PROGRAM CURRICULUM

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

(in Collaboration with Microsoft)

for

B. TECH. FOUR YEAR DEGREE PROGRAM

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

ADITYA UNIVERSITY

Aditya Nagar, ADB Road, Surampalem - 533 437

ADITYA UNIVERSITY

B.Tech. in Department of Artificial Intelligence and Machine Learning

VISION

To be a leading hub in Artificial Intelligence through excellence in education, innovation, and sustainable practices.

MISSION

M1: Deliver cutting-edge AI education with advanced tools, techniques, and industry collaboration to address global challenges.

M2: Nurture creativity, research, and lifelong learning for personal and professional excellence.

M3: Promote ethical leadership and sustainability to build a responsible AI ecosystem.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Apply emerging tools and technologies to solve interdisciplinary problems.

PEO2: Advance in education and research by applying innovative ideas and project-based learning.

PEO3: Work collaboratively and establish leadership with ethical, social, and financial accountability.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Apply core engineering, computing principles, AI and programming skills to develop efficient software solutions.

PSO2: Utilize emerging technologies to solve real-world challenges in industry and society with innovation and responsibility.

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 Artificial Intelligence and Machine Learning

B.Tech (AI&ML) in Collaboration with Microsoft
Program Curriculum-2025
(Applicable for the batches admitted from the A.Y.2025-26)

UG Programs Offered

- B. Tech in (Artificial Intelligence and Machine Learning)
- Minor Stream offered in B.Tech (Artificial Intelligence and Machine Learning) in Analytics and Security - Collaboration with Microsoft
- B. Tech in (Artificial Intelligence and Machine Learning) 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 Petroleum Technology
  - Minor degree in Mining Engineering
  - Minor degree in Agricultural Engineering
  - Minor degree in Entrepreneurship Development and Incubation
  - Minor degree in Quantum Technologies

Credit Division Category-wise

S.No	Broad Category of Course	UGC	Credits
1	Major Core Courses (MCC)	80	85
2	Minor Stream Courses (MSC)	32	32
3	Multidisciplinary Courses (MDC)	9	9
4	Ability Enhancement Courses (AEC)	8	9
5	Skill Enhancement Courses (SEC)	9	5
6	Value Added Courses (VAC)	6-8	4
7	Summer Internships (SI)	2-4	4
8	Full Semester Internship (PROJ)	12	12
9	Mandatory Courses (MC)		0
10	Certification Courses (CC)		0
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
2501MA01	Linear Algebra & Calculus	**FC**	2	1		3	50	50	100	-
2501MA02	Differential Equations & Vector Calculus	**FC**	2	1		3	50	50	100	-
2501CS71	Computer Organization & Architecture	**FC**	2	1		3	50	50	100	DLD
2501PH02	Modern Physics	**FC**	2		1	3	50	50	100	-
2501ME01	Engineering Graphics	**FC**	1		2	3	50	50	100	-
2501IT42	Programming with Python	**FC**	2		2	4	50	50	100	PPSC
2501CS01	Programming for Problem Solving using C	**FC**	2		2	4	50	50	100	-
2501CS03	Data Structures	**FC**	2		2	4	50	50	100	PPSC
2501IT01	Business Intelligence Lab	**FC**			2	2	50	50	100	-
2501MA08	Discrete Mathematics	IC	2	1		3	50	50	100	LAC
2501MA09	Probability & Statistics	IC	2	1		3	50	50	100	LAC
2501AI02	Artificial Intelligence	IC	2		1	3	50	50	100	-
2501CS08	Object Oriented Proramming through C++	IC	2		2	4	50	50	100	PPSC
2501IT05	Database Management Systems	IC	2		2	4	50	50	100	PPSC
2501AI03	Data Mining	IC	1		2	3	50	50	100	-
2501IT06	Java Programming	IC	2		2	4	50	50	100	PPSC
2501CS09	Language Processors	IC	2	1		3	50	50	100	PPSC
2501IT07	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
2501CS13	Operating Systems	IC	2		1	3	50	50	100	-
2501CS07	Computer Networks	IC	2		1	3	50	50	100	-
2501AI05	Machine Learning	IC	2		2	4	50	50	100	DAE
2501CS10	Advanced Data Structures & Algorithm Analysis	AC	2		1	3	50	50	100	DS
2501AI11	Deep Learning	AC	2		2	4	50	50	100	DAE
2501AI20	Natural Language Processing & Prompt Engineering	AC	1		2	3	50	50	100	ML
2501AI21	Reinforcement Learning & Gen AI	AC	1		2	3	50	50	100	ML
2501AI04	Big Data Analytics	AC	2		1	3	50	50	100	DM
Total			**46**	**6**	**33**	**85**				

