



**AMRITA**  
**VISHWA VIDYAPEETHAM**  
—DEEMED TO BE UNIVERSITY—

School of  
Engineering

(AMRITAPURI, BANGALORE, COIMBATORE, CHENNAI)

**B.Tech. in COMPUTER SCIENCE AND ENGINEERING**

**(BTC-CSE)**

**CURRICULUM 2019**

**SEMESTER I**

Cat.	Code	Title	L T P	Credit
HUM	19ENG111	Technical Communication	2 0 3	3
SCI	19MAT101	Single Variable Calculus	1 0 0	1
SCI	19MAT111	Multivariable Calculus	2 0 0	2
SCI	19MAT102	Matrix Algebra	2 0 0	2
ENGG	19CSE100	Problem Solving and Algorithmic Thinking	2 1 3	4
ENGG	19MEE100	Engineering Graphics - CAD	2 0 3	3
ENGG	19CSE101	Computer Systems Essentials	3 0 3	4
ENGG	19CSE180	Computer Hardware Essentials	0 0 3	1
HUM	19CUL101	Cultural Education - I	2 0 0	2
		<b>TOTAL</b>	<b>32</b>	<b>22</b>

**SEMESTER II**

Cat.	Code	Title	L T P	Credit
SCI	19MAT115	Discrete Mathematics	3 1 0	4
SCI	19MAT112	Linear Algebra	2 1 0	3
SCI	19PHY101	Engineering Physics - A	2 1 0	3
ENGG	19CSE102	Computer Programming	3 0 3	4
ENGG	19EEE111	Electrical and Electronics Engineering	3 0 0	3
ENGG	19EEE182	Electrical and Electronics Engg Practice	0 0 3	1
ENGG	19CSE103	User Interface Design	1 0 3	2
ENGG	19CSE111	Fundamentals of Data Structures	2 0 0	2
ENGG	19MEE181	Manufacturing Practice	0 0 3	1
HUM	19CUL111	Cultural Education - II	2 0 0	2
		<b>TOTAL</b>	<b>33</b>	<b>25</b>

**SEMESTER III**

Cat.	Code	Title	L T P	Credit
SCI	19MAT201	Numerical Methods	1 0 0	1
SCI	19MAT202	Optimization Techniques	2 0 0	2
ENGG	19CSE203	Digital Electronics	3 1 0	4
ENGG	19CSE201	Advanced Programming	2 0 3	3
ENGG	19CSE205	Program Reasoning	2 0 3	3
ENGG	19CSE202	Database Management System	3 0 3	4
ENGG	19CSE204	Object Oriented Paradigm	2 0 3	3
ENGG	19CSE281	Digital Electronics Lab	0 0 3	1
HUM	19AVP201	Amrita Value Programme	1 0 0	1
		Total	32	22

**SEMESTER IV**

Cat.	Code	Title	L T P	Credit
SCI	19MAT205	Probability and Random Processes	3 1 0	4
ENGG	19CSE212	Data Structures and Algorithms	3 0 3	4
ENGG	19CSE214	Theory of Computation	3 0 0	3
ENGG	19CSE211	Computer Organization and Architecture	3 0 3	4
ENGG	19CSE213	Operating Systems	3 0 3	4
HUM	19AVP211	Amrita Value Programme	1 0 0	1
HUM		Free Elective I**	2 0 0	2
HUM	19SSK211	Soft Skills I	1 0 3	2
HUM	19MNG300	Disaster Management		P/F
		Total	32	24

**SEMESTER V**

Cat.	Code	Title	L T P	Credit
ENGG	19CSE305	Machine Learning	3 0 3	4
ENGG	19CSE302	Design and Analysis of Algorithms	3 0 3	4
ENGG	19CSE301	Computer Networks	3 0 3	4
ENGG	19CSE304	Foundations of Data Science	2 0 3	3
ENGG	19CSE303	Embedded Systems	3 0 3	4
ENGG		Professional Elective I*	3 0 0	3
HUM	19SSK301	Soft Skills II	1 0 3	2
ENGG	19LIV390	Live-in –Labs***		[3]
HUM	19ENV300	Environmental Science		P/F
		Total	36	24+[3]

