Pondicherry Engineering College, Puducherry – 605014

(An Autonomous Institution of Government of Puducherry affiliated to Pondicherry University)

Curriculum and Syllabi
for
B.Tech. (Computer Science and Engineering)

(With Effect from Academic year 2018-19)

(Approved in Fifth Academic Council Meeting held on 6th May 2019)

CURRICULUM

The Curriculum of B.Tech. (Computer Science and Engineering) is designed to fulfil the Program Educational Objectives (PEO) and the Program Outcomes (PO) listed below:

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO1	Provide a strong foundation required to comprehend, analyse, design and develop solutions to real world computing problems.
PEO2	Expose the students to industry practices for providing computing solutions using current models and techniques.
PEO3	Enable the students to pursue higher studies and active research.
PEO4	Foster sustained professional development through life-long learning to adapt new computing technologies.

PROGRAMME OUTCOMES (PO)

PO1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	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 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	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	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	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	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	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.
PO11	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.
PO12	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.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1	Attain the ability to provide decision support for solving real-world problems using data analytics.

Distribution of credits among the subjects grouped under various categories:

Courses are grouped under various categories and the credits to be earned in each category of courses are as follows:

Sl. No.	Category	Credits	Course Category Code (CCC)
1	Humanities, Social Sciences and Management Courses	6 + 2 / 3 *	HSM
2	Basic Science Courses (Mathematics, Physics, Chemistry and Biology)	25	BSC
3	Engineering Science Courses (Workshop, Drawing, Basics of Electrical/Mechanical/Computer etc.,)	19	ESC
4	Professional Core Courses	69	PCC
5	Professional Elective Courses (from chosen discipline)	15	PEC
6	Open Elective Courses (from other technical/emerging disciplines)	10	OEC
7	Professional Activity Courses (Project Work, Entrepreneurship, Seminar, Internship, Comprehensive Test)	14	PAC
8	Mandatory non-Credit Courses (Environmental Sciences, Induction, Indian Constitution, Essence of Indian Traditional Knowledge, Professional Ethics)	Non-credit	MCC
	Total	**158**	

***included in the 10 credits under open elective category**

Semester-wise Courses and Credits

Semester I

Course Code	Course Name	CCC	SET	Periods			Credits
				L	T	P	
FY201	Induction Programme	MCC	-	-	-	-	0
MA201	Mathematics I	BSC	TY	3	1	0	4
PH201	Physics	BSC	TY	3	1	0	4
CY201	Chemistry	BSC	TY	3	1	0	4
HS201	English for Communication	HSM	TY	2	0	2	3
ME201	Workshop and Manufacturing Practice	ESC	LB	0	0	3	1.5
PH202	Physics Laboratory	BSC	LB	0	0	3	1.5
CY202	Chemistry Laboratory	BSC	LB	0	0	3	1.5
Total				11	3	11	**19.5**
				25			

Semester II

Course Code	Course Name	CCC	SET	Periods			Credits
				L	T	P	
MA202	Mathematics II	BSC	TY	3	1	0	4
EE201	Basic Electrical Engineering	ESC	TY	3	1	0	4
CS201	Programming for Problem Solving	ESC	TY	3	0	0	3
ME202	Engineering Graphics and Computer Aided Drawing	ESC	TY	2	0	4	3
CE201	Environmental Science	MCC	-	3	0	0	0
EE202	Basic Electrical Engineering Laboratory	ESC	LB	0	0	3	1.5
CS202	Programming Laboratory	ESC	LB	0	0	3	1.5
Total				14	2	10	**17**
				26			

CCC - Course Category Code, **SET** – Semester Exam Type, **TY** – Theory, **LB** – Laboratory, **PR** - Project

Semester III

Course Code	Course Name	CCC	SET	Periods			Credits
				L	T	P	
SH201	Biology for Engineers	BSC	TY	3	0	0	2
EC235	Electronic Devices and Digital Systems	ESC	TY	3	0	0	3
CS203	Computer Organization and Architecture	PCC	TY	3	1	0	4
CS204	Data Structures	PCC	TY	3	0	0	3
CS205	Object Oriented Programming Languages	PCC	TY	3	0	0	3
EC236	Electronic Devices and Digital Systems Laboratory	ESC	LB	0	0	3	1.5
CS206	Data Structures Laboratory	PCC	LB	0	0	3	1.5
CS207	Object Oriented Programming Languages Laboratory	PCC	LB	0	0	3	1.5
SH202	Indian Constitution	MCC	-	3	0	0	0
Total				18	1	9	**19.5**
				28			

Course Code	Open Elective/Honours/ Minor Course	CCC	SET	Periods			Credits
				L	T	P	
ZZOXX*	Open Elective Course	OEC	TY	3	0	0	3
CSH01	Human Computer Interaction	PCC	TY	3	1	0	4
CSM01	Data Structures and Algorithms	PCC	TY	3	1	0	4