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	-
2501EC95	Digital Logic Design	**FC**	2	1		3	50	50	100	-
2501MB01	Engineering Economics & Management	**FC**	2			2	50	50	100	-
Total			**6**	**1**	**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	Advanced Cognitive Skills for Engineers	**FC**			1	1	100	-	100	ECSE-I
2501UC07	Design Thinking	**FC**			1	1	100	-	100	-
2501UC08	Universal Human Values	**FC**	2			2	100	-	100	-
2501UC09	Technical Paper Publication	AC			2	2	100	-	100	-
2501AI35	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
2501CS17	Object Oriented Analysis & Design using UML	IC			2	2	50	50	100	ASE
2501AI34	Web Application Development using MERN Stack	AC			2	2	50	50	100	-
2501CS19	CI/CD using DevOps	AC			1	1	100	-	100	-
Total					**5**	**5**				

Value Added Courses (VAC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CS04	Internet of Things	**FC**			1	1	50	50	100	-
2501AI06	Data Analysis Essentials	IC			2	2	50	50	100	PP
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
2501AI22	Summer Internship-I	IC			2	2	100	-	100	-
2501AI23	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
2501AI25	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: Analytics and Security (In Collaboration with Microsoft)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501AI36	Network Security Essentials	FC	2			2	50	50	100	-
2501AI37	Introduction to System Design	IC	2		1	3	50	50	100	-
2501AI38	Introduction to Generative AI	IC	2		1	3	50	50	100	-
2501AI39	Cloud Security Essentials	IC	2		1	3	50	50	100	-
2501AI40	Cyber Security Essentials	IC	2		1	3	50	50	100	-
2501AI41	Fundamentals of Block Chain	IC	2		1	3	50	50	100	-
2501AI42	AI for Cyber Threat Intelligence	IC	2		1	3	50	50	100	-
2501AI43	Generative Adversarial Networks Fundamentals	AC	2		1	3	50	50	100	-
2501AI44	AI in Healthcare Security	AC	2		1	3	50	50	100	-
2501AI45	Advanced Topics in Generative AI	AC	2		1	3	50	50	100	-
2501AI46	Ethical AI and Responsible Computing	AC	2		1	3	50	50	100	-
Total					**32**	**32**				