**SEMESTER VI**

Semester VI				
Cat.	Code	Title	L T P	Credit
ENGG	19CSE314	Software Engineering	2 0 3	3
ENGG	19CSE313	Principles of Programming Languages	2 0 3	3
ENGG	19CSE312	Distributed Systems	3 0 3	4
ENGG	19CSE311	Computer Security	3 0 0	3
ENGG		Professional Elective II*	3 0 0	3
ENGG		Professional Elective III*	3 0 0	3
HUM	19SSK311	Soft Skills III	1 0 3	2
ENGG	19LIV490	Live-in –Labs***		[3]
		Total	29	21+[3]

**SEMESTER VII**

Cat.	Code	Title	L T P	Credit
ENGG	19CSE401	Compiler Design	2 0 3	3
ENGG		Professional Elective IV*	3 0 0	3
ENGG		Professional Elective V*	3 0 0	3
ENGG		Professional Elective VI*	3 0 0	3
ENGG		Free Elective II**	3 0 0	3
PRJ	19CSE495/ 19CSE491	Project - Phase – 1 / Seminar	0 0 6	2
HUM	19LAW300	Indian Constitution		P/F
		<b>Total</b>	<b>23</b>	<b>17</b>

**SEMESTER VIII**

Cat.	Code	Title	L T P	Credit
PRJ	19CSE499	Project - Phase – 2	0 0 30	10
		<b>Total</b>	<b>30</b>	<b>10</b>
		<b>Total Credit</b>		<b>165</b>

**\*Professional Elective - Electives categorised under Engineering, Science, Mathematics, Live-in-Labs, and NPTEL Courses. Student can opt for such electives across departments/campuses. Students with CGPA of 7.0 and above can opt for a maximum of 2 NPTEL courses with the credits not exceeding 8.**

**\*\* Free Electives - This will include courses offered by Faculty of Humanities and Social Sciences/ Faculty Arts, Commerce and Media / Faculty of Management/Amrita Darshanam -(International Centre for Spiritual Studies).**

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

## PROFESSIONAL ELECTIVES

Electives in Cyber Security				
Cat.	Code	Title	L T P	Credit
ENGG	19CSE331	Cryptography	3 0 0	3
ENGG	19CSE332	Information Security	3 0 0	3
ENGG	19CSE333	Secure Coding	3 0 0	3
ENGG	19CSE334	Cyber Forensics and Malware	3 0 0	3
ENGG	19CSE335	Ethical Hacking	3 0 0	3
ENGG	19CSE336	Digital Currency Programming	3 0 0	3
ENGG	19CSE337	Social Networking and Security	3 0 0	3
ENGG	19CSE338	Mobile and Wireless Security	3 0 0	3

Electives in Computer Networks				
Cat.	Code	Title	L T P	Credit
ENGG	19CSE339	Wireless Sensor Networks	3 0 0	3
ENGG	19CSE340	Advanced Computer Networks	3 0 0	3
ENGG	19CSE341	Mobile Adhoc Networks	3 0 0	3
ENGG	19CSE342	Wireless and Mobile Communications	3 0 0	3

Electives in Data Science				
ENGG	19CSE351	Computational statistics and Inference Theory	3 0 0	3
ENGG	19CSE352	Business Analytics	3 0 0	3
ENGG	19CSE353	Mining of Massive Datasets	3 0 0	3
ENGG	19CSE354	Web Mining	3 0 0	3
ENGG	19CSE355	Time Series Analysis and Forecasting	2 0 3	3
ENGG	19CSE356	Social Network Analytics	3 0 0	3
ENGG	19CSE357	Big Data Analytics	2 0 3	3

Electives in Computer Vision				
ENGG	19CSE431	Digital Image Processing	2 0 3	3
ENGG	19CSE432	Pattern Recognition	3 0 0	3
ENGG	19CSE433	Computer Graphics and Visualization	2 0 3	3
ENGG	19CSE434	Image and Video Analysis	2 0 3	3
ENGG	19CSE435	Computer Vision	3 0 0	3
ENGG	19CSE436	Machine Vision	3 0 0	3
ENGG	19CSE437	Deep Learning for Computer Vision	2 0 3	3
ENGG	19CSE438	Medical Image Processing	2 0 3	3
ENGG	19CSE439	Augmented and Virtual Reality	3 0 0	3
ENGG	19CSE440	Biometrics	3 0 0	3

