ADITYA UNIVERSITY

B. TECH. FOUR YEAR DEGREE

PROGRAM CURRICULUM

(Applicable for the batches admitted from A.Y 2025-26)

PETROLEUM TECHNOLOGY

ADITYA UNIVERSITY

Aditya Nagar, ADB Road, Surampalem - 533 437

Department of Petroleum Technology

Department Vision

To be a globally recognized centre of excellence in petroleum engineering education, fostering research, innovation, and sustainable solutions.

Department Mission

M1: Provide transformative learning through practice, and industry collaboration.

M2: Advance in impactful research through innovation and technology.

M3: Apply sustainable practices to address global resource and environmental challenges.

Program Educational Objectives (PEOs)

Graduates of the Program will

PEO 1: Pursue lifelong learning and growth in petroleum and related fields.

PEO 2: Develop solutions for petroleum industry challenges in exploration, production, and management.

PEO 3: Demonstrate research ability, teamwork, and leadership.

Program Specific Outcomes (PSOs)

After successful completion of the program, the graduates will be able to

PSO 1: Solve exploration and production problems using modern tools.

PSO 2: Design and optimize petroleum processing systems and equipment.

PROGRAM OUTCOMES (PO's)

The 11 Program Outcomes are described as below.

After successful completion of the program, the graduates will be able to

PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO5	**Engineering tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO6	**The Engineer and the world :** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO7	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO8	**Individual and collaborative teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
PO9	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO10	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO11	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Department of Petroleum Technology

B. Tech (PT) Program Curriculum-2025

(Applicable for the batches admitted from A.Y 2025-26)

UG Programs Offered

- B. Tech in (Petroleum Technology)
- B. Tech in (Petroleum Technology) with
    - Minor degree in Civil Engineering
    - Minor degree in Electrical and Electronics Engineering
    - Minor degree in Mechanical Engineering
    - Minor degree in Electronics and Communication Engineering
    - Minor degree in Computer Science and Engineering
    - Minor degree in Data Science
    - Minor degree in Artificial Intelligence and Machine Learning
    - Minor degree in Mining Engineering
    - Minor degree in Agricultural Engineering
    - Minor degree in Entrepreneurship Development and Incubation
    - Minor degree in Quantum Technologies

Minor Streams offered in B. Tech (Petroleum Technology)

- Minor Stream in Pipeline and Petroleum Transport Engineering
- Minor Stream in Fire and Safety in Petroleum Industries

VISION & MISSION OF THE UNIVERSITY

VISION:

To be a globally recognized University through excellence in Education, Innovation, and Sustainable growth

MISSION:

M1: Deliver collaborative education to prepare students for global challenges through transformative learning

M2: Vibrant research ecosystem, innovation, and sustainable growth.

M3: Sustainable and inclusive community, global challenges.

VISION & MISSION OF THE DEPARTMENT

VISION:
To gain global recognition in petroleum education in research excellence, innovation, and sustainable solutions.

MISSION:

M1: Offer transformative learning for lifelong growth in petroleum engineering**.**

M2: Drive impactful research in innovation, and technology.

M3: Empower students to tackle global challenges in resource and environmental sustainability.

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PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates of the Program will

PEO 1: Pursue continuous professional growth through self-learning and further education in Petroleum and related fields.

PEO 2: Use engineering skills, critical thinking, and problem-solving to address societal, technical, and business challenges.

PEO 3: Demonstrate research skills, team spirit or leadership qualities**.**

PROGRAM OUTCOMES (POs)

After successful completion of the program, the graduates will be able to

PO 1 **Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO 2 **Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO 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)

PO 4 **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).

PO 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)

PO 6 **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).

PO 7 **Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO 8 **Individual and Collaborative Team work**: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO 9 **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.

PO 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 multidisciplinary environments.

PO 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)

After successful completion of the program, the graduates will be able to

PSO 1: Solve petroleum technology problems using analytical methods, modern tools, and techniques.

PSO 2: Design, operate, maintain, and troubleshoot petroleum process equipment.

Credit Division Category-wise

S. No.	Broad Category of Course	UGC	Credits
1	Major (Core) MCC	80	81
2	Minor Stream Courses (MSC) (or) University Open Elective Courses (UEC)	32	32
3	Multidisciplinary Courses (MDC)	09	09
4	Ability Enhancement Courses (AEC)	08	09
5	Skill Enhancement Courses (SEC)	09	09
6	Value Added Courses (VAC)	6-8	04
7	Summer Internship (SI)	2-4	04
8	Full Semester Internship (PROJ)	12	12
9	Mandatory Course (MC)	00	00
Total Credits to be earned for B. Tech Degree		**160**	**160**

Foundation Courses – FC

Intermediate-level Courses - IC

Advanced Courses – AC

Major (Core) Courses (MCC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CH01	Engineering Chemistry	FC	2		1	3	50	50	100	-
2501MA01	Linear Algebra & Calculus	FC	2	1		3	50	50	100	-
2501PH01	Solid State Physics	FC	2		1	3	50	50	100	-
2501PT06	Geology & Sedimentology for Petroleum Engineers	FC	1	1	2	4	50	50	100	-
2501PT10	Petroleum Geology & Exploration Techniques	FC	1	1	2	4	50	50	100	-
2501MA02	Differential Equations & Vector Calculus	FC	2		1	3	50	50	100	LA&C
2501MA05	Numerical Methods & Integral Transforms	IC	2	1		3	50	50	100	-
2501MA06	Complex Variables & Statistical Methods	IC	2	1		3	50	50	100	-
2501IT01	Business Intelligence Lab	FC			2	2	50	50	100	-
2501CS01	Programming for Problem Solving Using C	FC	2		2	4	50	50	100	BIL
2501ME01	Engineering Graphics	FC	1		2	3	50	50	100	-
2501ME03	Engineering Workshop	FC			1	1	100	-	100	-
2501PT01	Drilling Engineering	IC	2		2	4	50	50	100	GSPE & PGET
2501PT04	Fluid Mechanics for Petroleum Engineers	IC	1	1	2	4	50	50	100	-
2501PT09	Petroleum Formation Evaluation	IC	1	1		2	50	50	100	PGET
2501PT08	Instrumentation & Process Control	IC	2		2	4	50	50	100	-
2501PT05	Fundamentals of Liquefied Natural Gas	IC	3			3	50	50	100	FMPE
2501PT02	Elements of Reservoir Engineering	IC	2		2	4	50	50	100	GSPE
2501PT11	Petroleum Production Engineering	IC	1	1		2	50	50	100	ERE
2501PT12	Petroleum Refinery Engineering	IC	3			3	50	50	100	PPE
2501PT07	Heat Transfer in Petroleum Operations	IC	1	1	2	4	50	50	100	FMPE

2501PT14	Safety & Environmental Engineering Practices in Petroleum Industry	IC	2			2	50	50	100	-
2501PT17	Well Workover & Stimulation	AC	1	1		2	50	50	100	ERE
2501PT13	Reservoir Modelling & Simulation	AC	1	1	2	4	50	50	100	ERE
2501PT15	Surface Production Operations	IC	2			2	50	50	100	-
2501PT16	Unconventional Hydrocarbon Resources	AC	1	1		2	50	50	100	ERE
2501PT03	Enhanced Oil Recovery	AC	2	1		3	50	50	100	PPE
Total			**42**	**13**	**26**	**81**				