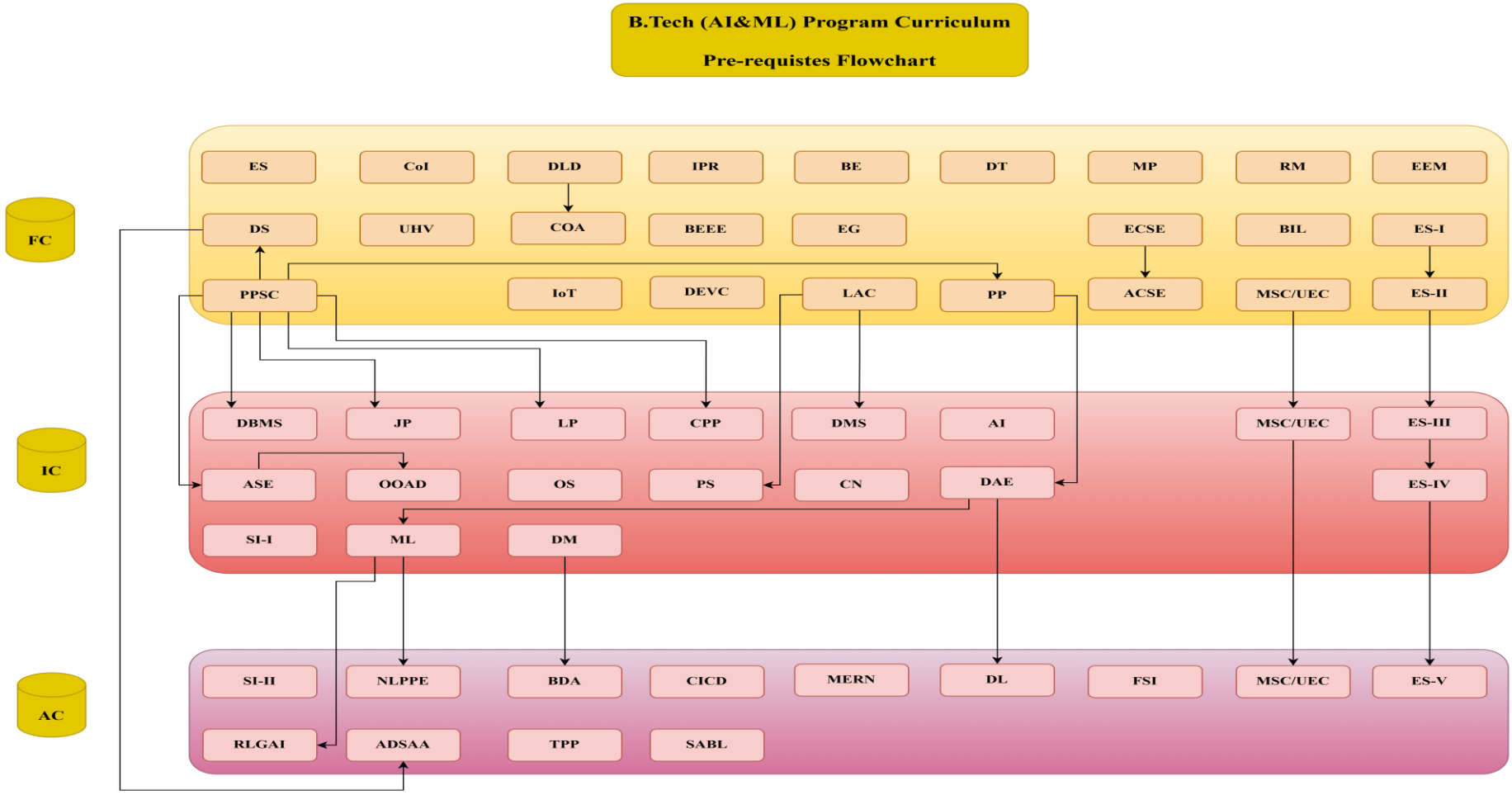
Certification Courses

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
	Project Based Learning – Certification AZ-900 : Microsoft Azure Fundamentals	AC			2					-
	Project Based Learning - Certification AI-901: Azure AI Fundamentals	AC			2					-
	Project Based Learning - Certification DP-900: Azure Data Fundamentals	AC			2					-
	Project Based Learning - Certification AI-103: Azure AI App and Agent Developer	AC			2					-
	Project Based Learning - Certification AI-300: Azure MLOps Engineer	AC			2					-
	Project Based Learning - Certification AI-200: Azure AI Cloud Developer	AC			2					-
	Project Based Learning - Certification DP-800: Azure SQL AI Developer Associate	AC			2					-
Total					**14**					

