

PROGRAM CURRICULUM

PETROLEUM TECHNOLOGY

for

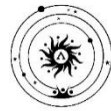
B. TECH. FOUR YEAR DEGREE PROGRAM

(Applicable for the batches admitted from A.Y 2024-25)



ADITYA UNIVERSITY

Aditya Nagar, ADB Road, Surampalem - 533 437



ADITYA UNIVERSITY

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.



ADITYA UNIVERSITY

Department of Petroleum Technology B. Tech (PT) Program Curriculum-2024 (Applicable for the batches admitted from A.Y 2024-25)

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

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	06
7	Summer Internship (SI)	2-4	04
8	Full Semester Internship (or) Project (PROJ)	12	10
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
241CH001	Engineering Chemistry	FC	2		1	3	50	50	100	-
241MA001	Linear Algebra & Calculus	FC	2	1		3	50	50	100	-
241PH001	Solid State Physics	FC	2		1	3	50	50	100	-
241PT006	Geology & Sedimentology for Petroleum Engineers	FC	2		2	4	50	50	100	-
241PT010	Petroleum Geology & Exploration Techniques	FC	2		2	4	50	50	100	-
241MA002	Differential Equations & Vector Calculus	FC	2	1		3	50	50	100	LA&C
241MA005	Numerical Methods & Integral Transforms	IC	2	1		3	50	50	100	-
241MA006	Complex Variables & Statistical Methods	IC	2	1		3	50	50	100	-
241IT001	IT & AI Skills	FC			2	2	50	50	100	-
241CS001	Programming for Problem Solving Using C	FC	2		2	4	50	50	100	IT & AI
241ME001	Engineering Graphics	FC	1		2	3	50	50	100	-
241ME003	Engineering Workshop	FC			1	1	100	-	100	-
241PT001	Drilling Engineering	IC	2		2	4	50	50	100	GSPE & PGET
241PT004	Fluid Mechanics for Petroleum Engineers	IC	2		2	4	50	50	100	-
241PT009	Petroleum Formation Evaluation	IC	2			2	50	50	100	PGET

241PT008	Instrumentation & Process Control	IC	2		2	4	50	50	100	-
241PT005	Fundamentals of Liquefied Natural Gas	IC	2			2	50	50	100	FMPE
241PT002	Elements of Reservoir Engineering	IC	2		2	4	50	50	100	GSPE
241PT011	Petroleum Production Engineering	IC	2			2	50	50	100	ERE
241PT012	Petroleum Refinery Engineering	IC	2		2	4	50	50	100	PPE
241PT007	Heat Transfer in Petroleum Operations	IC	2		2	4	50	50	100	FMPE
241PT014	Safety & Environmental Engineering Practices in Petroleum Industry	IC	2			2	50	50	100	-
241PT017	Well Workover & Stimulation	AC	2			2	50	50	100	ERE
241PT013	Reservoir Modelling & Simulation	AC	2		2	4	50	50	100	-
241PT015	Surface Production Operations	IC	2			2	50	50	100	-
241PT016	Unconventional Hydrocarbon Resources	AC	2			2	50	50	100	ERE
241PT003	Enhanced Oil Recovery	AC	3			3	50	50	100	PPE
Total			50	4	27	81				

Multidisciplinary Courses (MDC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EE001	Basic Electrical & Electronics Engineering	FC	2		2	4	50	50	100	-
241MB002	Engineering Economics	IC	3			3	50	50	100	-
241MB003	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
241EN001	Essential Cognitive Skills for Engineers	FC			1	1	100	-	100	-
241EN002 (or) 241UC005/ 241UC004/ 241UC006/ 241UC003	Advanced Cognitive Skills for Engineers (or) Proficiency in Foreign Language (Japanese/ German/ Spanish/ French)	FC			1	1	100	-	100	-
241UC007	Design Thinking	FC			1	1	100	-	100	-
241UC008	Universal Human Values	FC	2			2	100	-	100	-
241UC009	Technical Paper Publication	AC			2	2	100	-	100	-
241PT052	Student Activity-Based Learning	AC				2				
	Total		2		5	9				

Skill Enhancement Courses (SEC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241PT019	MATLAB For Petroleum Engineers Lab	IC			2	2	50	50	100	-
241PT051	Well Control and Pressure Control Lab	IC			1	1	100	-	100	-
241PT020	Petroleum Equipment Design and Simulation Lab	IC			2	2	50	50	100	SPO
241PT018	Drilling Simulation Lab	AC			2	2	50	50	100	-
241PT021	Unit Operations Using SCI Lab	AC			2	2	50	50	100	FMPE & HTP0
Total						9	9			

Value Added Courses (VAC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241CS002	Data Analysis Using Python	IC			2	2	50	50	100	-
241UC010	Indian Cultural Heritage & Fine Arts	FC			1	1	100	-	100	-
241PE001	Sports & Yoga	FC			1	1	100	-	100	-
241CS004	Internet of Things	FC			1	1	100	-	100	-
241UC011	Employability Skills-I	FC			3	0	100	-	100	-
241UC013	Employability Skills-II	FC			3	0	100	-	100	ES-I
241UC014	Employability Skills-III	IC			3	0	100	-	100	ES-II
241UC015	Employability Skills-IV	IC			3	0	100	-	100	ES-III
241UC016	Employability Skills-V	AC			3	1	100	-	100	ES-IV
Total						20	6			

Summer Internships (SI)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241PT022	Summer Internship-I	IC			2	2	100	-	100	-
241PT023	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
241PT024	Full Semester Internship (or) Project	AC			10	10	50	50	100	-
Total					10	10				