Multidisciplinary Courses (MDC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501EE01	Basic Electrical & Electronics Engineering	FC	2		2	4	50	50	100	-
2501MB02	Engineering Economics	IC	3			3	50	50	100	-
2501MB03	Management Science	AC	2			2	50	50	100	-
	Total		**7**		**2**	**9**				

Ability Enhancement Courses (AEC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501EN01	Essential Cognitive Skills for Engineers	FC			1	1	100	-	100	-
2501EN02/ 2501UC05/ 2501UC04/ 2501UC03/ 2501UC06	Advanced Cognitive Skills for Engineers **(or)** Proficiency in Foreign Language ((Japanese/ German/ French/ Spanish)	FC			1	1	100	-	100	-
2501UC07	Design Thinking using AI	FC			1	1	100	-	100	-
2501UC08	Universal Human Values	FC	2			2	100	-	100	-
2501UC09	Technical Paper Publication	AC			2	2	100	-	100	-
2501PT52	Student Activity Based Learning	AC			2	2	100	-	100	-
Total			**2**		**7**	**9**				

Skill Enhancement Courses (SEC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501PT19	MATLAB For Petroleum Engineers Lab	IC			2	2	50	50	100	-
2501PT51	Well Control and Pressure Control Lab	IC			1	1	100	-	100	-
2501PT20	Petroleum Equipment Design and Simulation Lab	IC			2	2	50	50	100	SPO
2501PT18	Drilling Simulation Lab	AC			2	2	50	50	100	-
2501PT21	Unit Operations Using SCI Lab	AC			2	2	50	50	100	FMPE & HTPO
Total					**9**	**9**				

Value Added Courses (VAC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CS02	Data Analysis Using Python	IC			2	2	50	50	100	PPSC
2501CS04	Internet of Things	FC			1	1	50	50	100	-
2501UC11	Employability Skills-I	FC			3	0	100	-	100	-
2501UC13	Employability Skills-II	FC			3	0	100	-	100	ES-I
2501UC14	Employability Skills-III	IC			3	0	100	-	100	ES-II
2501UC15	Employability Skills-IV	IC			3	0	100	-	100	ES-III
2501UC16	Employability Skills-V	AC			3	1	100	-	100	ES-IV
Total					**18**	**4**				

Summer Internships (SI)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501PT22	Summer Internship-I	IC			2	2	100	-	100	-
2501PT23	Summer Internship-II	AC			2	2	100	-	100	-
Total					**4**	**4**				

Full Semester Internship (PROJ)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501PT24	Full Semester Internship	AC			12	12	50	50	100	-
Total					**12**	**12**				

Mandatory Courses (MC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501AC01	Environmental Science	FC	2			0	100	-	100	-
2501AC02	Constitution of India	FC	2			0	100	-	100	-
2501AC03	Research Methodology	FC	2			0	100	-	100	-
2501AC04	Intellectual Property Rights & Patents	FC	2			0	100	-	100	-
2501AC05	Indian Knowledge Systems	FC	2			0	100	-	100	-
	Total		**10**			**0**				

Minor Stream Courses (MSC)

Pipeline and Petroleum Transport Engineering:

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501PT27	Introduction To Petroleum Engineering	FC	3			3	50	50	100	-
2501PT35	Unit Operations in Petroleum Industry	FC	3			3	50	50	100	-
2501PT34	Transportation of Petroleum Products	FC	3			3	50	50	100	-
2501PT31	Pipeline Engineering	FC	3			3	50	50	100	-
2501PT29	Operational & Maintenance of Pipelines	IC	3			3	50	50	100	PE
2501PT26	Flow Assurance	IC	2			2	50	50	100	IPE
2501PT28	Midstream Project Economic Analysis	IC	3			3	50	50	100	TPP
2501PT33	Storage & Transportation of Crude oil & Natural Gas	IC	3			3	50	50	100	TPP & UOPI
2501PT25	Data Analytics & AI For Process Industry	IC	3			3	50	50	100	UOPI
2501PT30	Petroleum Economics Polices & Regulations	AC	3			3	50	50	100	MPEA
2501PT32	Pipeline Project Management	AC	3			3	50	50	100	OMP
Total			**32**			**32**				

Fire and Safety in Petroleum Industries:

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501PT39	Fundamentals of Petroleum Engineering	FC	2			2	50	50	100	-
2501PT38	Fire Risk & Control	FC	3			3	50	50	100	-
2501PT41	Occupational Health & Safety	FC	3			3	50	50	100	-
2501PT45	Statutory Rules & Regulation	FC	3			3	50	50	100	-
2501PT36	Advances In Sustainable Development	IC	3			3	50	50	100	OHS
2501PT40	Hazard Identification & Risk Assessment	IC	3			3	50	50	100	OHS
2501PT46	Structural Fire Protection System	IC	3			3	50	50	100	FRC
2501PT42	Process Safety & Security	IC	3			3	50	50	100	OHS
2501PT44	Safety In Engineering Industry	AC	3			3	50	50	100	HIRA
2501PT43	Safety In Drilling	AC	3			3	50	50	100	HIRA
2501PT37	Disaster Risk Management	AC	3			3	50	50	100	-
Total			**32**			**32**				

UNIVERSITY OPEN ELECTIVE COURSE S (UEC)

AI & ML											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
2501AI02	Artificial Intelligence	FC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
2501AI05	Machine Learning	FC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
2501AI27	AI & Data Science	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
2501AI28	AI in Healthcare	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE (DS) PT, Min. E	DAP
2501AI11	Deep Learning	IC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
2501AI10	Natural Language Processing	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
2501AI09	Reinforcement Learning	AC	1		2	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
2501AI29	AI in Agriculture	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	DAP
2501AI30	Robotics & AI	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	DAP
2501AI31	AI in Finance & Economics	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS), PT, Min. E	DAP
Total			**19**		**13**	**32**					

Production Excellence											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
2501ME81	Fundamentals of Production Excellence	FC	2			2	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501ME82	Six Sigma for Production Excellence	FC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE
2501ME83	Quality Excellence in Production	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE
2501ME84	Digital Transformation for Production Excellence	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE
2501ME85	Agile Production Systems	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE
2501ME86	Process Excellence & Optimization	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE
2501ME87	Risk Management in Production Excellence	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT,	FPE

										AIML, CSE(DS) PT, Min. E	
2501ME88	Ethical & Social Responsibility in Production Excellence	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE
2501ME89	Data-Driven Decision Making for Production Excellence	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min E	FPE
2501ME58	Industry 5.0 for Engineers	AC	3			3	50	50	100	CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT, Min E	FPE
2501ME90	Cost Excellence in Production	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE
Total			**23**		**9**	**32**					