Electives in Cyber Physical Systems				
ENGG	19CSE441	Introduction to Cyber-Physical Systems	3 0 0	3
ENGG	19CSE442	Pervasive and Ubiquitous Systems	3 0 0	3
ENGG	19CSE443	Spatiotemporal data management	3 0 0	3
ENGG	19CSE444	Real-Time Systems	3 0 0	3
ENGG	19CSE445	Cloud Computing	2 0 3	3
ENGG	19CSE446	Internet of Things	2 0 3	3

Electives in Artificial Intelligence				
ENGG	19CSE451	Principles of Artificial Intelligence	2 0 3	3
ENGG	19CSE452	Semantic Web	2 0 3	3
ENGG	19CSE453	Natural Language Processing	2 0 3	3
ENGG	19CSE454	Information Retrieval	2 0 3	3
ENGG	19CSE455	Artificial Intelligence and Robotics	2 0 3	3
ENGG	19CSE456	Neural Networks and Deep Learning	2 0 3	3
ENGG	19CSE457	Bayesian Machine Learning	2 0 3	3
ENGG	19CSE458	Computational Intelligence	2 0 3	3

**Electives General**

ENGG	19CSE459	Advanced Algorithms and Analysis	3 0 0	3
ENGG	19CSE460	User Experience Design	2 0 3	3
ENGG	19CSE461	Net-Centric Programming	2 0 3	3
ENGG	19CSE462	Introduction to Game Theory	3 0 0	3

**Professional Electives for Other Branches**

ENGG	19CSE471	Principles of Operating Systems	3 0 0	3
ENGG	19CSE463	Mobile Application Development	2 0 3	3
ENGG	19CSE464	Fundamentals of Software Engineering	2 0 3	3
ENGG	19CSE465	Introduction to Big Data Analytics	2 0 3	3
ENGG	19CSE466	Foundation of Information Technology	2 0 3	3
ENGG	19CSE467	Principles of Database Management Systems	2 0 3	3
ENGG	19CSE477	Principles of Computer Networks	3 0 0	3
ENGG	19CSE204	Object Oriented Paradigm	2 0 3	3
ENGG	19CSE201	Advanced Programming	2 0 3	3
ENGG	19CSE282	Python Programming	0 0 3	1

**PROFESSIONAL ELECTIVES UNDER SCIENCE STREAM**

CHEMISTRY				
Cat.	Code	Title	L T P	Credit
SCI	19CHY243	Computational Chemistry and Molecular Modelling	3 0 0	3
SCI	19CHY236	Electrochemical Energy Systems and Processes	3 0 0	3
SCI	19CHY240	Fuels and Combustion	3 0 0	3
SCI	19CHY232	Green Chemistry and Technology	3 0 0	3
SCI	19CHY239	Instrumental Methods of Analysis	3 0 0	3
SCI	19CHY241	Batteries and Fuel Cells	3 0 0	3
SCI	19CHY242	Corrosion Science	3 0 0	3



PHYSICS				
SCI	19PHY340	Advanced Classical Dynamics	3 0 0	3
SCI	19PHY342	Electrical Engineering Materials	3 0 0	3
SCI	19PHY331	Physics of Lasers and Applications	3 0 0	3
SCI	19PHY341	Concepts of Nanophysics and Nanotechnology	3 0 0	3
SCI	19PHY343	Physics of Semiconductor Devices	3 0 0	3
SCI	19PHY339	Astrophysics	3 0 0	3
Mathematics				
SCI	19MAT341	Statistical Inference	3 0 0	3
SCI	19MAT342	Introduction to Game Theory	3 0 0	3
SCI	19MAT343	Numerical Methods and Optimization	3 0 0	3

#### FREE ELECTIVES

FREE ELECTIVES OFFERED UNDER MANAGEMENT STREAM				
Cat.	Code	Title	L T P	Credit
HUM	19MNG331	Financial Management	3 0 0	3
HUM	19MNG332	Supply Chain Management	3 0 0	3
HUM	19MNG333	Marketing Management	3 0 0	3
HUM	19MNG334	Project Management	3 0 0	3
HUM	19MNG335	Enterprise Management	3 0 0	3
HUM	19MNG338	Operations Research	3 0 0	3
HUM	19MEE401	Industrial Engineering	3 0 0	3
HUM	19MEE346	Managerial Statistics	3 0 0	3
HUM	19MEE347	Total Quality Management	3 0 0	3
HUM	19MEE342	Lean Manufacturing	3 0 0	3
HUM	19CSE358	Software Project Management	3 0 0	3