Foundation Courses (FC)					
Course Title	**Category**	**L**	**T**	**P**	**C**
Linear Algebra & Calculus	MCC	2	1		3
Differential Equations & Vector Calculus	MCC	2	1		3
Computer Organization & Architecture	MCC	2	1		3
Modern Physics	MCC	2		1	3
Engineering Graphics	MCC	1		2	3
Programming with Python	MCC	2		2	4
Programming for Problem Solving Using C	MCC	2		2	4
Data Structures	MCC	2		2	4
Business Intelligence Lab	MCC			2	2
Basic Electrical & Electronics Engineering	MDC	2		2	4
Digital Logic Design	MDC	2	1		3
Engineering Economics & Management	MDC	2			2
Essential Cognitive Skills for Engineers	AEC			1	1
Advanced Cognitive Skills for Engineers	AEC			1	1
Design Thinking	AEC			1	1
Universal Human Values	AEC	2			2
Internet of Things	VAC			1	1
Employability Skills-I	VAC			3	0
Employability Skills-II	VAC			3	0
Environmental Science	MC	2			0
Constitution of India	MC	2			0
Research Methodology	MC	2			0
Intellectual Property Rights & Patents	MC	2			0
Biology for Engineers	MC	2			0
Courses from Minor Stream(s)	MSC				3

Intermediate-Level Courses (IC)					
Course Title	**Category**	**L**	**T**	**P**	**C**
Discrete Mathematics	MCC	2	1		3
Probability & Statistics	MCC	2	1		3
Artificial Intelligence	MCC	2		1	3
Object Oriented Proramming through C++	MCC	2		2	4
Database Management Systems	MCC	2		2	4
Data Mining	MCC	1		2	3
Java Programming	MCC	2		2	4
Language Processors	MCC	2	1		3
Agile Software Engineering	MCC	2		1	3
Operating Systems	MCC	2		1	3
Computer Networks	MCC	2		1	3
Machine Learning	MCC	2		2	4
Object Oriented Analysis & Design using UML	SEC			2	2
Data Analysis Essentials	VAC			2	2
Employability Skills-III	VAC			3	0
Employability Skills-IV	VAC			3	0
Summer Internship – I	SI			2	2
Courses from Minor Stream(s)	MSC				3

Advanced Courses (AC)					
Course Title	**Category**	**L**	**T**	**P**	**C**
Advanced Data Structures & Algorithm Analysis	MCC	2		1	3
Deep Learning	MCC	2		2	4
Natural Language Processing & Prompt Engineering	MCC	1		2	3
Reinforcement Learning & Gen AI	MCC	1		2	3
Big Data Analytics	MCC	2		1	3
Technical Paper Publication	AEC			2	2
Student Activity Based Learning	AEC				2
Web Application Development using MERN Stack	SEC			2	2
CI/CD using DevOps	SEC			1	1
Employability Skills-V	VAC			3	1
Summer Internship – II	SI			2	2
Full Semester Internship	PROJ			12	12
Courses from Minor Stream(s)	MSC				3


B.Tech (AI&ML) Program Curriculum
Pre-requistes Flowchart
FC
IC
AC
ES
CoI
DLD
IPR
BE
DT
MP
RM
EEM
DS
UHV
COA
BEEE
EG
ECSE
BIL
ES-I
PPSC
IoT
DEVC
LAC
PP
ACSE
MSC/UEC
ES-II
DBMS
JP
LP
CPP
DMS
AI
MSC/UEC
ES-III
ASE
OOAD
OS
PS
CN
DAE
ES-IV
SI-I
ML
DM
SI-II
NLPPE
BDA
CICD
MERN
DL
FSI
MSC/UEC
ES-V
RLGAI
ADSAA
TPP
SABL

FC-Foundation Courses

ES-Environmental Science
CoI-Constitution of India
DLD-Digital Logic Design
IPR- Intellectual Property Rights & Patents
BE- Biology for Engineers
DT- Design Thinking
MP- Modern Physics
RM-Research Methodology
EEM- Engineering Economics & Management
DS- Data Structures
UHV- Universal Human Values
COA- Computer Organization & Architecture
BEEE- Basic Electrical & Electronics Engineering
EG- Engineering Graphics
ECSE- Essential Cognitive Skills for Engineers
ITAI- Business Intelligence Lab
ES-I- Employability Skills-I
PPSC- Programming for Problem Solving Using C
IoT- Internet of Things
DEVC- Differential Equations & Vector Calculus
LAC- Linear Algebra & Calculus
PP- Programming with Python
ES-II-Employability Skills-II