Semester IV

Course Code	Course Name	CCC	SET	Periods			Credits
				L	T	P	
MA206	Mathematics for Computing	BSC	TY	3	1	0	4
CS208	Operating Systems	PCC	TY	3	0	0	3
CS209	Design and Analysis of Algorithms	PCC	TY	3	0	0	3
CS210	Database Management Systems	PCC	TY	3	0	0	3
CS211	Software Engineering	PCC	TY	3	1	0	4
CS212	Operating System Laboratory	PCC	LB	0	0	3	1.5
CS213	Design and Analysis of Algorithms Laboratory	PCC	LB	0	0	3	1.5
CS214	Database Management Systems Laboratory	PCC	LB	0	0	3	1.5
Total				15	2	9	**21.5**
				26			

Course Code	Open Elective/Honours/ Minor Course	CCC	SET	Periods			Credits
				L	T	P	
ZZOXX*	Open Elective Course	OEC	TY	3	0	0	3
CSH02	Advanced Data Structure and Algorithms	PCC	TY	3	1	0	4
CSM02	Principles of Operating Systems	PCC	TY	3	1	0	4

***ZZ in ZZOXX is the Department Code of the department offering Open Elective**

Semester V

Course Code	Course Name	CCC	SET	Periods			Credits
				L	T	P	
HS202	Industrial Economics and Management	HSM	TY	3	0	0	3
CS215	Platform Technologies	PCC	TY	3	0	0	3
CS216	Computer Networks	PCC	TY	3	0	0	3
CS217	Automata Theory and Compiler Design	PCC	TY	3	1	0	4
CSYXX	Professional Elective Course - I	PEC	TY	3	0	0	3
CS218	Platform Technologies Laboratory	PCC	LB	0	0	3	1.5
CS219	Computer Networks Laboratory	PCC	LB	0	0	3	1.5
SH203	Essence of Indian Traditional Knowledge	MCC	-	3	0	0	0
Total				18	1	6	**19**
				25			

Course Code	Open Elective/Honours/ Minor Course	CCC	SET	Periods			Credits
				L	T	P	
ZZOXX*	Open Elective Course	OEC	TY	3	0	0	3
CSH03	Advanced Software Design	PCC	TY	3	1	0	4
CSM03	Principles of Database Management	PCC	TY	3	1	0	4

Semester VI

Course Code	Course Name	CCC	SET	Periods			Credits
				L	T	P	
EP201	Entrepreneurship	PAC	TY	3	0	0	2
CS220	Microprocessors and Microcontrollers	PCC	TY	3	0	0	3
CS221	Web Technologies	PCC	TY	3	0	0	3
CS222	Information Security	PCC	TY	3	1	0	4
CSYXX	Professional Elective Course - II	PEC	TY	3	0	0	3
CSYXX	Professional Elective Course - III	PEC	TY	3	0	0	3
CS223	Microprocessors and Microcontrollers Laboratory	PCC	LB	0	0	3	1.5
CS224	Web Technologies Laboratory	PCC	LB	0	0	3	1.5
Total				18	1	6	**21**
				25			

Course Code	Open Elective/Honours/ Minor Course	CCC	SET	Periods			Credits
				L	T	P	
ZZOXX*	Open Elective Course	OEC	TY	3	0	0	3
CSH04	Advanced Security Concepts	PCC	TY	3	1	0	4
CSM04	Internet Programming	PCC	TY	3	1	0	4

Semester VII

Course Code	Course Name	CCC	SET	Periods			Credits
				L	T	P	
CS225	Artificial Intelligence	PCC	TY	3	0	0	3
CS226	Parallel and Distributed Systems	PCC	TY	3	1	0	4
CS227	Data Science Essentials	PCC	TY	3	1	0	4
CSYXX	Professional Elective Course - IV	PEC	TY	3	0	0	3
CSYXX	Professional Elective Course - V	PEC	TY	3	0	0	3
CS228	Artificial Intelligence Laboratory	PCC	LB	0	0	3	1.5
CS229	Seminar	PAC	-	0	0	2	1
CS230	Professional Ethics	MCC	-	2	0	0	0
Total				17	2	5	**19.5**
				24			

Course Code	Open Elective/Honours/ Minor Course	CCC	SET	Periods			Credits
				L	T	P	
ZZOXX*	Open Elective Course	OEC	TY	3	0	0	3
CSH05	Deep Learning	PCC	TY	3	1	0	4
CSM05	Network Technology	PCC	TY	3	1	0	4