Supply Chain Management											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
2501MB17	Introduction to Supply Chain Management	FC	2			2	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501MB18	Logistics & Distribution Management	FC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
2501MB19	Supply Chain Project Management	IC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
2501MB20	Supply Chain Innovation &Trends	IC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
2501MB21	Supply Chain Analytics	IC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
2501MB22	Demand Planning & Forecasting	IC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
2501MB23	Supply Chain Risk Management	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
2501MB24	Inventory Management & Control	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT,	ISCM

										AIML, CSE(DS) PT, Min. E	
2501MB25	E-Commerce & Supply Chain Management	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
2501MB26	Operations Management	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
2501MB27	Supply Chain Ethics & Corporate Social Responsibility (CSR)	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
Total			**32**			**32**					

Sustainability											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
2501CE74	Introduction to Sustainable Development	FC	2			2	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501CE66	Natural Disaster Management & Mitigation	FC	3			3	50	50	100	EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501CE62	Waste Water Management	IC	3			3	50	50	100	EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501CE59	Integrated Solid Waste Management for a Smart City	IC	3			3	50	50	100	EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501CE58	Watershed Management	IC	3			3	50	50	100	EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501EE33	Energy Audit, Conservation & Management	IC	3			3	50	50	100	CE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
2501EE53	Electric Power Generation, Transmission & Distribution Systems	AC	3			3	50	50	100	CE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
2501CE75	Sustainable Agriculture & Food Systems	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501CE76	Sustainable Supply Chain Management	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT,	-

										AIML, CSE(DS) PT, Min. E	
2501CE77	Sustainable Production Excellence	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501CE78	AI in Environmental Science and Sustainability	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
Total			**32**			**32**					

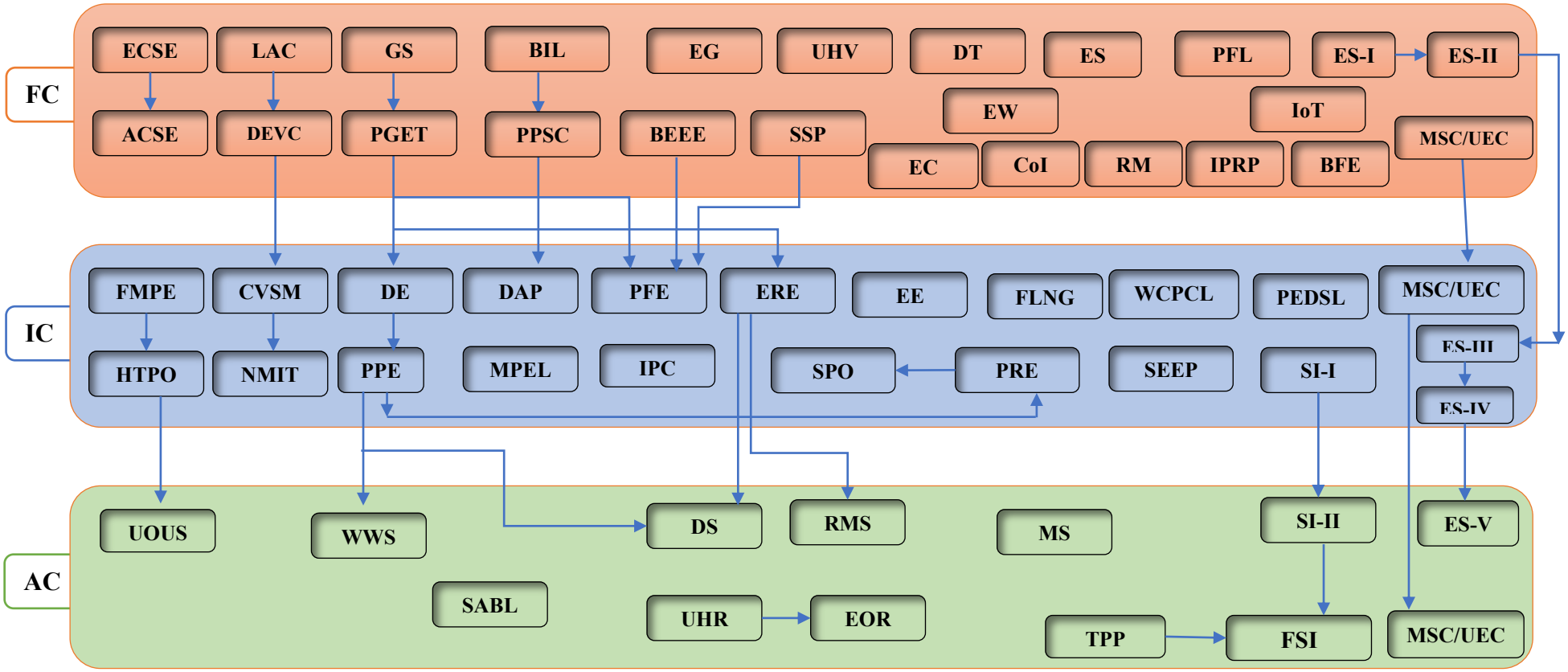
Security											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
2501CS32	Cybersecurity Essentials	FC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT35	Security in Software Development	FC	3			3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501CS28	Ethical Hacking	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501CS69	Cloud Security	IC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT36	Security &Compliance in Business	IC	3			3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT37	Cryptography & Data Security	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT38	Security Awareness & Social Engineering	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT39	Cybersecurity Policy & Strategy	AC	3			3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT40	Security in Emerging Technologies	AC	3			3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501CS30	Information Security Analysis & Audit	AC	2			2	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT41	Financial Information Security & Privacy	AC	3			3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
Total			**25**		**07**	**32**					

Others											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
2501CE65	Remote Sensing & GIS Applications	FC	3			3	50	50	100	EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501EE36	Electric Energy Storage Systems	FC	3			3	50	50	100	CE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
2501EE43	Electrical safety	IC	3			3	50	50	100	CE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
2501EE54	Hybrid & Electric Vehicles	IC	3			3	50	50	100	CE, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
2501ME73	Organizational Behaviour	FC	3			3	50	50	100	CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501ME36	Sustainable Energy Systems	FC	3			3	50	50	100	CE, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501ME37	Solar Energy Systems	FC	3			3	50	50	100	CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501ME60	Composite Materials	IC	3			3	50	50	100	CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	SSP/MP
2501EC82	Communication Systems	FC	3			3	50	50	100	CE, EEE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501EC83	Electronic Measurements & Instrumentation	FC	3			3	50	50	100	CE, EEE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
2501EC84	Introduction to Embedded Systems	FC	3			3	50	50	100	CE, EEE, CSE, IT, AIML, CSE(DS) PT, Min. E	-

2501EC85	Fundamentals of Image Processing	FC	3			3	50	50	100	CE, EEE, CSE, IT, AIML, CSE(DS) PT, Min. E	
2501EC77	Sensors and Transducers	IC	3			3	50	50	100	CE, EEE, CSE, IT, AIML, CSE(DS) PT, Min. E	
2501CS03	Data Structures	FC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min. E	PPSC
2501CS65	Computer Organization	FC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501CS13	Operating Systems	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT05	Database Management Systems	IC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min. E	PPSC
2501IT07	Agile Software Engineering	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	PPSC
2501CS07	Computer Networks	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT06	Java Programming	IC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min. E	PPSC
2501CS68	Fundamentals of RedHat Enterprise Linux	FC			2	2	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501CS67	AWS Cloud Foundations	IC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501CS66	AWS Cloud Development	AC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501CS70	Continuous integration & delivery using DevOps	AC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT24	Fundamentals of Salesforce Administration	FC			2	2	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-

