriculum based on the above credit breakup proposed by the UGC is as follows:

Semester\Category	MC	MS	MD	AEC	SEC	VAC	SI	PD	TOTAL
1	6	-	6	3	2	4	-	-	21
2	11	-	3	3	2	2	-	-	21
3	12	5	-	-	4	-	-	-	21
4	17	2	-	-	1	1	-	-	21
5	14	6	-	-	-	1	-	-	21
6	13	6	-	-	-	-	-	4	23
7	7	8	-	2	-	-	2	6	25
8	-	5	-	-	-	-	-	2	7
Total	80	32	9	8	9	8	2	12	160

Credit Breakup of Proposed Curriculum across Course Categories - Detailed

Semester	MC			MS			MD	AEC	SEC	VAC	SI	PD	TOTAL
	<i>SSNSoE</i>	<i>Dept Major</i>	<i>Program Major</i>	<i>SSNSoE</i>	<i>Dept Minor</i>	<i>Program Minor</i>	<i>SSNSoE</i>	<i>SSNSoE</i>	<i>Dept / Program</i>	<i>Dept / Program</i>	<i>Dept / Program</i>	<i>Dept / Program</i>	
1		6					6	3	2	4			21
2	3	8					3	3	2	2			21
3		12		3	2				4				21
4		14	3		2				1	1			21
5			14		6					1			21
6			13			6						4	23
7			7			8		2			2	6	25
8						5						2	7
Total	3	40	37	3	10	19	9	8	9	8	2	12	160

SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Mathematics I	MD	3	30	15	0	45	90	3
2		Chemistry for Chemical Engineers	MD	4	30	0	30	30	90	3
3		Communicative English	AEC	4	30	0	30	30	90	3
4		Solid Mechanics for Technologists	MC	3	45	0	0	45	90	3
5		Introduction to Chemical Engineering	MC	3	45	0	0	45	90	3
6		Professional Ethics and Human Values	VAC	2	30	0	0	30	60	2
7		Programming in Python for Data Science	VAC	3	15	0	30	15	60	2
PRACTICALS										
8		Makers Space Laboratory	SEC	4	0	0	45	15	60	2
TOTAL				26	225	15	135	255	630	21

SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Mathematics II	MC	3	45	0	0	45	90	3
2		English for Engineers	AEC	4	30	0	30	30	90	3
3		Engineering Physics	MD	4	30	0	30	30	90	3
4		Environmental Engineering	VAC	2	30	0	0	30	60	2
5		Engineering Thermodynamics	MC	3	45	0	0	45	90	3
6		Principles of Electrical and Electronics Engineering	MC	4	30	0	30	30	90	3
PRACTICALS										
7		Engineering Graphics and Computer Aided Drafting	SEC	4	0	0	30	30	60	2
8		Data Science Lab for Chemical Engineers	MC	4	0	0	30	30	60	2
TOTAL				31	225	0	120	285	630	21

SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Applied Mathematics for Chemical Engineers	MS	3	45	0	0	45	90	3
2		Instrumental Methods of Analysis	MC	2	30	0	0	30	60	2
3		Chemical Process Industries	MS	2	30	0	0	30	60	2
4		Fluid Mechanics for Chemical Engineers	MC	3	45	0	0	45	90	3
5		Design Thinking, Innovation and Entrepreneurship	SEC	4	30	0	30	30	90	3
6		Chemical Process Calculations	MC	3	45	0	0	45	90	3
PRACTICALS										
7		Chemical Analysis Laboratory	MC	4	0	0	30	30	60	2
8		Fluid Mechanics for Chemical Engineers Laboratory	MC	4	0	0	30	30	60	2
9		ANSYS Fluent Fluid Flow Simulation Software	SEC	2	0	0	15	15	30	1
TOTAL				27	225	0	105	300	630	21

