

**Punyashlok Ahilyadevi Holkar Solapur University, Solapur**



NAAC Accredited-2015

'B' Grade (CGPA 2.62)

**Name of the Faculty: Science & Technology**

**CHOICE BASED CREDIT SYSTEM**

**Syllabus Structure: B. Tech. (Computer Science & Engineering)**

**S.Y. B. Tech (Computer Science & Engineering) w.e.f. Academic Year 2019-20**

**T.Y. B. Tech (Computer Science & Engineering) w.e.f. Academic Year 2020-21**

**Final Year B. Tech (Computer Science & Engineering)w.e.f. Academic Year 2021-22**



**PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR**  
**FACULTY OF SCIENCE & TECHNOLOGY**  
**Computer Science & Engineering**

**Programme Educational Objectives and Outcomes**

**A. Program Educational Objectives**

1. To make students competent for professional career in Computers, IT & allied fields.
2. To build strong fundamental knowledge amongst student to pursue higher education and continue professional development in Computers, IT & other fields
3. To imbibe professional ethics, develop team spirit and effective communication skills to be successful leaders and managers with a holistic approach.
4. To nurture students to be sensitive to ethical, societal & environmental issues while conducting their professional work.

**B. Program Outcomes Engineering Graduate will be able to –**

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** 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.
- 4. Conduct investigations of complex problems:** 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.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** 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.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**10. Communication:** 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.

**11. Project management and finance:** 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.

**12. Life-long learning:** 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.

**C. Program Specific Outcomes (PSOs)**

1. Graduate has an ability to use technical skills necessary for design, maintenance, development and implementation of database systems and networking applications.
2. Graduate has an ability to provide IT solutions, develop mobile applications in multidisciplinary areas using standard tools and techniques.
3. Graduate has an ability to utilize and apply software engineering tools for design and realization of projects in various domains of Computer Science and Engineering.



**PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOAPUR**  
**FACULTY OF SCIENCE & TECHNOLOGY**  
**Structure of Second Year B.Tech. (CSE) wef. 2019-2020**

**Semester – III**

Course Code	Theory Course Name	Hrs./Week			Credits	Examination Scheme			
		L	T	P		ISE	ESE	ICA	Total
CS211	Applied Mathematics-I	3	1	--	4	30	70	25	125
CS212	Discrete Mathematical Structures	3	1	--	4	30	70	25	125
CS213	Data Communication	3	--	--	3	30	70	--	100
CS214	Digital Techniques	4	--	--	4	30	70	--	100
CS215	Computer Graphics	3	--	--	3	30	70	--	100
CS216	Advanced C Concepts	2	--	--	2	25	--	--	25
	<b>Sub Total</b>	18	2	--	20	175	350	50	575
	<b>Laboratory / Workshop</b>								
							<b>ESE</b>		
							<b>POE</b>		
CS213	Data Communication	--	--	2	1	--	50	25	75
CS214	Digital Techniques	--	--	2	1	--	50	25	75
CS215	Computer Graphics	--	--	2	1	--	--	25	25
CS216	Advanced C Concepts	--	--	4	2	--	50	25	75
	<b>Sub Total</b>	--	--	10	5	--	150	100	250
	<b>Grand Total</b>	<b>18</b>	<b>2</b>	<b>10</b>	<b>25</b>	<b>175</b>	<b>500</b>	<b>150</b>	<b>825</b>
ENV21	Environmental Studies	1	--	--	--	--	--	--	--

**Semester – IV**

Course Code	Theory Course Name	Hrs./Week			Credits	Examination Scheme			
		L	T	P		ISE	ESE	ICA	Total
CS221	Applied Mathematics-II	3	1	--	4	30	70	25	125
CS222	Theory of Computation	4	1	--	5	30	70	25	125
CS223	Microprocessors	3	--	--	3	30	70	--	100
CS224	Data Structures	3	--	--	3	30	70	--	100
CS225	Computer Networks	3	--	--	3	30	70	--	100
CS226	Object Oriented Programming through C++	2	--	--	2	25	--	--	25
	<b>Sub Total</b>	18	2	--	20	175	350	50	575
	<b>Laboratory / Workshop</b>								
							<b>ESE</b>		
							<b>POE</b>		
CS223	Microprocessors	--	--	2	1	--	50	25	75
CS224	Data Structures	--	--	4	2	--	50	25	75
CS225	Computer Networks	--	--	2	1	--	--	25	25
CS226	Object Oriented Programming through C++	--	--	2	1	--	50	25	75
	<b>Sub Total</b>	--	--	10	5	--	150	100	250
	<b>Grand Total</b>	<b>18</b>	<b>2</b>	<b>10</b>	<b>25</b>	<b>175</b>	<b>500</b>	<b>150</b>	<b>825</b>
ENV22	Environmental Studies	1	--	--	--				