IC-Intermediate-Level Courses

DBMS- Database Management Systems
JP- Java Programming
LP- Language Processors
CPP-Object Oriented programming through C++
DMS- Discrete Mathematics
AI- Artificial Intelligence
ES-III- Employability Skills-III
ASE- Agile Software Engineering
OOAD- Object Oriented Analysis & Design using UML
OS- Operating Systems
PS- Probability & Statistics
CN- Computer Networks
DAE- Data Analysis Essentials
ACSE-Advanced Cognitive Skills for Engineers
ES-IV-Employability Skills-IV
SI-1- Summer Internship – I
ML- Machine Learning
DM- Data Mining

AC-Advanced Courses

SI-II- Summer Internship – II
NLPPE- Natural Language Processing & Prompt Engineering
BDA- Big Data Analytics
CI/CD- CI/CD using DevOps
MERN- Web Application Development using MERN Stack
DL- Deep Learning
FSI- Full Semester Internship
ES-V-Employability Skills-V
RLGAI- Reinforcement Learning & Gen AI
ADSAA- Advanced Data Structures & Algorithm Analysis
TPP- Technical Paper Publication
SABL-Student Activity Based Learning

MSC- Minor Stream Courses

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
2501CS01	Programming for Problem Solving Using C	MCC	FC	2		2	4	6
2501IT01	Business Intelligence Lab	MCC	FC			2	2	4
2501EC95	Digital Logic Design	MDC	FC	2	1		3	4
2501EE01	Basic Electrical & Electronics Engineering	MDC	FC	2		2	4	6
2501EN01	Essential Cognitive Skills for Engineers	AEC	FC			1	1	2
2501UC08	Universal Human Values	AEC	FC	2			2	2
	Project Based Learning – Certification AZ-900 : Microsoft Azure Fundamentals	CC	FC			2	0	4
Total				**10**	**2**	**9**	**19**	**31**

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
2501PH02	Modern Physics	MCC	FC	2		1	3	4
2501CS03	Data Structures	MCC	FC	2		2	4	6
2501ME01	Engineering Graphics	MCC	FC	1		2	3	5
2501CS71	Computer Organization & Architecture	MCC	FC	2	1		3	3
2501IT42	Programming with Python	MCC	IC	2		2	4	6
2501EN02	Advanced Cognitive Skills for Engineers	AEC	FC			1	1	2
2501UC07	Design Thinking	AEC	FC			1	1	2
2501UC11	Employability Skills-I	VAC	FC			3	0	*6*
2501AC01	Environmental Science	MC	FC	2			0	2
	Project Based Learning - Certification AI-901: Azure AI Fundamentals	CC	FC			2	0	4
Total				**13**	**2**	**14**	**22**	**43**

III SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501MA09	Probability & Statistics	MCC	IC	2	1		3	3
2501CS10	Advanced Data Structures & Algorithm Analysis	MCC	AC	2		1	3	4
2501AI02	Artificial Intelligence	MCC	IC	2		1	3	4
2501CS08	Object Oriented Programming through C++	MCC	IC	2		2	4	6
2501IT05	Database Management Systems	MCC	IC	2		2	4	6
2501IT07	Agile Software Engineering	MCC	IC	2		1	3	4
2501AI06	Data Analysis Essentials	VAC	IC			2	2	4
2501UC13	Employability Skills-II	VAC	FC			3	0	*6*
2501AC02	Constitution of India	MC	FC	2			0	*2*
	Project Based Learning - Certification DP-900 : Azure Data Fundamentals	CC	IC			2	0	4
Total				**14**	**1**	**14**	**22**	**43**

IV SEMESTER

Course Code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501MA08	Discrete Mathematics	MCC	IC	2	1		3	3
2501AI03	Data Mining	MCC	IC	1		2	3	5
2501IT06	Java Programming	MCC	IC	2		2	4	6
2501CS13	Operating Systems	MCC	IC	2		1	3	4
2501AI36	Minor Stream Course-1 Network Security Essentials	MSC	FC	2			2	2
2501AI37	Minor Stream Course-2 Introduction to System Design	MSC	FC	2		1	3	4
2501AI34	Web Application Development using MERN Stack	SEC	AC			2	2	4
2501UC14	Employability Skills-III	VAC	FC			3	0	6
2501AC03	Research Methodology	MC	FC	2			0	*2*
	Project Based Learning - Certification AI-103 : Azure AI App and Agent Developer	CC	IC			2	0	4
Total				**13**	**1**	**13**	**20**	**40**

V SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501CS07	Computer Networks	MCC	IC	2		1	3	4
2501AI05	Machine Learning	MCC	IC	2		2	4	6
2501AI38	Minor Stream Course-3 Introduction to Generative AI	MSC	IC	2		1	3	4
2501AI39	Minor Stream Course-4 Cloud Security Essentials	MSC	IC	2		1	3	4
2501AI40	Minor Stream Course-5 Cyber Security Essentials	MSC	IC	2		1	3	4
2501MB01	Engineering Economics & Management	MDC	FC	2			2	2
2501CS17	Object Oriented Analysis & Design using UML	SEC	IC			2	2	2
2501UC15	Employability Skills-IV	VAC	FC			3	0	6
2501AI22	Summer Internship-I	SI	IC			2	2	4
2501AC04	Intellectual Property Rights & Patents	MC	FC	2			0	*2*
	Project Based Learning - Certification AI-300 : Azure MLOps Engineer	CC	IC			2	0	4
Total				**14**	**0**	**15**	**22**	**42**

VI SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501AI11	Deep Learning	MCC	AC	2		2	4	6
2501AI20	Natural Language Processing & Prompt Engineering	MCC	AC	1		2	3	5
2501CS09	Language Processors	MCC	IC	2	1		3	3
2501AI41	Minor Stream Course-6 Fundamentals of Block Chain	MSC	IC	2		1	3	4
2501AI42	Minor Stream Course-7 AI for Cyber Threat Intelligence	MSC	IC	2		1	3	4
2501AI43	Minor Stream Course-8 Generative Adversarial Networks Fundamentals	MSC	IC	2		1	3	4
2501CS19	CI/CD using DevOps	SEC	AC			1	1	2
2501CS04	Internet of Things	VAC	FC			1	1	2
2501AC05	Indian Knowledge Systems	MC	FC	2			0	*2*
	Project Based Learning - Certification AI-200 : Azure AI Cloud Developer	CC	AC			2	0	4
Total				**13**	**1**	**11**	**21**	**36**

VII SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501AI21	Reinforcement Learning & Gen AI	MCC	AC	1		2	3	5
2501AI04	Big Data Analytics	MCC	AC	2		1	3	4
2501AI44	Minor Stream Course-9 AI in Healthcare Security	MSC	AC	2		1	3	4
2501AI45	Minor Stream Course-10 Advanced Topics in Generative AI	MSC	AC	2		1	3	4
2501AI46	Minor Stream Course-11 Ethical AI and Responsible Computing	MSC	AC	2		1	3	4
2501AI23	Summer Internship-II	SI	AC			2	2	4
	Project Based Learning - Certification DP-800: Azure SQL AI Developer Associate	CC	AC			2	0	4
Total				**9**	**0**	**10**	**17**	**29**

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	FC			3	1	**6**
2501AI35	Student Activity Based Learning	AEC	AC				2	4
2501AI25	Full Semester Internship	PROJ	AC			12	12	24
Total				**0**	**0**	**17**	**17**	**38**

Total Credit: 160.

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

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 2501CE47	Railway Engineering (or) Docks & Harbour Engineering	FC	3			3	50	50	100	-
2501CE36 2501CE37	Environmental Impact & Risk Management (or) Environmental Management	IC	3			3	50	50	100	-
2501CE56 2501CE49	Urban Transportation Planning (or) Intelligent Transportation Systems.	IC	3			3	50	50	100	-
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 & Distribution Systems	IC	3			3	50	50	100	ENA-1/BEEE
2501EE34 2501EE27	Alternative Energy Sources (or) Utilization of Electrical Energy	IC	3			3	50	50	100	EPGDS/ BEEE/ ISM
2501EE37 2501EE35	Hybrid Electric Vehicles (or) Special Electric machines	AC	3			3	50	50	100	FPE/ OCEM
2501EE43	Electrical Safety (or)	AC	3			3	50	50	100	EPGDS/ PSA