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Heat Transfer	MC	6	45	0	45	45	135	4.5
2		Materials Science and Technology	MC	2	30	0	0	30	60	2
3		Mass Transfer I	MC	3	45	0	0	45	90	3
4		Mechanical Operations	MC	3	45	0	0	45	90	3
5		Energy Audit and Management	MS	2	30	0	0	30	60	2
6		Chemical Engineering Thermodynamics	MC	3	45	0	0	45	90	3
PRACTICALS										
7		Mechanical Operations Laboratory	MC	3	0	0	30	15	45	1.5
8		Piping and Instrumentation Diagram	SEC	2	0	0	15	15	30	1
9		Independent Research /Extra	VAC	2	0	0	15	15	30	1

		Academic Activity								
TOTAL				26	240	0	105	285	630	21

SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Process Engineering Economics	MC	2	30	0	0	30	60	2
2		Chemical Reaction Engineering I	MC	3	45	0	0	45	90	3
3		Mass Transfer II	MC	6	45	0	45	45	135	4.5
4		Numerical Methods in Chemical Engineering	MC	6	45	0	45	45	135	4.5
5		Sustainable Energy Technology	MS	3	45	0	0	45	90	3
6		Experimental and Analytical Methods in Chemical Engineering	MS	3	45	0	0	45	90	3
PRACTICALS										
7		Independent Research /Extra Academic Activity	VAC	2	0	0	15	15	30	1
TOTAL				25	255	0	105	270	630	21

Note: Students Pursuing GPP should register for an additional course on Project Management and Planning (3 credits) under MS category during V semester and this additional credit earned will be adjusted during VIII semester by exempting a minor course of 3 credits.

SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Transport Phenomena	MC	3	45	0	0	45	90	3
2		Chemical Reaction Engineering II	MC	5	45	0	30	45	120	4
3		Process Instrumentation, Dynamics and Control	MC	5	45	0	30	45	120	4
4		Industrial Process Plant Safety	MC	2	30	0	0	30	60	2
5		Minor Stream Course 1	MS	3	45	0	0	45	90	3
6		Minor Stream Course 2	MS	3	45	0	0	45	90	3
PRACTICALS										

7		Capstone Project Phase 1	PD	8	0	0	60	60	120	4
TOTAL				29	255	0	120	315	690	23

SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Chemical Process Modeling and Simulation	MC	6	30	0	60	30	120	4
2		Process Equipment Design	MC	3	45	0	0	45	90	3
3		Program Minor 3	MS	3	45	0	0	45	90	3
4		Program Minor 4	MS	3	45	0	0	45	90	3
5		Program Minor 5	MS	2	30	0	0	30	60	2
PRACTICALS										
6		Ability Enhancement Course	AEC	2	30	0	0	30	60	2
7		Capstone Project Phase 2	PD	12	0	0	90	90	180	6
8		Internship	SI	4	0	0	30	30	60	2
TOTAL				35	225	0	180	345	750	25

SEMESTER VIII

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Program Minor - 6	MS	2	30	0	0	30	60	2
2		Program Minor -7	MS	3	45	0	0	45	90	3
PRACTICALS										
3		Capstone Project Phase 3	PD	4	0	0	30	30	60	2
TOTAL				9	75	0	30	105	210	7

Major Core Courses Department Core Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Introduction to Chemical Engineering	1	3	45	0	0	45	90	3
2		Engineering Thermodynamics	2	3	45	0	0	45	90	3
3		Principles of Electrical and Electronics Engineering	2	4	30	0	30	30	90	3
4		Data Science Lab for Chemical Engineers	2	4	0	0	30	30	60	2
5		Instrumental Methods of Analysis	3	2	30	0	0	30	60	2
6		Fluid Mechanics for Chemical Engineers	3	3	45	0	0	45	90	3
7		Chemical Process Calculations	3	3	45	0	0	45	90	3
8		Chemical Analysis Laboratory	3	4	0	0	30	15	60	2
9		Fluid Mechanics for Chemical Engineers Laboratory	3	4	0	0	30	15	60	2
10		Heat Transfer	4	6	45	0	45	45	135	4.5
11		Materials Science and Technology	4	2	30	0	0	30	60	2
12		Mass Transfer I	4	3	45	0	0	45	90	3
13		Mechanical Operations	4	3	45	0	0	45	90	3
14		Mechanical Operations Laboratory	4	3	0	0	30	15	45	1.5

Program Core Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Chemical Engineering	4	3	45	0	0	45	90	3

