SHIV NADAR
INSTITUTION OF EMINENCE DEEMED TO BE UNIVERSITY
DELHI NCR

BTech
Chemical Engineering

Proposed Curriculum (2025 onwards)

Total credits – 163

Credit breakup

- **Core – 82**
- **Electives – 21**
- **Experiential Learning – 8**
- **CCC/UWE – 40**
- **Project – 12**

Specializations offered – (Applicable for 2025 batch onwards)

- **Modelling and Simulation**
- **Bioenergy and Biomaterials**

Program Structure | Chemical Engineering

Semester 1 (20 credits)				
Course Code	Title	Credits	Category	Prerequisites
PHY1001	Fields, Waves & Quanta	5	Core	None
MAT1001	Multivariate Calculus	4	Core	None
CSD1001	Problem solving using Programming	4	Core	None
ECE1001	The Electron's Path: Fundamentals of EEE	3	Core	None
SOE1001	Introduction to Engineering: Ideas to Impact	2	Core	None
ECB1001	Nature's Code: Chemistry & Biology	2	Core	None

Semester 2 (18 credits)				
Course Code	Title	Credits	Category	Prerequisites
TBA	Linear Systems and Transforms	4	Core	None
TBA	Forces in Action	3	Core	None
TBA	The Matter of Materials	2	Core	None
TBA	Connected Intelligence: Sensors and IoT	3	Core	None
TBA	Design to Reality: CAD & 3D Printing	2	EL	None
CCC704	Envt. & Sustainability (guided CCC)	4	CCC	None

Semester 3 (21 credits)				
Course Code	Title	Credits	Category	Prerequisites
CHD2001	Material & Energy Balance	4	Core	MAT1001 and Linear Systems and Transforms
CHD2002	Chemical Eng. Thermodynamics	4	Core	None
CHD2003	Fluid Mechanics	3	Core	None
CHD2004	Mechanical Operations	2	Core	None
	Data Structures & Algorithms	4	Core	None
	UWE/CCC	4	U/C	

Semester 4 (24 credits)				
Course Code	Title	Credits	Category	Prerequisites
CHD20xx	Introduction to Chem. Engg. Software	2	Core	None
CHD2005	Heat Transfer	3	Core	CH2003
CHD2006	Numerical Methods	3	Core	MAT1001 and Linear Systems and Transforms
	Elective from Pool 1/2	3	Elective	None

	Elective from Pool 3	3	Elective	None
CHD4001	Fluid Mechanics Laboratory	1	Core	CHD2003
CHD4002	Mechanical Operations Laboratory	1	Core	CHD2004
	Applied Linear Algebra (guided UWE)	4	U/C	
	UWE/CCC	4	U/C	

Semester 5 (23 credits)				
Course Code	Title	Credits	Category	Prerequisites
CHD3001	Chemical Reaction Engineering	4	Core	CHD2001
CHD3002	Mass Transfer	4	Core	CHD2003
	Artificial Intelligence & Machine Learning	4	Core	None
CHD3003	Process Dynamics & Control	3	Core	CHD2001
	Elective from Pool 1/2/3	3	Elective	
CHD4003	Heat Transfer Laboratory	1	Core	CHD2005
	UWE/CCC	4	U/C	

Semester 6 (24 credits)				
Course Code	Title	Credits	Category	Prerequisites
CHD3004	Transport Phenomena	3	Core	CHD2003
Major Elective	Elective from Pool 1/2	3	Elective	
Major Elective	Elective from Pool 3	3	Elective	
CHD3005	Chemical Technology	3	Core	CHD3001
CHD4004	Mass Transfer Laboratory	1	Core	CHD3002
CHD4005	Process Dynamics & Control Laboratory	1	Core	CHD3003
	Experiential Learning - I	2	EL	
	Natural Gas Engineering (guided UWE)	3	U/C	
	UWE/CCC	5	U/C	

Semester 7 (21 credits)				
Course Code	Title	Credits	Category	Prerequisites
CHD4006	Chemical Reaction Eng. Laboratory	1	Core	CHD3001
	Elective from Pool 1/2	3	Elective	
	Elective from Pool 3	3	Elective	
	Experiential Learning - II	2	EL	
CHD4901	Minor Project	6	P/T/I	
	UWE/CCC	6	U/C	

Semester 8 (12 credits)				
Course Code	Title	Credits	Category	Prerequisites
CHD4902	Major Project	6	P/T/I	CHD2xxx, CHD3xxx, CHD4xxx
	CCC/UWE	6	U/C	

List of Courses

List of courses in Experiential Learning category

Course code	Title	Credits	Semester	Prerequisites
SOE1001	Introduction to Engineering: Ideas to Impact	2	1	None
	Design to Reality: CAD & 3D Printing	2	2	None
CHD4801	Experiential Learning – I (Career dev.)	2	6	None
CHD4802	Experiential Learning - II (Career dev.)	2	7	None
	Total:	8		