2501IT34	Advanced Salesforce Administration	AC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT23	Principles of Pega Systems	IC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501IT26	Pega System Architecture & Design	AC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
2501MB04	Entrepreneurship Development & Incubation	IC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501MB05	Business Ethics & Corporate Governance	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501MB06	Entrepreneurship Development & Business Management	AC	1		2	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
2501EC29	SoC Design	AC	3			3	50	50	100	CE, EEE, ME, CSE, IT, AIML, CSE (DS), PT, Min.E.	MPMC
2501CS23	Cloud Computing	FC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min.E.	-

B. TECH (PT) PROGRAM CURRICULUM
PRE-REQUISITE FLOW CHART



FC: Foundation Courses

LAC: Linear Algebra & Calculus
DEVC: Differential Equations & Vector Calculus
GS: Geology & Sedimentology for Petroleum Engineers
PGET: Petroleum Geology & Exploration Techniques
EC: Engineering Chemistry
SSP: Solid State Physics
PPSC.: Programming for Problem Solving Using C
BIL: Business Intelligence Lab
BEEE: Basic Electrical & Electronics Engineering
ECSE: Essential Cognitive Skills for Engineers
ACSE: Advanced Cognitive Skills for Engineers
PFL: Proficiency in Foreign language
DT: Design Thinking using AI
UHV: Universal Human Values
EG: Engineering Graphics
EW: Engineering Workshop
IoT: Internet of Things
ES: Environmental Science
CoI: Constitution of India
RM: Research Methodology
IPRP: Intellectual Property Rights & Patents
BFE: Biology for Engineers
ES-I: Employability Skills-I
ES-II: Employability Skills-II
MSC/UEC: Minor Stream Course / University Elective Courses

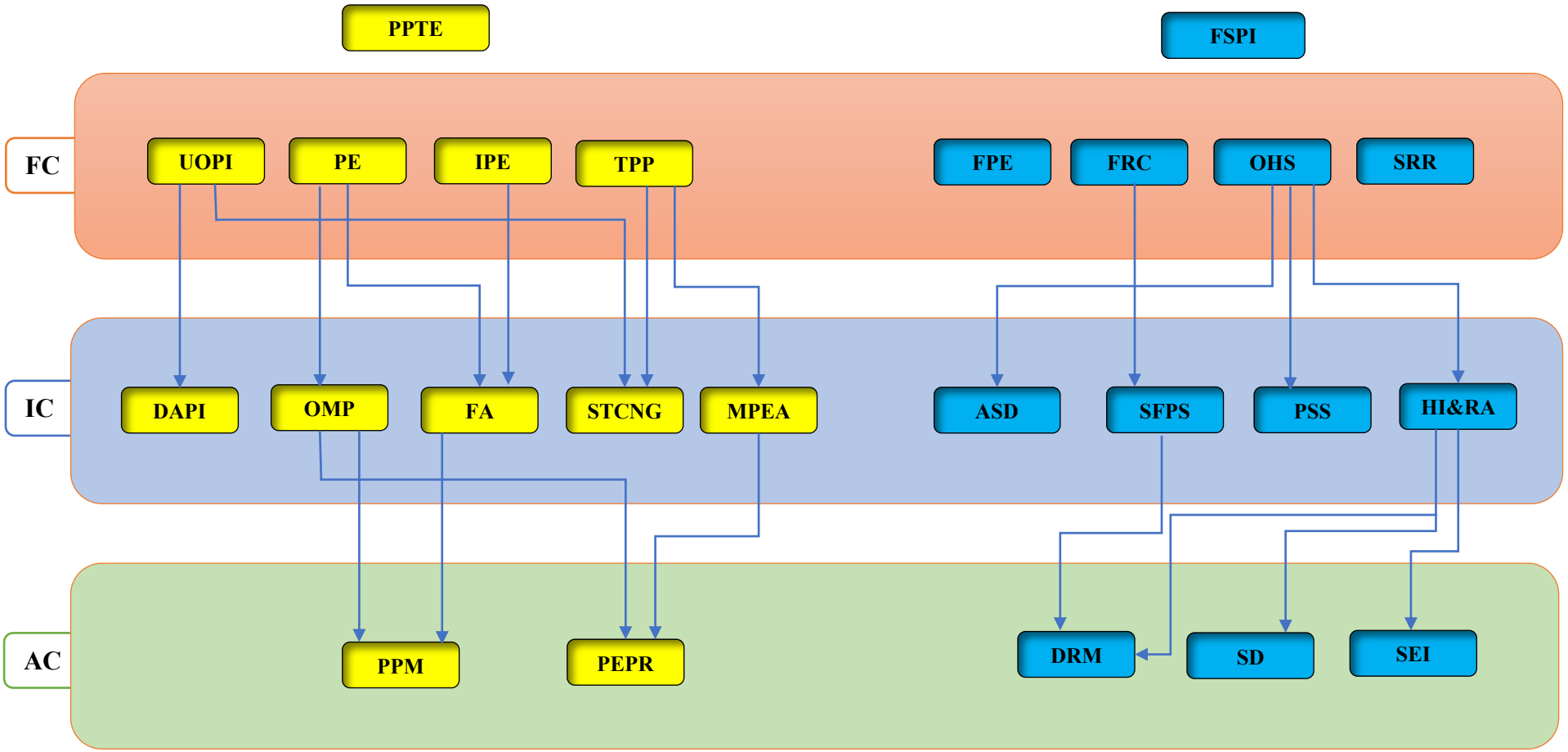
IC: Intermediate-level Courses

NMIT: Numerical Methods & Integral Transforms
EE: Engineering Economics
DE: Drilling Engineering
FMPE: Fluid Mechanics for Petroleum Engineers
HTPO: Heat Transfer in Petroleum Operations
DAP: Data Analysis Using Python
CVSM: Complex Variables & Statistical Methods
PFE: Petroleum Formation Evaluation
IPC: Instrumentation & Process Control
FLNG: Fundamentals of Liquefied Natural gas
ERE: Elements of Reservoir Engineering
WCPCL: Well Control & Pressure Control Lab
MPEL: MATLAB for Petroleum Engineers Lab
PEDSL: Petroleum Equipment Design & Simulation Lab
SI-I: Summer Internship-I
PPE: Petroleum Production Engineering
PRE: Petroleum Refinery Engineering
SEEP: Safety & Environmental Engineering Practices in Petroleum Industry
SPO: Surface Production Operations
ES-III: Employability Skills-III
ES-IV: Employability Skills-IV

AC: Advanced Courses

DSL: Drilling Simulation Lab
MS: Management Science
WWS: Well Workover & Stimulation
RMS: Reservoir Modelling & Simulation
UOUS: Unit Operations Using SCI Lab
UHR: Unconventional Hydrocarbon Resources
EOR: Enhanced Oil Recovery
SI-II: Summer Internship-II
TPP: Technical Paper Publication
FSI: Full Semester Internship
ES-V: Employability Skills-V
SABL: Student Activity Based Learning