		Thermodynamics								
2		Process Engineering Economics	5	2	30	0	0	30	60	2
3		Chemical Reaction Engineering I	5	3	45	0	0	45	90	3
4		Mass Transfer II	5	6	45	0	45	45	135	4.5
5		Numerical Methods in Chemical Engineering	5	6	45	0	45	45	135	4.5
6		Transport Phenomena	6	3	45	0	0	45	90	3
7		Chemical Reaction Engineering II	6	5	45	0	30	45	120	4
8		Process Instrumentation, Dynamics and Control	6	5	45	0	30	45	120	4
9		Industrial Process Plant Safety	6	2	30	0	0	30	60	2
10		Chemical Process Modeling and Simulation	7	6	30	0	60	30	120	4
11		Process Equipment Design	7	3	45	0	0	45	90	3

Department Minor Stream Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Chemical Process Industries	3	2	30	0	0	30	60	2
2		Energy Audit and Management	4	2	30	0	0	30	60	2
3		Sustainable Energy Technology	5	3	45	0	0	45	90	3
4		Experimental and Analytical Methods in Chemical Engineering	5	3	45	0	0	45	90	3

DEPARTMENT MINOR STREAMS

The Department of Chemical Engineering offers the following list of Minor Streams.

1. Digitalization, AI, and Machine Learning
2. Industrial Safety and Management
3. Advanced Materials and Nanotechnology

Each Minor Stream has seven courses worth 19 credits. The student must enroll in any one of the above three Minor Streams.

MINOR STREAM 1 - Digitalization, AI, and Machine Learning

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Fundamentals of AI and ML	6	3	45	0	0	45	90	3
2		Process Control and Optimization	6	3	45	0	0	45	90	3
3		Data Analytics for Chemical Engineers	7	3	45	0	0	45	90	3
4		Introduction to Molecular Modeling	7	3	45	0	0	45	90	3
5		MINOR STREAM BASKET 1	7	2	30	0	0	30	60	2
6		MINOR STREAM BASKET 2	8	2	30	0	0	30	60	2
7		MINOR STREAM BASKET 3	8	3	45	0	0	45	90	3

The following is the tentative list of courses that may be offered under the *Minor Stream Baskets*:

Minor Stream Basket 1 (2 Credit courses)	Minor Stream Basket 2 (2 Credit courses)	Minor Stream Basket 3 (3 Credit courses)
Process Simulation Software (Aspen)	Application of Machine Learning for Process Optimization	Molecular Dynamics Simulation for Chemical Engineers
Application of CFD by Ansys Fluent	Neural Networks for Process Modeling	Introduction to Digital Twin Technology
Process Modeling and Simulation with MATLAB	Reinforcement Learning for Process Control	Industrial Internet of Things (IIoT) for Chemical Plants
Chemical Process Flow Sheet	Predictive Analysis for Chemical Processes	Quantum Chemistry for Process Engineers

MINOR STREAM 2 - Industrial Safety and Management

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Fundamentals of Industrial, Environmental and Occupational Safety	6	3	45	0	0	45	90	3
2		Environmental Impact Assessment	6	3	45	0	0	45	90	3
3		Industrial Safety, Health and Environment Acts	7	3	45	0	0	45	90	3
4		Hazard Analysis and Risk Assessment	7	3	45	0	0	45	90	3
5		MINOR STREAM BASKET 1	7	2	30	0	0	30	60	2
6		MINOR STREAM BASKET 2	8	2	30	0	0	30	60	2
7		MINOR STREAM BASKET 3	8	3	45	0	0	45	90	3

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The following is the tentative list of courses that may be offered under the *Minor Stream Baskets*:

<i>Minor Stream Basket 1 (2 Credit courses)</i>	<i>Minor Stream Basket 2 (2 Credit courses)</i>	<i>Minor Stream Basket 3 (3 Credit courses)</i>
Principles of Safety Management	Safety in Textile Industry	Fire Engineering and Protection
Disaster Management	Safety in Powder Handling	Occupational Health and Hygiene
Reliability Engineering	Safety in Petrochemical industries	Loss prevention techniques and procedures
Risk Management	Transport Safety	Nuclear Safety and Radioactive Materials