Abbreviations: L - Lectures, P –Practical, T - Tutorial, ISE - In Semester Exam.,

ESE- End Semester Exam, ICA - Internal Continuous Assessment, ISE - Internal Tests,

ESE - University Examination (Theory &/ POE &/Oral examination)

Note: ‘#’ indicates Practical exam only.

**Note :**

**Semester III and Semester IV – The Structure of S.Y. B.Tech (CSE) and S.Y. B.Tech (IT) is same. Therefore, paper will be common for both the programs.**

1. Student is required to study and pass Environmental Science subject in Second Year of Engineering to become eligible for award of degree.
2. Batch size for the practical /tutorial shall be of 20 students. On forming the batches, if the strength of remaining students exceeds 9, then a new batch shall be formed.
3. Vocational Training (evaluated at B.E. Part-I) of minimum 15 days shall be completed in any vacation after S.E. Part-II but before B.E. Part-I & the report shall be submitted and evaluated in B.E. Part-I
4. Student shall select one Self Learning Module at Third year Semester V and Semester VI.
5. ICA assessment shall be a continuous process based on student's performance in – class tests, assignments, homework, subject seminars, quizzes, laboratory books and their interaction and attendance for theory and lab sessions as applicable.
6. Appropriate Professional Electives Subjects may be added when required.
7. Project group for B.E. (Computer Science and Engineering) Part I and Part II shall not be of more than **five** students.



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**FACULTY OF SCIENCE & TECHNOLOGY**  
**Structure of Third Year B.Tech. (CSE) wef. 2020-2021**  
**Semester – V**

Course Code	Theory Course Name	Hrs./Week			Credits	Examination Scheme			
		L	T	P		ISE	ESE	ICA	Total
CS311	System Programming	3	--	--	3	30	70	--	100
CS312	Operating System	3	01	--	4	30	70	25	125
CS313	\$ Database Engineering	4	--	--	4	30	70	--	100
CS314	Design and Analysis of Algorithm	3	--	--	3	30	70	--	100
CS315	Computer Organization and Architecture	3	01	--	4	30	70	25	125
CS316	# Java Programming	2	--	--	2	25	--	25	50
SLH31	Self Learning (HSS)	--	--	--	2	--	50	--	50
	Sub Total	18	02	--	22	175	400	75	650
<b>Laboratory / Workshop</b>									
							<b>ESE</b>		
							<b>POE</b>		
CS311	System Programming	--	--	2	1		--	25	25
CS313	\$ Database Engineering	--	--	2	1		50	25	75
CS314	Design and Analysis of Algorithm	--	--	2	1		--	25	25
CS316	# Java Programming	--	--	4	2		50	--	50
	Sub Total	--	--	10	5		100	75	175
	<b>Grand Total</b>	<b>18</b>	<b>02</b>	<b>10</b>	<b>27</b>	<b>175</b>	<b>500</b>	<b>150</b>	<b>825</b>

**Semester – VI**

Course Code	Theory Course Name	Hrs./Week			Credits	Examination Scheme			
		L	T	P		ISE	ESE	ICA	Total
CS321	Compiler Construction	3	--	--	3	30	70	--	100
CS322	\$ Unix Operating System	4	--	--	4	30	70	--	100
CS323	Professional Elective – I	3	--	--	3	30	70	--	100
CS324	\$ Software Engineering	3	--	--	3	30	70	--	100
CS325	\$ Object Oriented Modelling and Design	3	--	--	3	30	70	--	100
CS326	# Professional Elective – II	2	--	--	2	--	--	25	25
CS327	# Programming with Python	2	--	--	2			25	25
SLH32	Open Elective (Self Learning Technical)	--	--	--	2	--	50	--	50
	Sub Total	20	--	--	22	150	400	50	600
<b>Laboratory / Workshop</b>									
							<b>ESE</b>		
							<b>POE</b>		
CS322	Unix Operating System	--	--	2	1		--	25	25
CS323	Artificial Intelligence	--	--	2	1		--	25	25
CS326	# Professional Elective-II	--	--	2	1		50	--	50
CS327	# Programming with Python	--	--	2	1		50	--	50
CS328	Mini Project	--	--	2	1		50	25	75
	Sub Total	20	--	10	5		150	100	225
	<b>Grand Total</b>	<b>20</b>	<b>--</b>	<b>10</b>	<b>27</b>	<b>150</b>	<b>550</b>	<b>150</b>	<b>825</b>