<b>HUM</b>	<b>19CSE359</b>	<b>Financial Engineering</b>	<b>3 0 0</b>	<b>3</b>
<b>HUM</b>	<b>19CSE360</b>	<b>Engineering Economic Analysis</b>	<b>3 0 0</b>	<b>3</b>
<b>HUM</b>	<b>19MNG331</b>	<b>Financial Management</b>	<b>3 0 0</b>	<b>3</b>
<b>HUM</b>	<b>19CSE362</b>	<b>Information Systems</b>	<b>3 0 0</b>	<b>3</b>

<b>FREE ELECTIVES OFFERED UNDER HUMANITIES / SOCIAL SCIENCE STREAMS</b>				
<b>Cat.</b>	<b>Code</b>	<b>Title</b>	<b>L T P</b>	<b>Credit</b>
<b>HUM</b>	<b>19CUL230</b>	<b>Achieving Excellence in Life - An Indian Perspective</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19CUL231</b>	<b>Excellence in Daily Life</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19CUL232</b>	<b>Exploring Science and Technology in Ancient India</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19CUL233</b>	<b>Yoga Psychology</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19ENG230</b>	<b>Business Communication</b>	<b>1 0 3</b>	<b>2</b>
<b>HUM</b>	<b>19ENG231</b>	<b>Indian Thought through English</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19ENG232</b>	<b>Insights into Life through English Literature</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19ENG233</b>	<b>Technical Communication</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19ENG234</b>	<b>Indian Short Stories in English</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19FRE230</b>	<b>Proficiency in French Language (Lower)</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19FRE231</b>	<b>Proficiency in French Language (Higher)</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19GER230</b>	<b>German for Beginners I</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19GER231</b>	<b>German for Beginners II</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19GER232</b>	<b>Proficiency in German Language (Lower)</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19GER233</b>	<b>Proficiency in German Language (Higher)</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19HIN101</b>	<b>Hindi I</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19HIN111</b>	<b>Hindi II</b>	<b>2 0 0</b>	<b>2</b>
<b>HUM</b>	<b>19HUM230</b>	<b>Emotional Intelligence</b>	<b>2 0 0</b>	<b>2</b>

HUM	19HUM231	Glimpses into the Indian Mind - the Growth of Modern India	2 0 0	2
HUM	19HUM232	Glimpses of Eternal India	2 0 0	2
HUM	19HUM233	Glimpses of Indian Economy and Polity	2 0 0	2
HUM	19HUM234	Health and Lifestyle	2 0 0	2
HUM	19HUM235	Indian Classics for the Twenty-first Century	2 0 0	2
HUM	19HUM236	Introduction to India Studies	2 0 0	2
HUM	19HUM237	Introduction to Sanskrit Language and Literature	2 0 0	2
HUM	19HUM238	National Service Scheme	2 0 0	2
HUM	19HUM239	Psychology for Effective Living	2 0 0	2
HUM	19HUM240	Psychology for Engineers	2 0 0	2
HUM	19HUM241	Science and Society - An Indian Perspective	2 0 0	2
HUM	19HUM242	The Message of Bhagwad Gita	2 0 0	2
HUM	19HUM243	The Message of the Upanishads	2 0 0	2
HUM	19HUM244	Understanding Science of Food and Nutrition	2 0 0	2
HUM	19JAP230	Proficiency in Japanese Language (Lower)	2 0 0	2
HUM	19JAP2313	Proficiency in Japanese Language (Higher)	2 0 0	2
HUM	19KAN101	Kannada I	2 0 0	2
HUM	19KAN111	Kannada II	2 0 0	2
HUM	19MAL101	Malayalam I	2 0 0	2
HUM	19MAL111	Malayalam II	2 0 0	2
HUM	19SAN101	Sanskrit I	2 0 0	2
HUM	19SAN111	Sanskrit II	2 0 0	2
HUM	19SWK230	Corporate Social Responsibility	2 0 0	2
HUM	19SWK231	Workplace Mental Health	2 0 0	2
HUM	19TAM101	Tamil I	2 0 0	2
HUM	19TAM111	Tamil II	2 0 0	2