MINOR STREAM 3 – Advanced Materials and Nanotechnology

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Elements of Nanoscience and Nanotechnology	6	3	45	0	0	45	90	3
2		Industrial Nanotechnology	6	3	45	0	0	45	90	3
3		Nano Materials for Energy and Environment	7	3	45	0	0	45	90	3
4		Materials Characterization and Analytical Techniques	7	3	45	0	0	45	90	3
5		MINOR STREAM BASKET 1	7	2	30	0	0	30	60	2
6		MINOR STREAM BASKET 2	8	2	30	0	0	30	60	2
7		MINOR STREAM BASKET 3	8	3	45	0	0	45	90	3

The following is the tentative list of courses that may be offered under the *Minor Stream Baskets*:

<i>Minor Stream Basket 1 (2 Credit courses)</i>	<i>Minor Stream Basket 2 (2 Credit courses)</i>	<i>Minor Stream Basket 3 (3 Credit courses)</i>
Basics of Nanotechnology in Tissue Engineering	Polymers: Concepts, Properties, Uses and Sustainability	Ferrous and non-Ferrous Metallurgy
Nanoscience and Technology of Ceramics	Polymer Process Engineering	Corrosion Science and Technology
Nanotechnology for Electrochemical Energy Storage	Composite Materials	Colloids and Surfaces
Semiconductor Materials and Nanodevices	Smart Materials	Behaviour and Selection of Materials

Multi-Disciplinary Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Mathematics I	1	3	30	15	0	45	90	3
2		Chemistry for Chemical Engineers	1	4	30	0	30	30	90	3
3		Engineering Physics	2	4	30	0	30	30	90	3

Skill Enhancement Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Makers Space Laboratory	1	4	0	0	45	15	60	2
2		Engineering Graphics and Computer Aided Drafting	2	4	0	0	30	30	60	2
3		Design Thinking, Innovation and Entrepreneurship	3	4	30	0	30	30	90	3
4		ANSYS Fluent Fluid Flow Simulation Software	3	2	0	0	15	15	30	1
5		Piping and Instrumentation Diagram	4	2	0	0	15	15	30	1

Ability Enhancement Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Communicative English	1	4	30	0	30	30	90	3
2		English for Engineers	2	4	30	0	30	30	90	3
3		Ability Enhancement Course	7	2	30	0	0	30	60	2

Value Added Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Professional Ethics and Human Values	1	2	30	0	0	30	60	2
2		Programming in Python for Data Science	1	3	15	0	30	15	60	2
3		Environmental Engineering	2	2	30	0	0	30	60	2
4		Independent Research /Extra Academic Activity	4	2	0	0	15	15	30	1
5		Independent Research /Extra Academic Activity	5	2	0	0	15	15	30	1

Micro-Specialization

The Department offers Micro-Specializations to Undergraduate students. Its salient features are as follows:

1. Each Micro-Specialization has a defined structure in terms of three sequential components:
 - **Component I** - One Foundation course that constitutes a mandatory requirement and also a prerequisite for subsequent components.
 - **Component II** - Two courses from a specified vertical.
 - **Component III** - Project/Design/Term Paper
2. A Student would be required to complete all three components (12-14 credits) from the specified stream to earn a Micro-Specialization.

Provisional List of Micro-Specialization Verticals

The following is the list of Micro-Specialization verticals offered to our undergraduate students:

1. Food Technology
2. Quantum Technology
3. Nanomedicine
4. Green Chemistry and Engineering
5. Quantum Chemical Engineering
6. Net Zero and Decarbonization

GRAND PROJECT PATHWAY

Semester	Course	Credit
III	Design Thinking, Innovation and Entrepreneurship	3
IV	Independent Research /Extra Academic Activity	1
V	Independent Research /Extra Academic Activity	1
V	Project Management and Planning	3
VI	Capstone Project Phase 1	4
VII	Capstone Project Phase 2	6
VIII	Capstone Project Phase 3	2
Total Credit for GPP		20

L - Lecture, T - Tutorial, P - Practical, TW & SL – Term Work & Self Learning, TH – Total Hours and C – Credits

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