B. TECH (PT) MINOR STREAM COURSES
PRE-REQUISITE FLOW CHART



Minor Stream	Foundation Courses		Intermediate Level Courses		Advanced Courses	
PPTE: Pipeline and Petroleum Transport Engineering	**UOPI**	Unit Operations in Petroleum Industry	**DAPI**	Data Analytics & AI for Process Industry	**PPM**	Pipeline Project Management
	PE	Pipeline Engineering	**OMP**	Operational & Maintenance of Pipelines	**PEPR**	Petroleum Economics Polices & Regulations
	IPE	Introduction to Petroleum Engineering	**FA**	Flow Assurance		
	TPP	Transportation of Petroleum Products	**STCNG**	Storage & Transportation of Crude oil & Natural Gas		
			MPEA	Midstream Project Economic Analysis		
FSPI: Fire and Safety in Petroleum Industries	**FPE**	Fundamentals of Petroleum Engineering	**ASD**	Advances In Sustainable Development	**DRM**	Disaster Risk Management
	FRC	Fire Risk & Control	**SFPS**	Structural Fire Protection System	**SD**	Safety In Drilling
	OHS	Occupational Health & Safety	**PSS**	Process Safety & security	**SEI**	Safety In Engineering Industry
	SRR	Statutory Rules & Regulation	**HI&RA**	Hazard Identification & Risk Assessment		

Suggestive Semester-wise Curriculum

I SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501MA01	Linear Algebra & Calculus	MCC	FC	2	1		3	3
2501PH01	Solid State Physics	MCC	FC	2		1	3	4
2501PT06	Geology & Sedimentology for Petroleum Engineers	MCC	FC	1	1	2	4	6
2501ME01	Engineering Graphics	MCC	FC	1		2	3	5
2501IT01	Business Intelligence Lab	MCC	FC			2	2	4
2501ME03	Engineering Workshop	MCC	FC			1	1	2
2501EN01	Essential Cognitive Skills for Engineers	AEC	FC			1	1	2
2501UC07	Design Thinking using AI	AEC	FC			1	1	2
Total				**6**	**2**	**10**	**18**	**28**

II SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501MA02	Differential Equations & Vector Calculus	MCC	FC	2	1		3	3
2501CH01	Engineering Chemistry	MCC	FC	2		1	3	4
2501CS01	Programming For Problem Solving Using C	MCC	FC	2		2	4	6
2501PT10	Petroleum Geology & Exploration Techniques	MCC	IC	1	1	2	4	6
2501EE01	Basic Electrical & Electronics Engineering	MDC	FC	2		2	4	6
2501MB03	Management Science	MDC	AC	2			2	2
2501EN02	Advanced Cognitive Skills for Engineers	AEC	FC			1	1	2
2501UC08	Universal Human Values	AEC	FC	2			2	2
2501UC11	Employability Skills -I	VAC	FC			3	0	3
2501AC01	Environmental Science	MC	FC				0	2
Total				**13**	**2**	**11**	**23**	**36**

III SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501MA06	Complex Variables & Statistical Methods	MCC	IC	2	1		3	3
2501PT04	Fluid Mechanics for Petroleum Engineers	MCC	IC	1	1	2	4	6
2501PT08	Instrumentation & Process Control	MCC	IC	2		2	4	6
-	Minor Stream Course - 1 / University Open Elective Course - 1	MSC / UEC	FC/ IC	2			2	2
-	Minor Stream Course - 2 / University Open Elective Course -2	MSC / UEC	FC/ IC	3			3	3
2501MB02	Engineering Economics	MDC	IC	3			3	3
2501UC13	Employability Skills -II	VAC	FC			3	0	3
2501AC02	Constitution of India	MC	FC					2
Total				**13**	**2**	**7**	**19**	**28**

IV SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501MA05	Numerical Methods & Integral Transforms	MCC	IC	2	1		3	3
2501PT07	Heat Transfer in Petroleum Operations	MCC	IC	1	1	2	4	6
2501PT05	Fundamentals of Liquefied Natural gas	MCC	IC	3			3	3
2501PT02	Elements of Reservoir Engineering	MCC	IC	2		2	4	6
-	Minor Stream Course - 3 / University Open Elective Course - 3	MSC / UEC	IC/ AC	3			3	3
2501PT51	Well Control and Pressure Control Lab	SEC	IC			1	1	2
2501PT19	MATLAB For Petroleum Engineers Lab	SEC	IC			2	2	4
2501CS02	Data Analysis Using Python	VAC	FC			1	1	2
2501UC14	Employability Skills -III	VAC	IC			3	0	3
2501AC03	Research Methodology	MC	FC				0	2
Total				**11**	**2**	**11**	**21**	**34**

V SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501PT09	Petroleum Formation Evaluation	MCC	IC	1	1		2	2
2501PT01	Drilling Engineering	MCC	IC	2		2	4	6
2501PT11	Petroleum Production Engineering	MCC	IC	1	1		2	2
2501PT15	Surface Production Operations	MCC	IC	2			2	2
-	Minor Stream Course – 4 / University Open Elective Course -4	MSC / UEC	IC/ AC	3			3	3
-	Minor Stream Course - 5 / University Open Elective Course - 5	MSC / UEC	IC/ AC	3			3	3
-	Minor Stream Course – 6 / University Open Elective Course -6	MSC / UEC	IC/ AC	3			3	3
2501PT18	Drilling Simulation Lab	SEC	AC			2	2	4
2501CS04	Internet of Things	VAC	FC			1	1	2
2501UC15	Employability Skills -IV	VAC	IC			3	0	3
2501PT22	Summer Internship-I	SI	IC			2	2	4
2501AC04	Intellectual Property Rights & Patents	MC	FC				0	2
	Total			**15**	**2**	**10**	**24**	**36**

VI SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501PT14	Safety & Environmental Engineering Practices in Petroleum Industry	MCC	IC	2			2	2
2501PT17	Well Workover & Stimulation	MCC	AC	1	1		2	2
2501PT13	Reservoir Modelling & Simulation	MCC	AC	1	1	2	4	6
2501PT12	Petroleum Refinery Engineering	MCC	IC	3			3	3
-	Minor Stream Course - 7 / University Open Elective Course – 7	MSC / UEC	IC/ AC	3			3	3
-	Minor Stream Course – 8 / University Open Elective Course -8	MSC / UEC	IC/ AC	3			3	3
2501PT20	Petroleum Equipment Design & Simulation Lab	SEC	IC			2	2	4
2501AC05	Indian Knowledge Systems	MC	FC				0	2
	Total			**13**	**2**	**4**	**19**	**25**

VII SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501PT16	Unconventional Hydrocarbon Resources	MCC	AC	1	1		2	2
2501PT03	Enhanced Oil Recovery	MCC	AC	2	1		3	3
-	Minor Stream Course - 9 / University Open Elective Course – 9	MSC / UEC	IC/ AC	3			3	3
-	Minor Stream Course – 10 / University Open Elective Course -10	MSC / UEC	IC/ AC	3			3	3
-	Minor Stream Course – 11/ University Open Elective Course -11	MSC / UEC	IC/ AC	3			3	3
2501PT21	Unit Operations Using SCI Lab	SEC	AC			2	2	4
2501PT23	Summer Internship-II	SI	AC			2	2	4
	Total			**12**	**2**	**4**	**18**	**22**