List of courses in Core category

Course code	Title	Credits	Semester	Prerequisites
CHD2001	Material & Energy Balance *	3:0:1	3rd	MAT1001 and Linear Systems and Transforms
CHD2002	Chemical Eng. Thermodynamics *	3:1:0	3rd	None
CHD2003	Fluid Mechanics *	3:0:0	3rd	None
CHD2004	Mechanical Operations	2:0:0	3rd	None
	Data Structures & Algorithms	3:0:1	3rd	None
CHD20xx	Introduction to Chem. Engg. Software	0:0:2	4th	None
CHD2005	Heat Transfer *	3:0:0	4th	CH2003
CHD2006	Numerical Methods	3:0:0	4th	MAT1001 and Linear Systems and Transforms
CHD3001	Chemical Reaction Engineering *	3:1:0	5th	CHD2001
CHD3002	Mass Transfer *	3:1:0	5th	CHD2003
	Artificial Intelligence & Machine Learning	3:0:1	5th	None
CHD3003	Process Dynamics & Control	3:0:0	5th	CHD2001
CHD3004	Transport Phenomena	3:0:0	6th	CHD2003
CHD3005	Chemical Technology	3:0:0	6th	CHD3001
CHD4001	Fluid Mechanics Laboratory	0:0:1	4th	CHD2003
CHD4002	Mechanical Operations Laboratory	0:0:1	4th	CHD2004
CHD4003	Heat Transfer Laboratory	0:0:1	5th	CHD2005
CHD4004	Mass Transfer Laboratory	0:0:1	6th	CHD3002
CHD4005	Process Dynamics & Control Laboratory	0:0:1	6th	CHD3003
CHD4006	Chemical Reaction Eng. Laboratory	0:0:1	7th	CHD3001

List of electives:

Course code	Title	Credits	Prerequisites
Pool 1 – Modelling and Simulation Specialization (12 credits)			
CHD3301	Introduction to Modelling and Simulation	3:0:0	
CHD3303	Computational Fluid Dynamics	2:0:1	
CHD4201	Mod. & Sim. of Engineering Systems	3:0:0	
CHD4203	Molecular Simulation	3:0:0	
Pool 2 – Bioenergy and Biomaterials Specialization (12 credits)			
CHD3302	Waste to Biomaterials	3:0:0	
CHD3304	Biochemical Conversion to Bioenergy	3:0:0	
CHD4202	Thermochemical Conversion to Bioenergy	2:0:1	
CHD4204	Microreactor Tech. for Biofuel Production	3:0:0	
Pool 3 – Common Pool (9 credits compulsory from this pool)			
CHD4205	Advanced Chemical Engineering Thermo.	3:0:0	
CHD4206	Petroleum Refining Operations	3:0:0	
CHD4207	Process Equipment Design	3:0:0	
CHD4208	Nanocatalyst Synth. & Characterisation	3:0:0	
CHD4209	Process Engineering	3:0:0	
CHD4210	Process Safety	3:0:0	

Areas of Specialization

The students enrolled in B. Tech. Chemical Engineering (4 year) would have an option to specialize in one the following emerging areas-

1. Modelling and Simulation
2. Bioenergy and Biomaterials

Minimum Requirement for Specialization:
Suggested CGPA -
The student must complete minimum of 12 credits from the list of elective courses from the chosen specialization bucket.
At the time of graduation (end of 8th semester before convocation), students who have completed the specialization requirement may apply for a specialization in CHD to UG advisor for further processing.
A student can apply for a specialization in only one of the mentioned areas.

List of Elective courses in specialization buckets - Modelling and Simulation

Course code	Title	Credits	Prerequisites
CHD3301	Introduction to Modelling and Simulation	3:0:0	
CHD3303	Computational Fluid Dynamics	2:0:1	
CHD4201	Mod. & Sim. of Engineering Systems	3:0:0	
CHD4203	Molecular Simulation	3:0:0	

List of Elective courses in specialization buckets - Bioenergy and Biomaterials

Course code	Title	Credits	Prerequisites
CHD3302	Waste to Biomaterials	3:0:0	
CHD3304	Biochemical Conversion to Bioenergy	3:0:0	
CHD4202	Thermochemical Conversion to Bioenergy	2:0:1	
CHD4204	Microreactor Tech. for Biofuel Production	3:0:0	

Areas of Interdisciplinary Specialization

The students enrolled in B. Tech. Chemical Engineering (4 year) would have an option to specialize in one the following interdisciplinary areas-

1. Computational Mechanics

Minimum Requirement for Specialization:
Suggested CGPA -
The student must complete minimum of 12 credits from the list of elective courses from the chosen specialization bucket.
At the time of graduation (end of 8th semester before convocation), students who have completed the specialization requirement may apply for a specialization in CHD to UG advisor for further processing.
A student can apply for a specialization in only one of the mentioned areas.

List of Elective courses in specialization buckets – Computational Mechanics

Prerequisites –

Course code	Title	Compulsory (Yes/No)	Offering Department
	Modelling and Simulation for Engineering System	Yes	CHE/CED/MED
MED3XX/MED410	Finite element Method/ Computational Fluid Dynamics	Yes	MED
MED3XX	Fracture Mechanics	No	MED
	Continuum Mechanics	No	
CHD4203	Molecular Simulation	No	CHD
MED4XX	Advance Mechanics of Composite	NO	MED
	Optimization methods for Engineering Process & Design	NO	
	Multi Phase Flow	NO	