

B.TECH. PROGRAMME

CHEMICAL ENGINEERING

CURRICULUM

for 2015 admissions onwards

CURRICULUM

B. Tech - Chemical Engg.

2015 admissions onwards

GENERAL INFORMATION

Code Numbering:

Each course is assigned an 8-character Code number. The first two digits indicate the year of curriculum revision. The next three letters indicate the Department offering the course. The last three digits are unique to the course – the first digit indicates the level of the course (100, 200, 300, 400 etc.); the second digit indicates the type of the course, viz. 0, 1 and 2 indicate the core courses; 3,4,5,6 and 7 indicate the Elective courses; 8 indicates the Lab. or practical-based courses and 9 indicates Projects.

ABBREVIATIONS USED IN THE CURRICULUM:

Cat.	- Category;
L	- Lecture;
T	- Tutorial;
P	- Practicals;
Cr	- Credits;
ES	- Exam Slot;
ENGG.	- Engineering Sciences (including General, Core and Electives);
HUM	- Humanities (including Languages and others);
SCI	- Basic Sciences (including Mathematics);
PRJ	- Project Work (including Seminars).

Departments

AES	- Aerospace Engineering;
CHE	- Chemical Engineering;
CHY	- Chemistry;
CSE	- Computer Science and Engineering;
CUL	- Cultural Education;
CVL	- Civil Engineering;
ECE	- Electronics and Communication Engineering;
EEE	- Electrical and Electronics Engineering;
EIE	- Electronics and Instrumentation Engineering;
HUM	- Humanities and Languages;
MAT	- Mathematics;
MEC	- Mechanical Engineering;
PHY	- Physics;
SWK	- Social Work.

Category-wise distribution of credits for B Tech Chemical Engineering programme:

Humanities - 25 credits; Basic Sciences - 30 credits;
Engineering Sciences - 98 credits; Project Work - 15 credits. **Total = 168 Credits**

Semester I

Cat.	Code	Course Title	L-T-P	Cr	ES
HUM	15ENG111	Communicative English	2 0 2	3	A
SCI	15MAT111	Calculus and Matrix Algebra	2 1 0	3	B
ENGG	15CSE100	Computational Thinking and Problem Solving	3 0 2	4	D
SCI	15PHY100/ 15CHY100	Physics / Chemistry	3 0 0	3	C
SCI	15PHY181/ 15CHY181	Physics Lab. / Chemistry Lab.	0 0 2	1	L1
ENGG	15MEC180/ 15EEE180	Workshop A/ Workshop B	0 0 2	1	L2
ENGG	15MEC100	Engineering Drawing - CAD	2 0 2	3	E
HUM	15CUL101	Cultural Education I	2 0 0	2	F
Total					20

Semester II

Cat.	Code	Course Title	L-T-P	Cr	ES
SCI	15MAT121	Vector Calculus and Ordinary Differential Equations	3 1 0	4	B
SCI	15CHY100/ 15PHY100	Chemistry/ Physics	3 0 0	3	C
ENGG	15CSE102	Computer Programming	3 0 0	3	D
ENGG	15CHE111	Introduction to Chemical Engineering	3 0 0	3	A
ENGG	15CHE112	Material Balances	3 1 0	4	E
SCI	15CHY181/ 15PHY181	Chemistry Lab. / Physics Lab.	0 0 2	1	L1
ENGG	15EEE180/ 15MEC180	Workshop B/ Workshop A	0 0 2	1	L2
ENGG	15CSE180	Computer Programming Lab.	0 0 2	1	L3
HUM	15CUL111	Cultural Education II	2 0 0	2	F
Total					22

Semester III

Cat.	Code	Course Title	L-T-P	Cr	ES
ENGG	15CHE201	Energy Balance and Thermodynamics	3 0 2	4	A
ENGG	15CHE202	Fluid Mechanics	3 1 0	4	C
ENGG	15CHE203	Mechanical Operations	3 0 0	3	D
SCI	15CHY245	Instrumental Methods of Analysis	3 0 0	3	E
SCI	15MAT204	Transforms and Partial Differential Equations	2 1 0	3	B
HUM		Humanities Elective I	2 0 0	2	H
ENGG	15CHE281	Fluid Mechanics Lab.	0 0 2	1	L1
ENGG	15CHE282	Mechanical Operations Lab.	0 0 2	1	L2
HUM	15AVP201	Amrita Values Programme I	1 0 0	1	F
Total					22