VIII SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501UC09	Technical Paper Publication	AEC	AC			2	2	4
2501UC16	Employability Skills -V	VAC	AC			3	1	3
2501PT52	Student Activity Based Learning	AEC	AC			2	2	4
2501PT24	Full Semester Internship	PROJ	AC			12	12	24
	Total					**19**	**17**	**35**

Total Credit: 160

Minor Degree in Petroleum Technology (offered to other branches students)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501PT27	Introduction to Petroleum Engineering	FC	3			3	50	50	100	-
2501PT35	Unit Operations in Petroleum Industry	FC	3			3	50	50	100	-
2501PT47	Fundamentals of Geology & Reservoir Engineering	IC	3			3	50	50	100	-
2501PT48	Fundamentals of Drilling & Production Engineering **(or)**	IC	2			2	50	50	100	-
2501PT16	Unconventional Hydrocarbon Resources		1	1		2				
2501PT05	Fundamentals of Liquefied Natural Gas **(or)**	IC	3			3	50	50	100	-
2501PT49	Natural Gas Hydrates	AC	3			3				
2501PT50	Artificial Lift Techniques **(or)**	AC	3			3	50	50	100	-
2501PT03	Enhanced Oil Recovery		2	1		3				
2501PT12	Petroleum Refinery Engineering	AC	3			3	50	50	100	-
Total			**18**	**2**		**20**				

Minor Degree in Civil Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CE25	Repair & Rehabilitation of Structures	FC	3			3	50	50	100	-
2501CE43	Building Planning & Computer-Aided Drawing	FC			2	2	50	50	100	-
2501CE27	Green Buildings	FC	3			3	50	50	100	-
2501CE40	Fundamentals of Soil Behaviour	FC	2	1		3	50	50	100	-
2501CE54	Railway Engineering (or) Docks & Harbour Engineering	FC	3			3	50	50	100	-
2501CE47										
2501CE36	Environmental Impact & Risk Management (or) Environmental Management	IC	3			3	50	50	100	-
2501CE37										
2501CE56	Urban Transportation Planning (or) Intelligent Transportation Systems	IC	3			3	50	50	100	-
2501CE49										
Total			**17**	**1**	**2**	**20**				

Minor Degree in Electrical and Electronics Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501EE55	Operation & Control of Electric machines	FC	2			2	50	50	100	BEEE
2501EE56	Fundamentals of Power Electronics	FC	2			2	50	50	100	BEEE
2501EE13	Electrical Measurements & Instrumentation	FC	2	1	1	4	50	50	100	ENA-1/ BEEE
2501EE53	Electric Power Generation, Transmission and Distribution Systems	IC	3			3	50	50	100	ENA-1/ BEEE
2501EE34	Alternative Energy Sources (or) Utilization of Electrical Energy	IC	3			3	50	50	100	EPGDS / BEEE/ ISM
2501EE27										
2501EE37	Hybrid Electric Vehicles (or) Special Electric machines	AC	3			3	50	50	100	FPE/ OCEM
2501EE35										
2501EE43	Electrical Safety (or) Methods & Algorithms for Intelligent Control	AC	3			3	50	50	100	EPGDS/PSA
2501EE30										
	Total		**18**	**1**	**1**	**20**				

Minor Degree in Mechanical Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501ME74	Basic Mechanical Engineering	FC	2			2	50	50	100	-
2501ME04	Engineering Thermodynamics	IC	2	1		3	50	50	100	SSP/ MP
2501ME77	Introduction to Automobile Engineering (or) Mechanics of Solids	IC	3			3	50	50	100	SSP/ MP
2501ME78										
2501ME12	Heat Power Engineering (or) Refrigeration & Air Conditioning	IC	2	1		3	50	50	100	ETD
2501ME40										
2501ME75	Production Technology	IC	3			3	50	50	100	EW
2501ME76	Metallurgy & Material Science	IC	3			3	50	50	100	SSP/ MP
2501ME79	Theory of Machines (or) Advanced Engineering Metrology	AC	3			3	50	50	100	SSP/ MP
2501ME80										

Total	18	2		20				

Minor Degree in Electronics and Communication Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EC87	Fundamentals of Communications	FC	2		1	3	50	50	100	-
241EC88	Fundamentals of Signal Processing	FC	2		1	3	50	50	100	-
241EC89	Analog & Digital Circuits	IC	2			2	50	50	100	BEEE
241EC42	Wireless LAN's & PAN's	IC	3			3	50	50	100	-
241EC90 241EC91	Linear & Digital IC Applications (or) Sensors and Actuators	IC	3			3	50	50	100	ADC
241EC92 241EC93	Embedded Microcontrollers (or) Digital System Design	IC	2		1	3	50	50	100	ADC, PPSC
241EC67	Introduction to Internet of Things (or) Modern Wireless Communications	AC	2		1	3	50	50	100	EM, WLANS&PANS
241EC74			3			3	50	50	100	FC
Total			**16**		**4**	**20**				

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CS13	Operating Systems	IC	2		1	3	50	50	100	-
2501CS07	Computer Networks	IC	2		1	3	50	50	100	-
2501IT07	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
2501AI03	Data Mining	IC	1		2	3	50	50	100	-

Minor Degree in Computer Science and Engineering

Minor Degree in Data Science

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501IT07	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
2501CS34	Fundamentals of Data Science	IC	2		1	3	50	50	100	PPSC
2501CS12	NoSQL Databases	IC	2			2	50	50	100	-
2501AI03	Data Mining	IC	1		2	3	50	50	100	-
2501CS37 / 2501CS36	Health Care Data Analytics (or) Business Intelligence & Analytics	IC	2		1	3	50	50	100	PPSC
2501AI04 / 2501AI19	Big Data Analytics (or) Data Visualization	AC	2		1	3	50	50	100	DM / DAP
2501CS41 / 2501CS40	Social Network Analysis (or) Social Networks & Semantic Web	AC	2		1	3	50	50	100	
Total			**13**		**7**	**20**				

Minor Degree in Artificial Intelligence and Machine Learning

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CS08 / 2501IT06	Object Oriented Programming through C++ (or) Java Programming	IC	2		2	4	50	50	100	PPSC
2501CS16	Introduction to MERN Stack Development (or) Information Security Analysis & Audit	IC			2	2	50	50	100	JP
2501CS30			2			2	50	50	100	-
2501CS18	Advanced MERN Stack Development (or) Flutter Fundamentals	AC			2	2	50	50	100	IMSD
2501IT12					2	2	50	50	100	-
Total			**11**		**9**	**20**				