Mandatory Courses (MC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241AC001	Environmental Science	FC	2			0	100	-	100	-
241AC002	Constitution of India	FC	2			0	100	-	100	-
241AC003	Research Methodology	FC	2			0	100	-	100	-
241AC004	Intellectual Property Rights & Patents	FC	2			0	100	-	100	-
241AC005	Indian Knowledge Systems	FC	2			0	100	-	100	-
Total			10			0				

Minor Stream Course: Pipeline and Petroleum Transport Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241PT027	Introduction To Petroleum Engineering	FC	2			2	50	50	100	-
241PT035	Unit Operations in Petroleum Industry	FC	3			3	50	50	100	-
241PT034	Transportation of Petroleum Products	FC	3			3	50	50	100	-
241PT031	Pipeline Engineering	FC	3			3	50	50	100	-
241PT029	Operational & Maintenance of Pipelines	IC	3			3	50	50	100	PE
241PT026	Flow Assurance	IC	3			3	50	50	100	IPE
241PT028	Midstream Project Economic Analysis	IC	3			3	50	50	100	TPP
241PT033	Storage & Transportation of Crude oil & Natural Gas	IC	3			3	50	50	100	TPP & UOPI
241PT025	Data Analytics & AI For Process Industry	IC	3			3	50	50	100	UOPI
241PT030	Petroleum Economics Polices & Regulations	AC	3			3	50	50	100	MPEA
241PT032	Pipeline Project Management	AC	3			3	50	50	100	OMP
Total			32			32				

Minor Stream: Fire and Safety in Petroleum Industries

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241PT039	Fundamentals of Petroleum Engineering	FC	2			2	50	50	100	-
241PT038	Fire Risk & Control	FC	3			3	50	50	100	-
241PT041	Occupational Health & Safety	FC	3			3	50	50	100	-
241PT045	Statutory Rules & Regulation	FC	3			3	50	50	100	-
241PT036	Advances In Sustainable Development	IC	3			3	50	50	100	OHS
241PT040	Hazard Identification & Risk Assessment	IC	3			3	50	50	100	OHS
241PT046	Structural Fire Protection System	IC	3			3	50	50	100	FRC
241PT042	Process Safety & Security	IC	3			3	50	50	100	OHS
241PT044	Safety In Engineering Industry	AC	3			3	50	50	100	HIRA
241PT043	Safety In Drilling	AC	3			3	50	50	100	HIRA
241PT037	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
241AI002	Artificial Intelligence	FC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241AI005	Machine Learning	FC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
241AI027	AI & Data Science	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
241AI028	AI in Healthcare	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE (DS) PT, Min. E	DAP
241AI011	Deep Learning	IC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
241AI010	Natural Language Processing	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
241AI009	Reinforcement Learning	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	DAP
241AI029	AI in Agriculture	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	DAP
241AI030	Robotics & AI	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	DAP
241AI031	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			20		12	32					

Production Excellence											
Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Offered to Programs	Pre-requisite
241ME081	Fundamentals of Production Excellence	FC	2			2	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241ME082	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
241ME083	Quality Excellence in Production	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE
241ME084	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
241ME085	Agile Production Systems	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE
241ME086	Process Excellence & Optimization	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE

241ME087	Risk Management in Production Excellence	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	FPE
241ME088	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
241ME089	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
241ME058	Industry 5.0 for Engineers	AC	3			3	50	50	100	CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT, Min E	FPE
241ME090	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
241MB017	Introduction to Supply Chain Management	FC	2			2	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241MB018	Logistics & Distribution Management	FC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
241MB019	Supply Chain Project Management	IC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
241MB020	Supply Chain Innovation & Trends	IC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
241MB021	Supply Chain Analytics	IC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
241MB022	Demand Planning & Forecasting	IC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
241MB023	Supply Chain Risk Management	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM

241MB024	Inventory Management & Control	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
241MB025	E-Commerce & Supply Chain Management	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
241MB026	Operations Management	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	ISCM
241MB027	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
241CE074	Introduction to Sustainable Development	FC	2			2	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241CE079	Natural Disaster Management & Mitigation	FC	3			3	50	50	100	EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241CE081	Waste Water Management	IC	3			3	50	50	100	EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-

241CE082	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	-
241CE083	Watershed Management	IC	3			3	50	50	100	EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241EE033	Energy Audit, Conservation & Management	IC	3			3	50	50	100	CE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
241EE006	Electric Power Generation, Transmission & Distribution Systems	AC	3			3	50	50	100	CE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
241CE075	Sustainable Agriculture & Food Systems	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241CE076	Sustainable Supply Chain Management	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241CE077	Sustainable Production Excellence	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241CE078	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