2501EE30	Methods & Algorithms for Intelligent Control									
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	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
2501EC87	Fundamentals of Communications	FC	2		1	3	50	50	100	-
2501EC88	Fundamentals of Signal Processing	FC	2		1	3	50	50	100	-
2501EC89	Analog & Digital Circuits	IC	2			2	50	50	100	BEEE
2501EC42	Wireless LAN's & PAN's	IC	2	1	0	3	50	50	100	-
2501EC90	Linear & Digital IC Applications (or) Sensors & Actuators	IC	3			3	50	50	100	ADC
2501EC91										
2501EC92	Embedded Microcontrollers (or) Digital System Design	IC	2		1	3	50	50	100	ADC, PPSC
2501EC93										
2501EC67	Introduction to Internet of things (or) Modern Wireless Communications	AC	2		1	3	50	50	100	EM, WLAN's& PAN's
2501EC74			3			3	50	50	100	FC
TOTAL			15	1	4	20				

Minor Degree in Petroleum Technology

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		2			2				
2501PT49	Natural Gas Hydrates (or)	AC	2			2	50	50	100	-
2501PT05	Fundamentals of Liquefied Natural Gas		2			2				
2501PT50	Artificial Lift Techniques (or)	AC	3			3	50	50	100	-
2501PT03	Enhanced Oil Recovery		2	1						
2501PT12	Petroleum Refinery Engineering	AC	2		2	4	50	50	100	-
TOTAL			**17**	**1**	**2**	**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			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			3	50	50	100	
2501AE83	Post-harvest Engineering of Cereal Crops	FC	3			3	50	50	100	
2501AE84	Ground Water Hydrology	FC	3			3	50	50	100	
2501AE85	Micro Irrigation Systems	IC	2			2	50	50	100	
2501AE86	Surface Water Hydrology (or) Land & Water Management Engineering	IC	3			3	50	50	100	GWH
2501AE87										
2501AE88	Agricultural Process Engineering & Food Quality (or) Post-harvest Engineering for Horticultural Produce	AC	3			3	50	50	100	PHECC
2501AE89										
2501AE90	Agricultural Machinery & Equipment (or) Design of Bio-energy systems	AC	3			3	50	50	100	FRES
2501AE91										
TOTAL			**20**			**20**				