2501AI02	Artificial Intelligence	IC	2		1	3	50	50	100	DAP
2501AI05	Machine Learning	IC	2		2	4	50	50	100	DAP
2501AI15	AI Chatbots	IC	2			2	50	50	100	DAP
2501AI14	Soft Computing (or) Fundamentals of Data Science	IC	1	0	2	3	50	50	100	AI
2501CS34		IC	2	0	1	3	50	50	100	PPSC
2501AI10	Natural Language Processing (or) Data Visualization	AC	2		1	3	50	50	100	DAP
2501AI19										
2501AI16	Prompt Engineering & GenAI (or) Social Network Analysis	AC	2		1	3	50	50	100	ML
2501CS41										
2501AI17	Federated Machine Learning	AC	2			2	50	50	100	ML
Total			**14**		**6**	**20**				

Minor Degree in Mining Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501MN03	Development of Mineral Deposits	FC	3			3	50	50	100	-
2501MN41	Green Mining	FC	3			3	50	50	100	-
2501MN06	Surface Mining	IC	3			3	50	50	100	DMD
2501MN24	Drilling & Blasting	IC	3			3	50	50	100	DMD
2501MN07	Underground Coal Mining Technology (or) Underground Metal Mining Technology	IC	3			3	50	50	100	DMD
2501MN08										
2501MN14	Mine Legislation & General Safety (or) Environmental Pollution & Control	AC	3			3	50	50	100	UCMT / UMMT
2501MN28										
2501MN45	Industrial Safety Practices (or) Ground Control	AC	2			2	50	50	100	-
2501MN46										
Total			**20**			**20**				

Minor Degree in Agricultural Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite

2501AE82	Fundamentals of Renewable Energy Sources	FC	3	0	0	3	50	50	100	-
2501AE83	Post-harvest Engineering of Cereal Crops	FC	3	0	0	3	50	50	100	-
2501AE84	Ground Water Hydrology	FC	3	0	0	3	50	50	100	-
2501AE85	Micro Irrigation Systems	IC	2	0	0	2	50	50	100	-
2501AE86 2501AE87	Surface Water Hydrology (or) Land & Water Management Engineering	IC	3	0	0	3	50	50	100	GWH
2501AE88 2501AE89	Agricultural Process Engineering & Food Quality (or) Post-harvest Engineering for Horticultural Produce	AC	3	0	0	3	50	50	100	PHECC
2501AE90 2501AE91	Agricultural Machinery & Equipment (or) Design of Bio-energy systems	AC	3	0	0	3	50	50	100	FRES
Total			**20**			**20**				

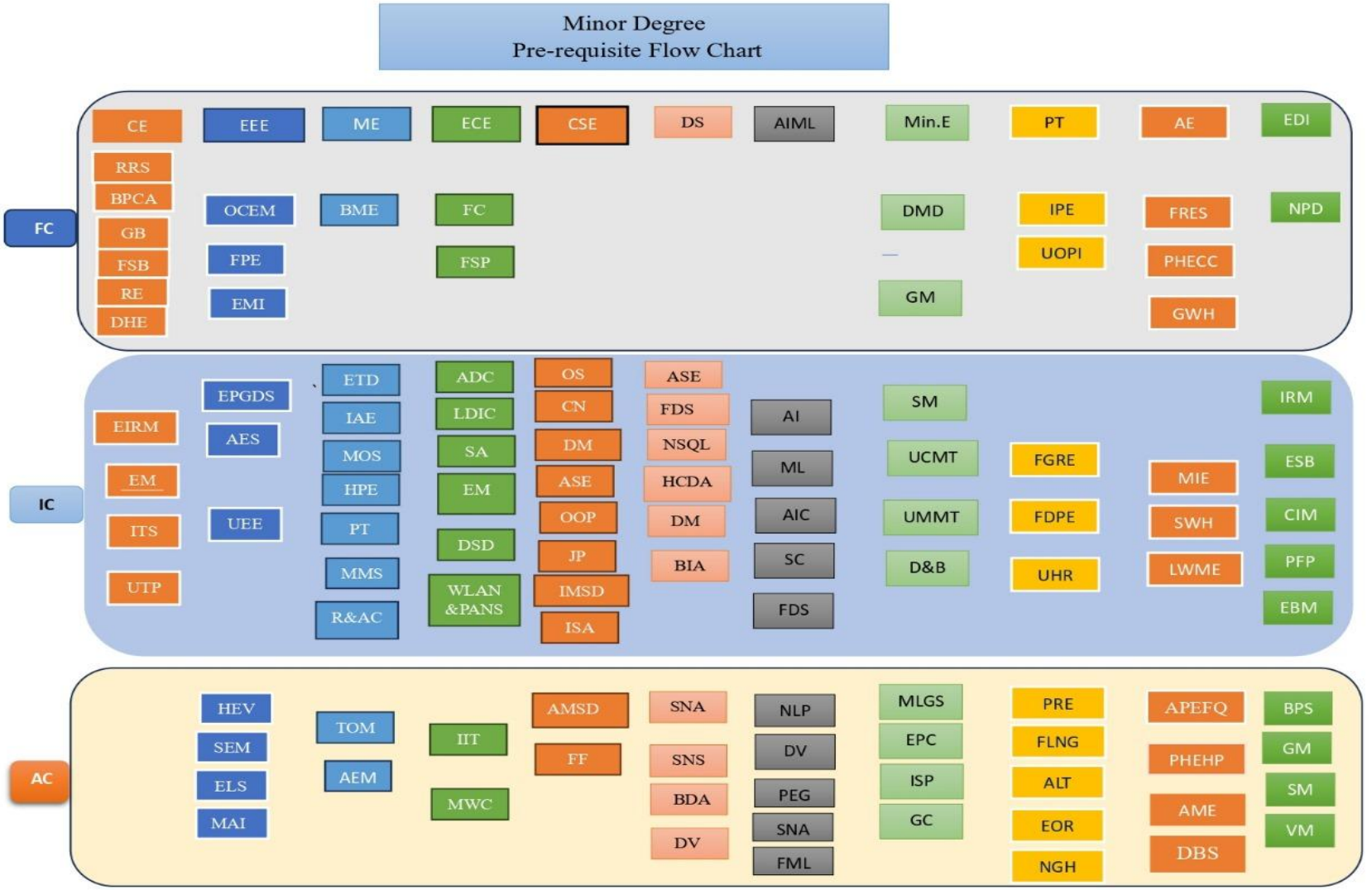
Minor Degree in Entrepreneurship Development & Incubation

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501MB07	New Product Development	FC	3			3	50	50	100	-
2501MB08	Entrepreneurship & Small Business Management	IC	2			2	50	50	100	-
2501MB09	Insurance & Risk Management	IC	3			3	50	50	100	-
2501MB10	Change & Innovations Management	IC	3			3	50	50	100	-
2501MB11 2501MB12	Personal Financial Planning (or) E-Business management	IC	3			3	50	50	100	-
2501MB13	Business Policy & Strategic Management (or)	AC	3			3	50	50	100	-

2501MB14	Green Marketing									
2501MB15 2501MB16	Startup Management (or) Venture Management	AC	3			3	50	50	100	-
Total			**20**			**20**				