**Professional Elective – I**

1. \$ Artificial Intelligence
2. Soft Computing

**Professional Elective – II**

1. Mobile Application Development
2. DevOps : Version Control, CI, CD

**Open Elective**

1. UI or UX technology
2. Software Licensing and Practices
3. Cyber Law and ethics

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Note : ‘#’ indicates Practical exam only.

**\$ - The theory courses for Computer Sci. and Engg. and Information Technology are same therefore paper will be common to both the program.**



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**Structure of Final Year B.Tech. (CSE) wef. 2021-2022**

**Semester – VII**

Course Code	Theory Course Name	Hrs./Week			Credits	Examination Scheme			
		L	T	P		ISE	ESE	ICA	Total
CS411	Distributed Systems	3	--	--	3	30	70	--	100
CS412	\$ Machine Learning	3	--	--	3	30	70	--	100
CS413	Modern Database System	4	--	--	4	30	70	--	100
CS 414A to CS414C	Professional Elective-III	3	--	--	3	30	70	--	100
CS 415A to CS415D	Professional Elective-IV	3	--	--	3	30	70	--	100
CS416	Web Technology	2	--	--	2	--	--	25	25
	<b>Sub Total</b>	18	--	--	18	150	350	25	525
<b>Laboratory / Workshop</b>									
							<b>ESE</b>		
							<b>POE</b>		
CS411	Distributed Systems	--	--	2	1		--	25	25
CS413	Modern Database System	--	--	2	1		--	25	25
CS412	Machine Learning	--	--	2	1		50	25	75
CS416	Web Technology	--	--	2	1		50	--	50
CS417	Lab-I : Project Phase I	--	--	4	2		50	25	75
	Vocational Training	--	--	--	1		--	25	25
	<b>Sub Total</b>				7		150	125	275
	<b>Grand Total</b>	<b>18</b>	<b>--</b>	<b>12</b>	<b>25</b>	<b>150</b>	<b>500</b>	<b>150</b>	<b>800</b>

**Semester – VIII**

Course Code	Theory Course Name	Hrs./Week			Credits	Examination Scheme			
		L	T	P		ISE	ESE	ICA	Total
CS421	\$ Management Information System	4	--	--	4	30	70	--	100
CS422	Information & Cyber Security	4	--	--	4	30	70	--	100
CS423A to CS423C	Professional Elective-V	3	1	--	4	30	70	25	125
CS424A to CS424C	Professional Elective-VI	3	1	--	4	30	70	25	125
CS425	# Programming in C#.Net	2	--	--	2	--	--	25	25
	<b>Sub Total</b>	16	2	--	18	120	280	75	475
<b>Laboratory / Workshop</b>									
							<b>ESE</b>		
							<b>POE</b>		
CS422	Information & Cyber Security	--	--	2	1		50	25	75
CS425	# Programming in C#.Net	--	--	2	1		50	--	50
CS426	Lab-II : Project Phase II	--	--	8	4		100	100	200
	<b>Sub Total</b>			12	6		200	125	325
	<b>Grand Total</b>	<b>16</b>	<b>02</b>	<b>12</b>	<b>24</b>	<b>120</b>	<b>480</b>	<b>200</b>	<b>800</b>

**Professional Elective III**

CS414A - \$ Internet of Things  
CS414B - \$ Software Testing and Quality Assurance  
CS414C – Adhoc and Sensor Networks

**Professional Elective IV**

CS415A - Business Intelligence  
CS415B - \$ Data Mining  
CS415C – Real Time Systems  
CS416D – Information Retrieval

**Professional Elective V**

CS423A - Big data Analytics  
CS423B - Artificial Neural Network

**Professional Elective VI**

CS424A - Cloud Computing  
CS424B - \$ Natural Language Programming

CS424C – Software Defined Network	CS424C – Parallel and Distributed Algorithms
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