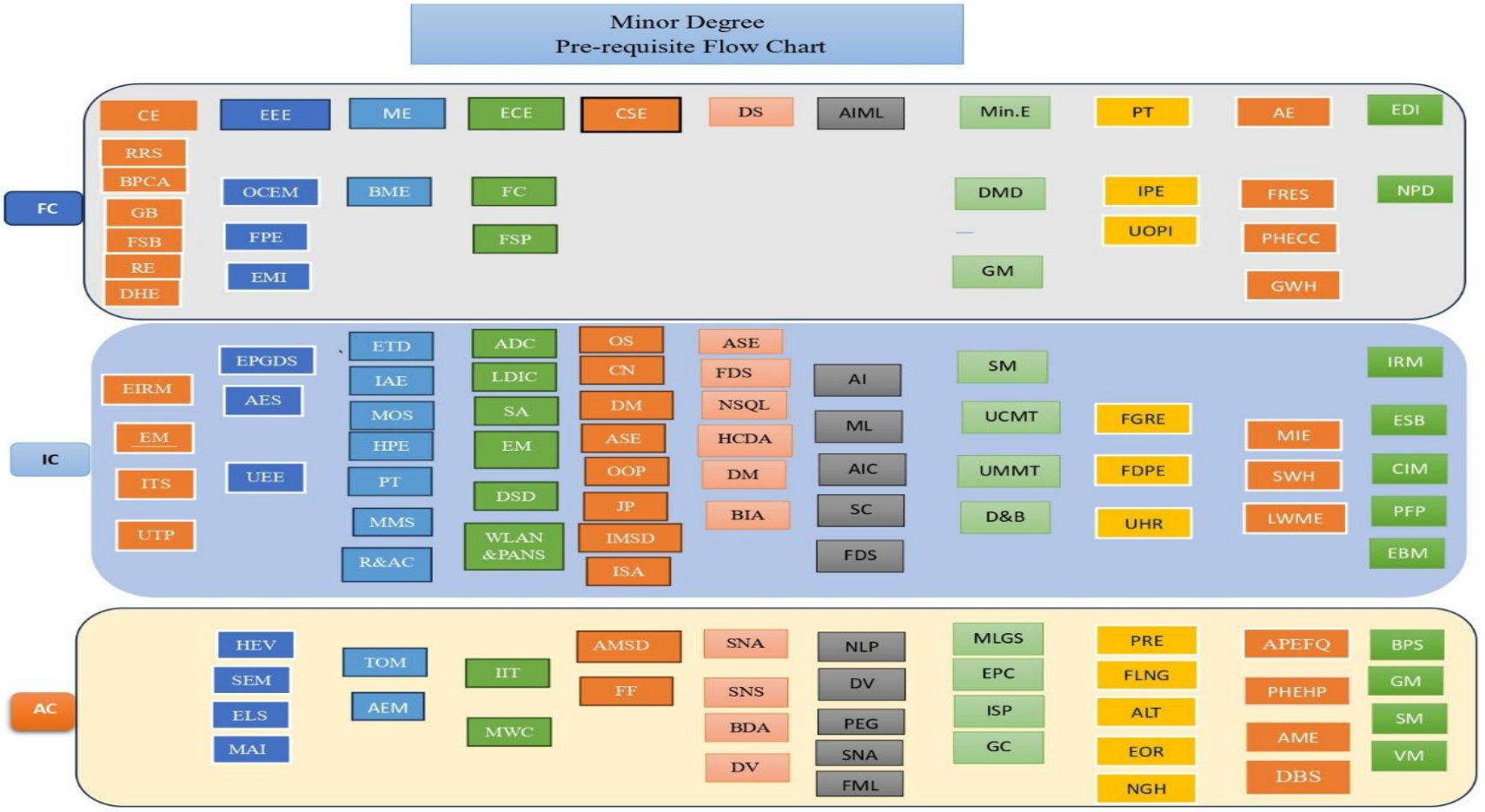
Minor Degree in Entrepreneurship Development & Incubation

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	Personal Financial Planning (or) E-Business management	IC	3			3	50	50	100	-
2501MB12										
2501MB13	Business Policy & Strategic Management (or) Green Marketing	AC	3			3	50	50	100	-
2501MB14										
2501MB15	Startup Management (or) Venture Management	AC	3			3	50	50	100	-
2501MB16										

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
RRS
BPCA
GB
FSB
RE
DHE
EEE
OCEM
FPE
EMI
ME
BME
ECE
FC
FSP
CSE
DS
AIML
Min.E
DMD
GM
PT
IPE
UOPI
AE
FRES
PHECC
GWH
EDI
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	
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	Railway Engineering				
	DHE	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	Special Electric Machines
					ES	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
			LDIC	Linear & Digital IC Applications		
			SA	Sensors & Actuators		
	FSP	Fundamentals of Signal Processing	EM	Embedded Microcontrollers	MWC	Modern Wireless Communications
			DSD	Digital System Design		
			WLAN &PAN	Wireless LANS & PANS		
CSE			ASE	Agile Software Engineering	WADMS	Web Application Development using MERN Stack
			OOP	Object Oriented Programming through C++		
			OS	Operating Systems	FF	Flutter Fundamentals
			CN	Computer Networks		
			JP	Java Programming		
			PC++	Programming with C++		
			ISA	Information Security Analysis and Audit		
			DM	Data Mining		
DS			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
					NGH	Natural Gas Hydrates
			UHR	Unconventional Hydrocarbon Resources	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
			MIE	Micro Irrigation Systems		
	FRES	Fundamentals of Renewable Energy Sources			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		