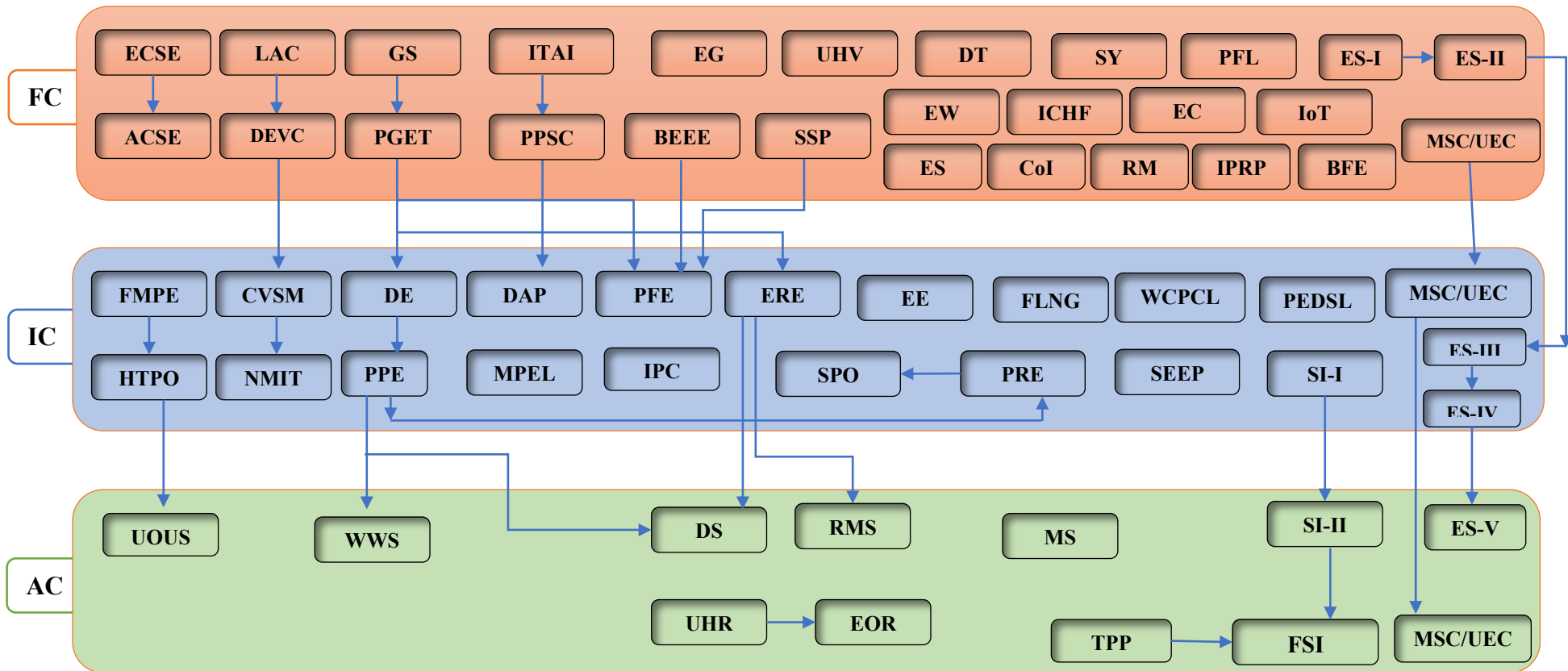
Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Offered to Programs	Pre-requisite
241CS032	Cybersecurity Essentials	FC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT035	Security in Software Development	FC	3			3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241CS028	Ethical Hacking	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241CS069	Cloud Security	IC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT036	Security & Compliance in Business	IC	3			3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT037	Cryptography & Data Security	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT038	Security Awareness & Social Engineering	AC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT039	Cybersecurity Policy & Strategy	AC	3			3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT040	Security in Emerging Technologies	AC	3			3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241CS030	Information Security Analysis & Audit	AC	2			2	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT041	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
241CE080	Remote Sensing & GIS Applications	FC	3			3	50	50	100	EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241EE036	Electric Energy Storage Systems	FC	3			3	50	50	100	CE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
241EE043	Electrical safety	IC	3			3	50	50	100	CE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
241EE054	Hybrid & Electric Vehicles	IC	3			3	50	50	100	CE, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
241ME073	Organizational Behaviour	FC	3			3	50	50	100	CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241ME036	Sustainable Energy Systems	FC	3			3	50	50	100	CE, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241ME037	Solar Energy Systems	FC	3			3	50	50	100	CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241ME060	Composite Materials	IC	3			3	50	50	100	CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	SSP/MP
241EC082	Communication Systems	FC	3			3	50	50	100	CE, EEE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241EC083	Electronic Measurements & Instrumentation	FC	3			3	50	50	100	CE, EEE, CSE, IT, AIML, CSE(DS) PT, Min. E	BEEE
241EC084	Introduction to Embedded Systems	FC	3			3	50	50	100	CE, EEE, CSE, IT, AIML, CSE(DS) PT, Min. E	-

241EC085	Fundamentals of Image Processing	FC	3			3	50	50	100	CE, EEE, CSE, IT, AIML, CSE(DS) PT, Min. E	
241EC077	Sensors and Transducers	IC	3			3	50	50	100	CE, EEE, CSE, IT, AIML, CSE(DS) PT, Min. E	
241CS003	Data Structures	FC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min. E	PPSC
241CS065	Computer Organization	FC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241CS013	Operating Systems	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT005	Database Management Systems	IC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min. E	PPSC
241IT007	Agile Software Engineering	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	PPSC
241CS007	Computer Networks	IC	2		1	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT006	Java Programming	IC	2		2	4	50	50	100	CE, EEE, ME, ECE, PT, Min. E	PPSC
241CS068	Fundamentals of RedHat Enterprise Linux	FC			2	2	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241CS067	AWS Cloud Foundations	IC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241CS066	AWS Cloud Development	AC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241CS070	Continuous integration & delivery using DevOps	AC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT024	Fundamentals of Salesforce Administration	FC			2	2	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT034	Advanced Salesforce Administration	AC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-

