B.TECH. PROGRAMME

COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

for 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 Computer Science and Engineering programme:

Humanities - 22 credits; Basic Sciences - 27 credits;
Engineering Sciences - 103 credits; Project Work - 12 credits. **Total = 164 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	15CSE111	Computer Science Essentials	3 0 0	3	E
ENGG	15EEE111	Fundamentals of Electrical and Electronics Engineering	4 0 0	4	A
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	15CSE201	Data Structures and Algorithms	3 1 0	4	A
ENGG	15CSE202	Object Oriented Programming	3 0 0	3	D
ENGG	15ECE202	Digital Circuits and Systems	3 1 0	4	C
SCI	15MAT201	Discrete Mathematics	3 1 0	4	B
HUM		Humanities Elective I		2	H
ENGG	15CSE281	Data Structures Lab.	0 0 2	1	L3
ENGG	15CSE282	Object Oriented Programming Lab.	0 0 2	1	L2
ENGG	15ECE281	Digital Circuits and Systems Lab.	0 0 2	1	L1
HUM	15AVP201	Amrita Values Programme I	1 0 0	1	F
			Total	**21**	

Semester IV

Cat.	Code	Course Title	L-T-P	Cr	ES
ENGG	15CSE211	Design and Analysis of Algorithms	3 1 0	4	A
ENGG	15CSE212	Introduction to Embedded Systems	3 0 0	3	C
ENGG	15CSE213	Operating Systems	3 1 0	4	D
SCI	15MAT213	Probability and Random Processes	3 1 0	4	B
ENGG	15CSE285	Embedded Systems Lab.	0 0 2	1	L1
ENGG	15CSE286	Operating Systems Lab.	0 0 2	1	L2
HUM		Humanities Elective II		2	H
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	15CSE301	Computer Organization and Architecture	3 0 0	3	A
ENGG	15CSE302	Database Management Systems	2 0 2	3	B
ENGG	15CSE303	Theory of Computation	3 0 0	3	C
HUM	15ENV300	Environmental Science and Sustainability	3 0 0	3	D
SCI	15MAT301	Linear Algebra, Queueing Theory and Optimization	3 1 0	4	B
ENGG		Elective I*	3 0 0	3	E
ENGG	15CSE381	Computer Organization and Architecture Lab.	0 0 2	1	L1
HUM	15SSK321	Soft Skills II	1 0 2	2	G
ENGG	15CSE390	Live-in-Lab**		[3]	P2
			Total	**22 [+3]**	

Semester VI

Cat.	Code	Course Title	L-T-P	Cr	ES
ENGG	15CSE311	Compiler Design	3 1 0	4	A
ENGG	15CSE312	Computer Networks	3 0 0	3	B
ENGG	15CSE313	Software Engineering	2 0 2	3	C
ENGG		Elective II*	3 0 0	3	E
ENGG		Elective III*	3 0 0	3	D
ENGG	15CSE385	Compiler Design Lab.	0 0 2	1	L1
ENGG	15CSE386	Computer Networks Lab.	0 0 2	1	L2
ENGG	15CSE387	Open Lab.	0 1 2	2	L3
HUM	15SSK331	Soft Skills III	1 0 2	2	G
			Total	**22**	

* 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.

Semester VII

Cat.	Code	Course Title	L-T-P	Cr	ES
ENGG	15CSE401	Machine Learning and Data Mining	3 0 0	3	A
ENGG	15CSE402	Structure and Interpretation of Computer Programs	3 1 0	4	B
ENGG		Elective IV*	3 0 0	3	E
ENGG		Elective V*	3 0 0	3	D
ENGG	15CSE430	Project Based Elective	2 0 2	3	C
ENGG	15CSE481	Machine Learning and Data Mining Lab.	0 0 2	1	L1
PRJ	15CSE495	Project Phase I		2	P1
ENGG	15CSE490	Live-in-Lab**		[3]	P2
			Total	**19 [+3]**	

Semester VIII

Cat.	Code	Course Title	L-T-P	Cr	ES
ENGG	15CSE411	Software Project Management	3 0 0	3	A
ENGG		Elective VI*	3 0 0	3	E
PRJ	15CSE499	Project Phase II		10	P
			Total	**16**	
			TOTAL	**164**	

* 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 (3 0 0 3)