Semester IV

Cat.	Code	Course Title	L-T-P	Cr	ES
ENGG	15CHE211	Chemical Engineering Thermodynamics	3 0 0	3	A
ENGG	15CHE212	Chemical Technology	4 0 0	4	B
ENGG	15CHE213	Process Heat Transfer	3 1 0	4	C
SCI		Science Elective	3 0 0	3	D
HUM		Humanities Elective II	2 0 0	2	H
ENGG	15CHE285	Chemical Engineering Instrumentation Lab.	1 0 2	2	L1
ENGG	15CHE286	Chemical Technology Lab.	0 0 2	1	L2
HUM	15SSK221	Soft Skills I	1 0 2	2	G
HUM	15AVP211	Amrita Values Programme II	1 0 0	1	F
Total					22

Semester V

Cat.	Code	Course Title	L-T-P	Cr	ES
ENGG	15CHE301	Chemical Reaction Engineering I	3 0 0	3	A
ENGG	15CHE302	Diffusional Mass Transfer Operations	3 1 0	4	C
ENGG	15CHE303	Statics and Strength of Materials	3 1 0	4	E
HUM	15ENV300	Environmental Science and Sustainability	3 0 0	3	D
SCI	15MAT214	Probability and Statistics	2 1 0	3	B
ENGG	15CHE381	Heat Transfer Lab.	0 0 2	1	L1
ENGG	15CHE382	Strength of Materials Lab.	0 0 2	1	L2
HUM	15SSK321	Soft Skills II	1 0 2	2	G
PRJ	15CHE391	Project Based Learning - Phase I		1	P1
ENGG	15CHE390	Live-in-Lab**		[3]	P2
Total				22	[+3]

Semester VI

Cat.	Code	Course Title	L-T-P	Cr	ES
ENGG	15CHE311	Chemical Reaction Engineering II	3 0 0	3	A
ENGG	15CHE312	Equilibrium Staged Operations	3 1 0	4	C
ENGG	15CHE313	Materials Technology	3 0 0	3	D
ENGG	15CHE314	Process Dynamics and Control	3 1 0	4	E
SCI	15MAT302	Numerical Methods	2 0 2	3	B
ENGG	15CHE385	Chemical Reaction Engineering Lab.	0 0 2	1	L1
ENGG	15CHE386	Mass Transfer Lab.	0 0 2	1	L2
HUM	15SSK331	Soft Skills III	1 0 2	2	G
PRJ	15CHE396	Project Based Learning – Phase II		2	P1
Total				23	

** Students undertaking and registering for a Live-in-Lab project, can be exempted from registering for an Elective course in the higher semester.

Semester VII

Cat.	Code	Course Title	L-T-P	Cr	ES
ENGG	15CHE401	Process Design and Integration	3 0 0	3	A
ENGG	15CHE402	Process Equipment Design and Drawing	2 0 2	3	B
ENGG	15CHE403	Transport Phenomena	3 1 0	4	C
ENGG		Elective I*	3 0 0	3	E
HUM		Management Elective	3 0 0	3	D
ENGG	15CHE481	Chemical Process Control Lab.	0 0 2	1	L1
ENGG	15CHE482	Computer Aided Design Lab.	1 0 2	2	L2
PRJ	15CHE495	Project Phase I		2	P1
ENGG	15CHE490	Live-in-Lab**		[3]	P2
Total				21	[+3]

Semester VIII

Cat.	Code	Course Title	L-T-P	Cr	ES
ENGG		Elective II*	3 0 0	3	E
ENGG		Elective III*	3 0 0	3	D
PRJ	15CHE499	Project Phase II		10	P
Total				16	

TOTAL 168

* A maximum of One Elective course can be chosen from the Electives prescribed for other Branches or from under Science Electives.

** Students undertaking and registering for a Live-in-Lab project, can be exempted from registering for an Elective course in the higher semester.