Semester VIII

Course Code	Course Name	CCC	SET	Periods			Credits
				L	T	P	
SWOXX	Open Elective through SWAYAM	OEC	-	-	-	-	2
SWOXX	Open Elective through SWAYAM	OEC	-	-	-	-	2
CS231	Comprehensive Test	PAC	-	-	-	2	1
CS232	Internship	PAC	-	-	-	-	2
CS233	Project Work	PAC	PR	-	-	8	8
Total				-	-	10	**15**
				10			

List of Professional Elective Courses (PEC)

Professional Elective Courses	Course Code	Course Name	Semester
Professional Elective – I	CSY01	Graphics and Image Processing	V
	CSY02	Software Design and Testing	
	CSY03	Python Programming	
Professional Elective – II /III	CSY04	Data warehousing and Data Mining	VI
	CSY05	Internet of Things	
	CSY06	Mobile Application Development	
	CSY07	Mobile Communication and Computing	
Professional Elective – IV /V	CSY08	Embedded Systems	VII
	CSY09	Cloud Computing	
	CSY10	Machine Learning	
	CSY11	Business Intelligence	

List of Open Electives Courses (OEC)

Course Code	Course Name
CSO01	Introduction to Python Programming
CSO02	Java Programming
CSO03	Fundamentals of RDBMS
CSO04	Essentials of Mobile Application Development
CSO05	Introduction to Data Science

Courses offered under various categories:

CCC	Course Code	Course Name	Semester	Credit	Total Credit
BSC	MA201	Mathematics I	I	4	25
	PH201	Physics	I	4	
	CY201	Chemistry	I	4	
	PH202	Physics Laboratory	I	1.5	
	CY202	Chemistry Laboratory	I	1.5	
	MA202	Mathematics II	II	4	
	SH201	Biology for Engineers	III	2	
	MA206	Mathematics for Computing	IV	4	
ESC	ME201	Workshop and Manufacturing Practice	I	1.5	19
	EE201	Basic Electrical Engineering	II	4	
	CS201	Programming for Problem Solving	II	3	
	ME202	Engineering Graphics & Computer Aided Drawing	II	3	
	EE202	Electrical Engineering Laboratory	II	1.5	
	CS202	Programming Laboratory	II	1.5	
	EC235	Electronic Devices and Digital Systems	III	3	
	EC236	Electronic Devices and Digital Systems Laboratory	III	1.5	
PCC	CS203	Computer Organization and Architecture	III	4	69
	CS204	Data Structures	III	3	
	CS205	Object Oriented Programming Languages	III	3	
	CS206	Data Structures Laboratory	III	1.5	
	CS207	Object Oriented Programming Languages Laboratory	III	1.5	
	CS208	Operating Systems	IV	3	
	CS209	Design and Analysis of Algorithms	IV	3	
	CS210	Database Management Systems	IV	3	
	CS211	Software Engineering	IV	4	
	CS212	Operating System Laboratory	IV	1.5	
	CS213	Design and Analysis of Algorithms Laboratory	IV	1.5	
	CS214	Database Management Systems Laboratory	IV	1.5	
	CS215	Platform Technologies	V	3	
	CS216	Computer Networks	V	3	
	CS217	Automata Theory and Compiler Design	V	4	
	CS218	Platform Technologies Laboratory	V	1.5	
	CS219	Computer Networks Laboratory	V	1.5	
	CS220	Microprocessors and Microcontrollers	VI	3	
	CS221	Web Technologies	VI	3	
	CS222	Information Security	VI	4	
	CS223	Microprocessors and Microcontrollers Laboratory	VI	1.5	
	CS224	Web Technologies Laboratory	VI	1.5	
	CS225	Artificial Intelligence	VII	3	
	CS226	Parallel and Distributed Systems	VII	4	
	CS227	Data Science Essentials	VII	4	
	CS228	Artificial Intelligence Laboratory	VII	1.5	

PEC	CSYXX	Professional Elective Course – I	V	3	**15**
	CSYXX	Professional Elective Course – II	VI	3	
	CSYXX	Professional Elective Course – III	VI	3	
	CSYXX	Professional Elective Course – IV	VII	3	
	CSYXX	Professional Elective Course – V	VII	3	
OEC	ZZOXX	Open Electives offered by other Departments	III - VII	6	**10**
	SWOXX	Open Electives offered under SWAYAM	-	4	
PAC	EP201	Entrepreneurship	VI	2	**14**
	CS229	Seminar	VII	1	
	CS231	Comprehensive Test	VIII	1	
	CS232	Internship	VIII	2	
	CS233	Project Work	VIII	8	
HSM	HS201	English for Communication	I	3	**6 + 3*/ 2***
	HS202	Industrial Economics and Management	V	3	
	HSOXX	Humanities Open Elective offered by HSS Department	**-**	3*	
	SWOXX	Humanities Open Elective offered under SWAYAM	**-**	2*	
Total					**158**

***included in the 10 credits under Open Elective category**