241IT023	Principles of Pega Systems	IC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241IT026	Pega System Architecture & Design	AC			3	3	50	50	100	CE, EEE, ME, ECE, PT, Min. E	-
241MB004	Entrepreneurship Development & Incubation	IC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241MB005	Business Ethics & Corporate Governance	AC	3			3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241MB006	Entrepreneurship Development & Business Management	AC	1		2	3	50	50	100	CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min. E	-
241EC029	SoC Design	AC	3			3	50	50	100	CE, EEE, ME, CSE, IT, AIML, CSE (DS), PT, Min.E.	MPMC
241CS023	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
ITAI: IT & AI Skills
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
UHV: Universal Human Values
EG: Engineering Graphics
EW: Engineering Workshop
ICHF: Indian Cultural Heritage & Fine Arts
SY: Sports & Yoga
IoT: Internet of Things
ES: Environmental Science
CoI: Constitution of India
RM: Research Methodology
IPRP: Intellectual Property Rights & Patents
IKS: Indian Knowledge Systems
ES-I: Employability Skills-I
ES-II: Employability Skills-II
MSC/UEC: Minor Stream Course / University Elective Courses

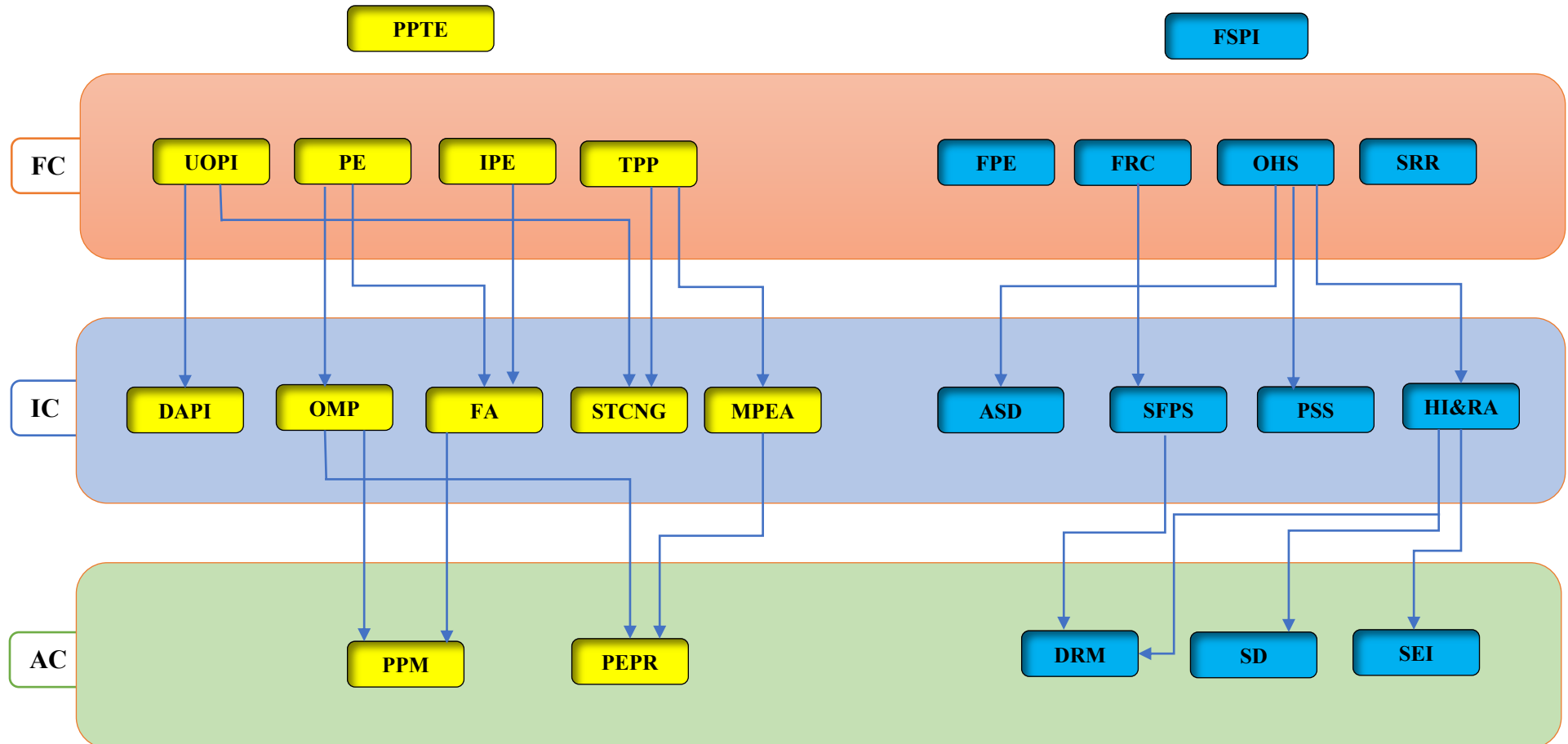
IC: Intermediate-level Courses

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
WCPC: 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

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 Policies & 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	
241MA001	Linear Algebra & Calculus	MCC	FC	2	1		3	3
241PH001	Solid State Physics	MCC	FC	2		1	3	4
241PT006	Geology & Sedimentology for Petroleum Engineers	MCC	FC	2		2	4	6
241ME001	Engineering Graphics	MCC	FC	1		2	3	5
241IT001	IT & AI Skills	MCC	FC			2	2	4
241ME003	Engineering Workshop	MCC	FC			1	1	2
241EN001	Essential Cognitive Skills for Engineers	AEC	FC			1	1	2
241UC008	Universal Human Values	AEC	FC	2			2	2
241PE001	Sports & Yoga	VAC	FC			1	1	2
Total				9	1	10	20	30

II SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241MA002	Differential Equations & Vector Calculus	MCC	FC	2	1		3	3
241CH001	Engineering Chemistry	MCC	FC	2		1	3	4
241CS001	Programming For Problem Solving Using C	MCC	FC	2		2	4	6
241PT010	Petroleum Geology & Exploration Techniques	MCC	IC	2		2	4	6
241EE001	Basic Electrical & Electronics Engineering	MDC	FC	2		2	4	6
241EN002 (or) 241UC005/ 241UC004/ 241UC006/ 241UC003	Advanced Cognitive Skills for Engineers (or) Proficiency in Foreign language (Japanese/German/Spanish/ French)	AEC	FC			1	1	2
241UC007	Design Thinking	AEC	FC			1	1	2
241UC010	Indian Cultural Heritage & Fine Arts	VAC	FC			1	1	2
241UC011	Employability Skills -I	VAC	FC			3	0	3
241AC001	Environmental Science	MC	FC	2				2
Total				12	1	13	21	36

III SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241MA006	Complex Variables & Statistical Methods	MCC	IC	2	1		3	3
241PT004	Fluid Mechanics for Petroleum Engineers	MCC	IC	2		2	4	6
241PT008	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
241MB002	Engineering Economics	MDC	IC	3			3	3
241CS002	Data Analysis Using Python	VAC	IC			2	2	4
241UC013	Employability Skills -II	VAC	FC			3	0	3
241AC002	Constitution of India	MC	FC	2				2
Total				16	1	9	21	32

IV SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241MA005	Numerical Methods & Integral Transforms	MCC	IC	2	1		3	3
241PT007	Heat Transfer in Petroleum Operations	MCC	IC	2		2	4	6
241PT005	Fundamentals of Liquefied Natural gas	MCC	IC	2			2	2
241PT002	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
241MB003	Management Science	MDC	AC	2			2	2
241PT051	Well Control and Pressure Control Lab	SEC	IC			1	1	2
241PT019	MATLAB For Petroleum Engineers	SEC	IC			2	2	4
241UC014	Employability Skills -III	VAC	IC			3	0	3
241AC003	Research Methodology	MC	FC	2			0	2
Total				15	1	10	21	33

V SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241PT009	Petroleum Formation Evaluation	MCC	IC	2			2	2
241PT001	Drilling Engineering	MCC	IC	2		2	4	6
241PT011	Petroleum Production Engineering	MCC	IC	2			2	2
241PT015	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
241PT018	Drilling Simulation Lab	SEC	AC			2	2	4
241CS004	Internet of Things	VAC	FC			1	1	2
241UC015	Employability Skills -IV	VAC	IC			3	0	3
241PT022	Summer Internship-I	SI	IC			2	2	4
241AC004	Intellectual Property Rights & Patents	MC	FC	2			0	2
	Total			19		10	24	36

VI SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241PT014	Safety & Environmental Engineering Practices in Petroleum Industry	MCC	IC	2			2	2
241PT017	Well Workover & Stimulation	MCC	AC	2			2	2
241PT013	Reservoir Modelling & Simulation	MCC	AC	2		2	4	6
241PT012	Petroleum Refinery Engineering	MCC	IC	2		2	4	6
	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
241PT020	Petroleum Equipment Design & Simulation Lab	SEC	IC			2	2	4
241AC005	Indian Knowledge Systems (IKS)	MC	FC	2			0	2
	Total			16		6	20	28

VII SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241PT016	Unconventional Hydrocarbon Resources	MCC	AC	2			2	2
241PT003	Enhanced Oil Recovery	MCC	AC	3			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
241PT021	Unit Operations Using SCI Lab	SEC	AC			2	2	4
241PT023	Summer Internship-II	SI	AC			2	2	4
	Total			14		4	18	22

VIII SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241UC009	Technical Paper Publication	AEC	AC			2	2	4
241UC016	Employability Skills -V	VAC	AC			3	1	3
241PT052	Student Activity-Based Learning	VAC	AC				2	
241PT024	Full Semester Internship (or) Project	PROJ	AC			10	10	20
Total						15	15	27

Total Credit: 160

* To acquire a minor degree, a student has to earn 20 credits in addition to the 160 credits.

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

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241PT027	Introduction to Petroleum Engineering	FC	2			2	50	50	100	-
241PT035	Unit Operations in Petroleum Industry	FC	3			3	50	50	100	-
241PT047	Fundamentals of Geology & Reservoir Engineering	IC	3			3	50	50	100	-
241PT048	Fundamentals of Drilling & Production Engineering (or)	IC	3			3	50	50	100	-
241PT016	Unconventional Hydrocarbon Resources									
241PT049	Natural Gas Hydrates (or)	AC	3			3	50	50	100	-
241PT005	Fundamentals of Liquefied Natural Gas									
241PT050	Artificial Lift Techniques (or)	AC	3			3	50	50	100	-
241PT003	Enhanced Oil Recovery									
241PT012	Petroleum Refinery Engineering	AC	3			3	50	50	100	-
Total			20			20				