15CSE330	Information Technology Essentials
15CSE331	Advanced Algorithms and Analysis
15CSE332	Advanced Computer Architecture
15CSE334	Big Data Analytics
15CSE335	Bioinformatics
15CSE336	Biometrics
15CSE337	Cloud Computing and Services
15CSE338	Computational Intelligence
15CSE339	Computer Systems Engineering
15CSE340	Computer Vision
15CSE341	Cryptography
15CSE342	Data Compression
15CSE343	Design Patterns
15CSE344	Digital Watermarking
15CSE345	Distributed Embedded Systems
15CSE347	Enterprise Architecture
15CSE349	Information Coding Techniques
15CSE350	Information Retrieval
15CSE351	Information Security
15CSE352	Intelligent Systems
15CSE353	Introduction to Intellectual Property Rights
15CSE355	Modelling and Simulation
15CSE358	Natural Language Processing
15CSE360	Parallel and Distributed Computing
15CSE361	Pattern Recognition
15CSE362	Pervasive Computing
15CSE363	Principles of Digital Image Processing
15CSE364	Real-Time Computing Systems
15CSE365	Scientific Computing
15CSE366	Semantic Web
15CSE367	Service-oriented Architecture

15CSE368	Software Quality Assurance
15CSE369	Spatiotemporal Data Management
15CSE370	Wireless and Mobile Communication
15CSE371	Wireless and Mobile Computing
15CSE372	Wireless Sensor Networks

PROJECT-BASED ELECTIVES (2 0 2 3)

15CSE333	Advanced Database Management Systems
15CSE346	Embedded Programming
15CSE348	Human Computer Interface
15CSE356	Multimedia Databases
15CSE357	Nand2tetris: Building Computers from First Principles
15CSE359	OS for Smart Devices (Android and IOS)
15CSE376	Net Centric Programming

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 Devices1

HUMANITIES ELECTIVES

15CUL230	Achieving Excellence in Life - An Indian Perspective	2 0 0 2
15CUL231	Excellence in Daily Life	2 0 0 2
15CUL232	Exploring Science and Technology in Ancient India	2 0 0 2
15CUL233	Yoga Psychology	2 0 0 2
15ENG230	Business Communication	1 0 2 2
15ENG231	Indian Thought through English	1 0 2 2
15ENG232	Insights into Life through English Literature	1 0 2 2
15ENG233	Technical Communication	1 0 2 2
15ENG234	Indian Short Stories in English	1 0 2 2
15FRE230	Proficiency in French Language (Lower)	1 0 2 2
15FRE231	Proficiency in French Language (Higher)	1 0 2 2
15GER230	German for Beginners I	1 0 2 2
15GER231	German for Beginners II	1 0 2 2
15GER232	Proficiency in German Language (Lower)	1 0 2 2

15GER233	Proficiency in German Language (Higher)	1 0 2 2
15HIN101	Hindi I	1 0 2 2
15HIN111	Hindi II	1 0 2 2
15HUM230	Emotional Intelligence	2 0 0 2
15HUM231	Glimpses into the Indian Mind - the Growth of Modern India	2 0 0 2
15HUM232	Glimpses of Eternal India	2 0 0 2
15HUM233	Glimpses of Indian Economy and Polity	2 0 0 2
15HUM234	Health and Lifestyle	1 0 2 2
15HUM235	Indian Classics for the Twenty-first Century	2 0 0 2
15HUM236	Introduction to India Studies	2 0 0 2
15HUM237	Introduction to Sanskrit Language and Literature	2 0 0 2
15HUM238	National Service Scheme	2 0 0 2
15HUM239	Psychology for Effective Living	2 0 0 2
15HUM240	Psychology for Engineers	2 0 0 2
15HUM241	Science and Society - An Indian Perspective	2 0 0 2
15HUM242	The Message of Bhagwad Gita	2 0 0 2
15HUM243	The Message of the Upanishads	2 0 0 2
15HUM244	Understanding Science of Food and Nutrition	1 0 2 2
15JAP230	Proficiency in Japanese Language (Lower)	1 0 2 2
15JAP231	Proficiency in Japanese Language (Higher)	1 0 2 2
15KAN101	Kannada I	1 0 2 2
15KAN111	Kannada II	1 0 2 2
15MAL101	Malayalam I	1 0 2 2
15MAL111	Malayalam II	1 0 2 2
15SAN101	Sanskrit I	1 0 2 2
15SAN111	Sanskrit II	1 0 2 2
15SWK230	Corporate Social Responsibility	2 0 0 2
15SWK231	Workplace Mental Health	2 0 0 2
15TAM101	Tamil I	1 0 2 2
15TAM111	Tamil II	1 0 2 2