ELECTIVES

15CHY232	Biomaterials Science
15CHY244	Green Chemistry and Technology
15CHE431	Biochemical Engineering
15CHE432	Chemical Process Modelling and Simulation
15CHE433	Environmental Engineering for Process Industries
15CHE434	Interfacial Science and Engineering
15CHE435	Material Characterization and Spectroscopic Methods
15CHE436	Modern Separation Methods
15CHE437	Nanoscience and Nanotechnology
15CHE438	Petroleum Refining and Petrochemical Technology
15CHE439	Polymer Composites
15CHE440	Polymer Materials – Structure Property Relations
15CHE441	Polymer Processing
15CHE442	Process Instrumentation
15CHE443	Process Intensification
15CHE444	Safety and Hazard Management in Chemical Industries
15CHE445	Solar Energy

MANAGEMENT ELECTIVES

15CHE470	Fundamentals of Management
15CHE471	Managerial Economics and Accounting
15CHE472	Project Engineering of Process Plants

SCIENCE ELECTIVES (3 0 0 3)

15CHY231	Advanced Polymer Chemistry
15CHY232	Biomaterials Science
15CHY233	Catalytic Chemistry
15CHY234	Chemistry of Advanced Materials
15CHY235	Chemistry of Engineering Materials
15CHY236	Chemistry of Nanomaterials
15CHY237	Chemistry of Toxicology
15CHY238	Colloidal and Interfacial Chemistry
15CHY239	Computational Chemistry and Molecular Modelling
15CHY241	Electrochemical Energy Systems and Processes
15CHY242	Environmental Chemistry
15CHY243	Fuels and Combustion
15CHY244	Green Chemistry and Technology
15CHY245	Instrumental Methods of Analysis
15CHY246	Medicinal Organic Chemistry
15CHY247	Modern Polymer Composites
15CHY248	Organic Reaction Mechanisms
15CHY249	Organic Synthesis and Stereochemistry
15CHY250	Polymer Materials and Properties
15CHY251	Polymers for Electronics
15CHY252	Solid State Chemistry
15CHY331	Batteries and Fuel Cells
15CHY332	Corrosion Science
15PHY230	Advanced Classical Dynamics
15PHY233	Biophysics and Biomaterials
15PHY234	Introduction to Computational Physics
15PHY238	Electrical Engineering Materials
15PHY239	Electromagnetic Fields and Waves
15PHY240	Electronic Material Sciences
15PHY241	Lasers in Material Processing

15PHY243	Microelectronic Fabrication
15PHY245	Nuclear Energy – Principles and Applications
15PHY247	Photovoltaics
15PHY248	Physics of Lasers and Applications
15PHY250	Quantum Physics and Applications
15PHY251	Thin Film Physics
15PHY331	Astronomy
15PHY333	Concepts of Nanophysics and Nanotechnology
15PHY335	Medical Physics
15PHY338	Physics of Semiconductor Devices
15PHY532	Astrophysics
15PHY535	Earth's Atmosphere
15PHY536	Earth's Structure and Evolution
15PHY540	Nonlinear Dynamics
15PHY542	Optoelectronic Devices

HUMANITIES ELECTIVES (1022)

15CUL230	Achieving Excellence in Life - An Indian Perspective
15CUL231	Excellence in Daily Life
15CUL232	Exploring Science and Technology in Ancient India
15CUL233	Yoga Psychology
15ENG230	Business Communication
15ENG231	Indian Thought through English
15ENG232	Insights into Life through English Literature
15ENG233	Technical Communication
15ENG234	Indian Short Stories in English
15FRE230	Proficiency in French Language (Lower)
15FRE231	Proficiency in French Language (Higher)
15GER230	German for Beginners I
15GER231	German for Beginners II
15GER232	Proficiency in German Language (Lower)
15GER233	Proficiency in German Language (Higher)

15HIN101	Hindi I
15HIN111	Hindi II
15HUM230	Emotional Intelligence
15HUM231	Glimpses into the Indian Mind - the Growth of Modern India
15HUM232	Glimpses of Eternal India
15HUM233	Glimpses of Indian Economy and Polity
15HUM234	Health and Lifestyle
15HUM235	Indian Classics for the Twenty-first Century
15HUM236	Introduction to India Studies
15HUM237	Introduction to Sanskrit Language and Literature
15HUM238	National Service Scheme
15HUM239	Psychology for Effective Living
15HUM240	Psychology for Engineers
15HUM241	Science and Society - An Indian Perspective
15HUM242	The Message of Bhagwad Gita
15HUM243	The Message of the Upanishads
15HUM244	Understanding Science of Food and Nutrition
15JAP230	Proficiency in Japanese Language (Lower)
15JAP231	Proficiency in Japanese Language (Higher)
15KAN101	Kannada I
15KAN111	Kannada II
15MAL101	Malayalam I
15MAL111	Malayalam II
15SAN101	Sanskrit I
15SAN111	Sanskrit II
15SWK230	Corporate Social Responsibility
15SWK231	Workplace Mental Health
15TAM101	Tamil I
15TAM111	Tamil II