Minor Degree in Civil Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241CE025	Repair & Rehabilitation of Structures	FC	3			3	50	50	100	-
241CE043	Building Planning & Computer-Aided Drawing	FC			2	2	50	50	100	-
241CE027	Green Buildings	FC	3			3	50	50	100	-
241CE040	Fundamentals of Soil Behaviour	FC	3			3	50	50	100	-
241CE054	Railway Engineering	FC	3			3	50	50	100	-
241CE047	Docks & Harbour Engineering									
241CE036	Environmental Impact & Risk Management	IC	3			3	50	50	100	-
241CE037	Environmental Management									
241CE056	Urban Transportation Planning	IC	3			3	50	50	100	-
241CE049	Intelligent Transportation Systems									
Total			18		2	20				

Minor Degree in Electrical and Electronics Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EE055	Operation & Control of Electric machines	FC	2			2	50	50	100	BEEE
241EE056	Fundamentals of Power Electronics	FC	2			2	50	50	100	BEEE
241EE013	Electrical Measurements & Instrumentation	FC	2		2	4	50	50	100	ENA-1/ BEEE
241EE006	Electric Power Generation and Distribution Systems	IC	3			3	50	50	100	ENA-1/ BEEE
241EE034	Alternative Energy Sources (or)	IC	3			3	50	50	100	EPGDS / BEEE/ ISM
241EE027	Utilization of Electrical Energy									
241EE037	Hybrid Electric Vehicles	AC	3			3	50	50	100	FPE/ OCM
241EE035	Special Electric machines									
241EE043	Electrical Safety (or)	AC	3			3	50	50	100	EPGDS/PSA
241EE030	Methods & Algorithms for Intelligent Control									
Total			18		2	20				

Minor Degree in Mechanical Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241ME074	Basic Mechanical Engineering	FC	2			2	50	50	100	-
241ME004	Engineering Thermodynamics	IC	2	1		3	50	50	100	SSP/ MP
241ME077	Introduction to Automobile Engineering (or)	IC	3			3	50	50	100	SSP/ MP
241ME078	Mechanics of Solids									
241ME012	Heat Power Engineering (or)	IC	2	1		3	50	50	100	ETD
241ME040	Refrigeration & Air Conditioning									
241ME075	Production Technology	IC	3			3	50	50	100	EW
241ME076	Metallurgy & Material Science	IC	3			3	50	50	100	SSP/ MP
241ME079	Theory of Machines (or)	AC	3			3	50	50	100	SSP/ MP
241ME080	Advanced Engineering Metrology									
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
241EC087	Fundamentals of Communications	FC	2		1	3	50	50	100	-
241EC088	Fundamentals of Signal Processing	FC	2		1	3	50	50	100	-
241EC089	Analog & Digital Circuits	IC	2			2	50	50	100	BEEE
241EC042	Wireless LAN's & PAN's	IC	3			3	50	50	100	-
241EC090	Linear & Digital IC Applications (or)	IC	3			3	50	50	100	ADC
241EC091	Sensors & Actuators									

241EC092	Embedded Microcontrollers (or) Digital System Design	IC	2		1	3	50	50	100	ADC, PPSC
241EC093										
241EC067	Introduction to Internet of Things (or) Modern Wireless Communications	AC	2		1	3	50	50	100	EM, WLAN's & PAN's
241EC074										3
Total Credits			16		4	20				

Minor Degree in Computer Science and Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241CS013	Operating Systems	IC	2		1	3	50	50	100	-
241CS007	Computer Networks	IC	2		1	3	50	50	100	-
241IT007	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
241AI003	Data Mining	IC	2		1	3	50	50	100	-
241CS008	Object Oriented Programming through C++ (or) Java Programming	IC	2		2	4	50	50	100	PPSC
241IT006										
241CS016	Introduction to MERN Stack Development(or) Information Security Analysis & Audit	IC			2	2	50	50	100	JP
241CS030			2			2	50	50	100	-
241CS018	Advanced MERN Stack Development (or) Flutter Fundamentals	AC			2	2	50	50	100	IMSD
241IT012					2	2	50	50	100	-
Total			12		8	20				

Minor Degree in Data Science

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241IT007	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
241CS034	Fundamentals of Data Science	IC	2		1	3	50	50	100	-
241CS012	NoSQL Databases	IC	2			2	50	50	100	-
241AI003	Data Mining	IC	2		1	3	50	50	100	-
241CS037	Health Care Data Analytics (or)	IC	2		1	3	50	50	100	-
241CS036	Business Intelligence & Analytics									PPSC
241AI004	Big Data Analytics (or)	AC	2		1	3	50	50	100	DM
241AI019	Data Visualization									DAP
241CS041	Social Network Analysis (or)	AC	2		1	3	50	50	100	
241CS040	Social Networks & Semantic Web									
Total			14		6	20				

Minor Degree in Artificial Intelligence and Machine Learning

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241AI002	Artificial Intelligence	IC	2		1	3	50	50	100	-
241AI005	Machine Learning	IC	2		2	4	50	50	100	DAP
241AI015	AI Chatbots	IC	2			2	50	50	100	AI
241AI014	Soft Computing (or)	IC	2		1	3	50	50	100	AI
241CS034	Fundamentals of Data Science	IC	2		1	3	50	50	100	-
241AI010	Natural Language Processing (or)	AC	2		1	3	50	50	100	DAP
241AI019	Data Visualization									
241AI016	Prompt Engineering & GenAI (or)	AC	2		1	3	50	50	100	ML
241CS041	Social Network Analysis									
241AI017	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
241MN003	Development of Mineral Deposits	FC	3			3	50	50	100	-
241MN041	Green Mining	FC	3			3	50	50	100	-
241MN006	Surface Mining	IC	3			3	50	50	100	DMD
241MN024	Drilling & Blasting	IC	3			3	50	50	100	DMD
241MN007	Underground Coal Mining Technology (or)	IC	3			3	50	50	100	DMD
241MN008	Underground Metal Mining Technology									
241MN014	Mine Legislation & General Safety (or)	AC	3			3	50	50	100	UCMT / UMMT
241MN028	Environmental Pollution & Control									
241MN045	Industrial Safety Practices (or)	AC	2			2	50	50	100	-
241MN046	Ground Control									
Total			20			20				