Minor Degree in Quantum Technologies

S.No.	Course Code	Course Name	L	T	P	C	Semester
Mandatory Courses							
1	251EC097	Survey of Quantum technologies and Application	3	0	0	3	IV
2	251EC098	Foundations of Quantum Technologies	3	0	0	3	V
3	251EC099	Basic Programming Lab (or)	1	0	2	3	V
	251EC100	Basic Laboratory Course for Quantum Technologies					
4	251EC101	Quantum Algorithms and Cryptography	12 week 3 Credit - NPTEL MOOC			3	VII/VIII
Any One course from the below							
5	251EC102	Introduction to Quantum Computation	3	0	0	3	VI
6	251EC103	Introduction to Quantum Communication	3	0	0	3	VI
7	251EC104	Introduction to Quantum Sensing	3	0	0	3	VI
8	251EC105	Introduction to Quantum Materials	3	0	0	3	VI
Any One course from the below							
9	251EC106	Engineering Foundations of Quantum Technologies	3	0	0	3	VII
10	251EC107	Solid State Physics for Quantum Technologies	3	0	0	3	VII
11	251EC108	Quantum Optics	3	0	0	3	VII
12	251EC109	Quantum Cybersecurity	3	0	0	3	VII
13	251EC110	Quantum Machine Learning	3	0	0	3	VII
Total			**18**	**0**	**0**	**18**	


Minor Degree
Pre-requisite Flow Chart
FC
CE
EEE
ME
ECE
CSE
DS
AIML
Min.E
PT
AE
EDI
RRS
BPCA
GB
FSB
RE
DHE
OCEM
FPE
EMI
BME
FC
FSP
DMD
GM
IPE
UOPI
FRES
PHECC
GWH
NPD
IC
EIRM
EM
ITS
UTP
EPGDS
AES
UEE
ETD
IAE
MOS
HPE
PT
MMS
R&AC
ADC
LDIC
SA
EM
DSD
WLAN &PANS
OS
CN
DM
ASE
OOP
JP
IMSD
ISA
ASE
FDS
NSQL
HCDA
DM
BIA
AI
ML
AIC
SC
FDS
SM
UCMT
UMMT
D&B
FGRE
FDPE
UHR
MIE
SWH
LWME
IRM
ESB
CIM
PFP
EBM
AC
HEV
SEM
ELS
MAI
TOM
AEM
IIT
MWC
AMSD
FF
SNA
SNS
BDA
DV
NLP
DV
PEG
SNA
FML
MLGS
EPC
ISP
GC
PRE
FLNG
ALT
EOR
NGH
APEFQ
PHEHP
AME
DBS
BPS
GM
SM
VM

Dept.	FOUNDATION COURSE		INTERMEDIATE- LEVEL COURSE		ADVANCED COURSE	
	RRS	Repair & Rehabilitation of Structures	EIRM	Environmental Impact & Risk Management		
	BPCA	Building Planning & Computer-Aided Drawing	EM	Environmental Management		
CE	GB	Green Building	UTP	Urban Transportation Planning		
	FSB	Fundamental of Soil Behaviour	ITS	Intelligent Transportation Systems		
	RE	Railway Engineering				
	DHE	Docks & Harbour Engineering				
	OCEM	Operation control of Electric Machines	AES	Alternative Energy Sources	MAI	Methods &Algorithms for Intelligent Control
EEE	FPE	Fundamentals of Power Electronics	EPGDS	Electric Power Generation, Transmission & Distribution Systems	HEV	Hybrid Electric Vehicles
	EMI	Electrical Measurements & Instrumentation	UEE	Utilization of Electrical Energy	SEM	Special Electric Machines
					ES	Electrical Safety
	BME	Basic Mechanical Engineering	ETD	Engineering Thermodynamics	TOM	Theory of Machines
			IAE	Introduction to Automobile Engineering	AEM	Advanced Engineering Metrology
			MOS	Mechanics of Solids		
ME			HPE	Heat Power Engineering		
			PT	Production Technology		
			MMS	Metallurgy & Material Science		
			R&AC	Refrigeration & Air Conditioning		
			ADC	Analog & Digital Circuits		
	FC	Fundamentals of Communications	LDIC	Linear & Digital IC Applications	IIT	Introduction to Internet of things
			SA	Sensors & Actuators		
ECE	FSP	Fundamentals of Signal Processing	EM	Embedded Microcontrollers	MWC	Modern Wireless Communications
			DSD	Digital System Design		
			WLAN& PAN	Wireless LANS & PANS		
			ASE	Agile Software Engineering		
CSE			OOP	Object Oriented Programming through C++	AMSD	Advanced MERN Stack Development

DS			OS	Operating Systems	FF	Flutter Fundamentals
			CN	Computer Networks		
			JP	Java Programming		
			IMSD	Introduction to MERN Stack Development		
			ISA	Information Security Analysis and Audit		
			DM	Data Mining		
			DM	Data Mining	SNA	Social Network Analysis
			FDS	Fundamentals of Data Science	DV	Data Visualization
			ASE	Agile Software Engineering	BDA	Big Data Analytics
			NSQL	NoSQL Databases	SNSW	Social Networks and Semantic Web
			BIA	Business Intelligence & Analytics		
			HCDA	Health Care Data Analysis		
AIML			ML	Machine Learning	DV	Data Visualization
			AI	Artificial Intelligence	PEG	Prompt Engineering and GenAI
			AI C	AI Chatbot	SNA	Social Network Analysis
			FDS	Fundamentals of Data Science	FML	Federated Machine Learning
			SC	Soft Computing	NLP	Natural Language Processing
Min. E	DMD	Development of Mineral Deposits	SM	Surface Mining	MLGS	Mine Legislation and General Safety
	GM	Green Mining	UCMT	Underground Coal Mining Technology	EPC	Environmental Pollution & Control
			UMMT	Underground Metal Mining Technology	ISP	Industrial Safety Practices
			DB	Drilling & Blasting	GC	Ground Control
PT	IPE	Introduction to Petroleum Engineering	FGRE	Fundamentals of Geology and Reservoir Engineering	PRE	Petroleum Refinery Engineering
	UOPI	Unit operations in Petroleum Industry	FDPE	Fundamentals of Drilling and Production Engineering	FLNG	Fundamentals of Liquefied Natural Gas
			UHR	Unconventional Hydrocarbon Resources	NGH	Natural Gas Hydrates
					ALT	Artificial Lift Techniques
					EOR	Enhanced Oil Recovery
Ag. E	GWH	Ground Water Hydrology	LWME	Land and Water Management	DBS	Design of Bio-Energy Systems
	PHECC	Post-harvest Engineering of Cereal Crops	SWH	Surface Water Hydrology	PHEHP	Post-Harvest Engineering for Horticultural Produce
	FRES	Fundamentals of Renewable Energy Sources	MIE	Micro Irrigation Systems	AME	Agricultural Machinery and Equipment
					APEFQ	Agriculture Process Engineering and Food Quality

EDC	NPD	New Product Development	ESB	Entrepreneurship and Small Business Management	BPS	Business Policy & Strategic Management
			CIM	Change & Innovations Management	GM	Green Marketing
			PFP	Personal Financial Planning	SM	Startup Management
			EBM	E-Business Management	VM	Venture Management
			IRM	Insurance and Risk Management		