Minor Degree in Agricultural Engineering

Agricultural Engineering							Marks			Pre-requisite
Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	
241AE082	Fundamentals of Renewable Energy Sources	FC	3	0	0	3	50	50	100	-
241AE083	Post-harvest Engineering of Cereal Crops	FC	3	0	0	3	50	50	100	-
241AE084	Ground Water Hydrology	FC	3	0	0	3	50	50	100	-
241AE085	Micro Irrigation Systems	IC	2	0	0	2	50	50	100	-
241AE086	Surface Water Hydrology (OR)	IC	3	0	0	3	50	50	100	GWH
241AE087										

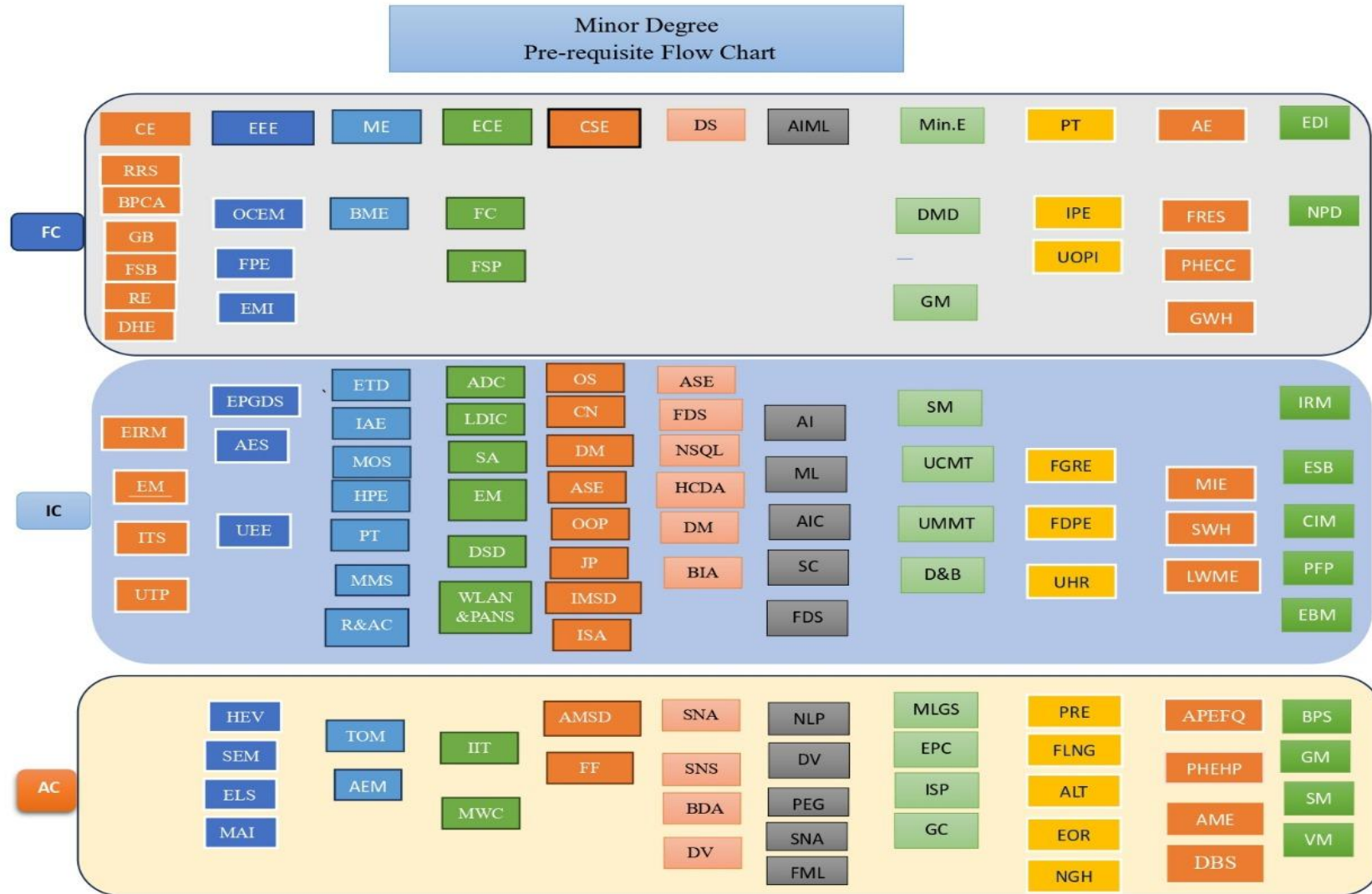
	Land & Water Management Engineering									
241AE088	Agricultural Process Engineering & Food Quality (OR) Post-harvest Engineering for Horticultural Produce	AC	3	0	0	3	50	50	100	PHECC
241AE089										
241AE090	Agricultural Machinery & Equipment (OR) Design of Bio-energy systems	AC	3	0	0	3	50	50	100	FRES
241AE091										
Total			20			20				

Minor Degree in Entrepreneurship Development & Incubation

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241MB007	New Product Development	FC	3			3	50	50	100	-
241MB008	Entrepreneurship & Small Business Management	IC	2			2	50	50	100	-
241MB009	Insurance & Risk Management	IC	3			3	50	50	100	-
241MB010	Change & Innovations Management	IC	3			3	50	50	100	-
241MB011	Personal Financial Planning (or) E-Business management	IC	3			3	50	50	100	-
241MB012										
241MB013	Business Policy & Strategic Management (or) Green Marketing	AC	3			3	50	50	100	-
241MB014										
241MB015	Startup Management (or) Venture Management	AC	3			3	50	50	100	-
241MB016										
Total			20			20				

Minor Degree in Quantum Technologies

S.No.	Course Code	Course Name	L	T	P	C	Semester
Mandatory Courses							
1	241EC097	Survey of Quantum technologies and Application	3	0	0	3	IV
2	241EC098	Foundations of Quantum Technologies	3	0	0	3	V
3	241EC099	Basic Programming Lab (or)	1	0	2	3	V
	241EC100	Basic Laboratory Course for Quantum Technologies					
4	241EC101	Quantum Algorithms and Cryptography	12 week 3 Credit - NPTEL MOOC			3	VII/VIII
Any One course from the below							
5	241EC102	Introduction to Quantum Computation	3	0	0	3	VI
6	241EC103	Introduction to Quantum Communication	3	0	0	3	VI
7	241EC104	Introduction to Quantum Sensing	3	0	0	3	VI
8	241EC105	Introduction to Quantum Materials	3	0	0	3	VI
Any One course from the below							
9	241EC106	Engineering Foundations of Quantum Technologies	3	0	0	3	VII
10	241EC107	Solid State Physics for Quantum Technologies	3	0	0	3	VII
11	241EC108	Quantum Optics	3	0	0	3	VII
12	241EC109	Quantum Cybersecurity	3	0	0	3	VII
13	241EC110	Quantum Machine Learning	3	0	0	3	VII
Total			18	0	0	18	



Dept.	FOUNDATION COURSE		INTERMEDIATE- LEVEL COURSE		ADVANCED COURSE	
CE	RRS	Repair & Rehabilitation of Structures	EIRM	Environmental Impact & Risk Management		
	BPCA	Building Planning & Computer-Aided Drawing	EM	Environmental Management		
	GB	Green Building	UTP	Urban Transportation Planning		
	FSB	Fundamental of Soil Behaviour	ITS	Intelligent Transportation Systems		
	RE DHE	Railway Engineering Docks & Harbour Engineering				
EEE	OCEM	Operation control of Electric Machines	AES	Alternative Energy Sources	MAI	Methods & Algorithms for Intelligent Control
	FPE	Fundamentals of Power Electronics	EPGDS	Electric Power Generation & Distribution Systems	HEV	Hybrid Electric Vehicles
	EMI	Electrical Measurements & Instrumentation	UEE	Utilization of Electrical Energy	SEM ES	Special Electric Machines Electrical Safety
ME	BME	Basic Mechanical Engineering	ETD	Engineering Thermodynamics	TOM	Theory of Machines
			IAE	Introduction to Automobile Engineering	AEM	Advanced Engineering Metrology
			MOS	Mechanics of Solids		
			HPE	Heat Power Engineering		
			PT	Production Technology		
			MMS	Metallurgy & Material Science		
			R&AC	Refrigeration & Air Conditioning		
ECE	FC	Fundamentals of Communications	ADC	Analog & Digital Circuits	IIT	Introduction to Internet of things
	FSP	Fundamentals of Signal Processing	LDIC	Linear & Digital IC Applications		
			SA	Sensors & Actuators		
CSE			EM	Embedded Microcontrollers	MWC	Modern Wireless Communications
			DSD	Digital System Design		
			WLAN& PAN	Wireless LANS & PANS		
			ASE	Agile Software Engineering	AMSD	Advanced MERN Stack Development
			OOP	Object Oriented Programming through C++		
		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
DS			NSQL	NoSQL Databases	SNSW	Social Networks and Semantic Web
			BIA	Business Intelligence & Analytics		
			HCDA	Health Care Data Analysis		
			ML	Machine Learning	DV	Data Visualization
			AI	Artificial Intelligence	PEG	Prompt Engineering and GenAI
AIML			AI C	AI Chatbot	SNA	Social Network Analysis
			FDS	Fundamentals of Data Science	FML	Federated Machine Learning
			SC	Soft Computing	NLP	Natural Language Processing
			SM	Surface Mining	MLGS	Mine Legislation and General Safety
Min. E	DMD	Development of Mineral Deposits	UCMT	Underground Coal Mining Technology	EPC	Environmental Pollution & Control
	GM	Green Mining	UMMT	Underground Metal Mining Technology	ISP	Industrial Safety Practices
			DB	Drilling & Blasting	GC	Ground Control
	IPE	Introduction to Petroleum Engineering	FGRE	Fundamentals of Geology and Reservoir Engineering	PRE	Petroleum Refinery Engineering
PT	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
	GWH	Ground Water Hydrology	LWME	Land and Water Management	ALT	Artificial Lift Techniques
	PHECC	Post-harvest Engineering of Cereal Crops	SWH	Surface Water Hydrology	EOR	Enhanced Oil Recovery
Ag. E			MIE	Micro Irrigation Systems	DBS	Design of Bio-Energy Systems
	FRES	Fundamentals of Renewable Energy Sources			PHEHP	Post-Harvest Engineering for Horticultural Produce
					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		