

Vishwakarma Institute of Technology, Pune-37

Programme: Computer Engineering

Course Outcomes [CO] -Programme Outcomes[PO] – Programme Specific Outcomes [PSO] Mapping

Academic Year 2024-25

Computer Engineering Department

Department Vision and Mission

Department Vision

To be a leader in the world of computing education practising creativity and innovation

Department Mission

To ensure students' employability by developing aptitude, computing, soft, and entrepreneurial skills

To enhance academic excellence through effective curriculum blended learning and comprehensive assessment with active participation of industry

To cultivate research culture resulting in knowledge-base, quality publications, innovative products and patents

To develop ethical consciousness among students for social and professional maturity to become responsible citizens

Programme Education Objectives [PEOs]

Engineering Graduates will be able to

PEO	PEO Focus	PEO Statement
PEO1	Preparation	Demonstrate application of sound engineering foundations to be a committed technology workforce
PEO2	Core competence	Apply mathematical and computing theory knowledge base to provide realistic computer engineering solutions
PEO3	Breadth	Exhibit problem solving skills and engineering practices to address problems faced by industry with innovative methods, tools and techniques
PEO4	Professionalism	Develop professional and ethical practices adopting effective guidelines to acquire desired soft skills in the societal and global context
PEO5	Learning Environment	Aim for continuing education and entrepreneurship in emerging areas of computing

Programme Specific Outcomes

Engineering Graduates will be able to

PSO	PSO Statement
PSO1	Select and incorporate appropriate computing theory principles, data structures and algorithms, programming paradigms to innovatively craft scientific solution addressing complex computing problems.
PSO2	Adapt to new frontiers of science, engineering and technology by getting acquainted with heterogeneous computing environments and platforms, computing hardware architectures and organizations through continuous experimentation.
PSO3	Conceive well-formed design specifications and constructs assimilating new design ideas and facts for identified real world problems using relevant development methodologies and practices, architecture styles and design patterns, modeling and simulation, and CASE tools.
PSO4	Exercise research and development aptitude focusing knowledge creation and dissemination through engineering artifacts construction, preparation and presentation of engineering evidences using procedures, techniques, guidelines, and standards considering technology migration and evolution.

Engineering Graduates will be able to

PO	Graduate Attributes	PO Statement
PO1	<u>GA:1</u> Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	<u>GA:2</u> 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.
PO3	<u>GA:3:</u> Design/ Development of solution	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	<u>GA:4:</u> Conduct Investigation 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.
PO5	<u>GA:5:</u> 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.
PO6	<u>GA:6:</u> 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.
PO7	<u>GA:7:</u> 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.
PO8	<u>GA:8:</u> Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	<u>GA:9:</u> Individual and Team Work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	<u>GA:10:</u> 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.
PO11	<u>GA:11:</u> 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.
PO12	<u>GA:12:</u> Lifelong 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.

Overview of CO-PO –PSO Assignment Structure

YEAR	CORE					SUPPORTING							PROGRAMM ESPECIFIC OUTCOMES			
	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
S.Y.	SELECT 3 POS 2 X 3 1 X 2					SELECT 2 POS 1 X 2 1 X 1							SELECT 1 PSO			
T.Y.	SELECT 3 POS 2 X 3 1 X 2					SELECT 2 POS 1 X 2 1 X 1							SELEC T 1 PSO			
B.TECH	SELECT 2 POS 2 X 3					SELECT 3 POS 2 X 2 1 X 1									SELECT 1 PSO	

B.Tech. (Computer Engineering)

Pattern 'B-24'

Effective from Academic Year 2024-25

SY- Structure - Module III

Code	Course Name	Programme Outcomes												Program Specific Outcomes				
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	
MD2201	Data Science	2.66	2.66	2.5	2.5	2.25	2.0						2.0	2.5		2.0		
CS2221	Internet of Things	2.0	2.5	3.0	2.0	3.0	2.0	2.0	2.0			2.0	1.0	2.0	2.0	3.0	3.0	3.0
CS2218	Object Oriented Programming	3	2.5	2.83	1.0	1.0	2.0	2.0	2.25			2.0	2.0	3.0	3.0	3.0	3.0	
CS2227	Database Management System	2.0	2.75	3.0	2.0	2.0		2.0			2.0	2.0	2.0	3.0	3.0	2.0	3.0	
CS2235	Computer Organization and Architecture	2.75	2.0	2.66	1.75	3.0	1.5	1.67	0.0	2.0	1.33	0.0	2.0	2.5	2.67	2.25	2.0	
CS2229	Design Thinking-3	1.57	1.57	1.71	1.71	1.57	2.0	1.0	2.33	2.0	3.0	1.0	1.0					
CS2242	Engineering Design and Innovation-III	2.0	2.0	2.83	2.83	2.6	2.5	2.0	2.0	3.0	1.0	2.16	2.0	3.0	3.0	3.0	3.0	

PO1	<u>GA: 1</u> Engineering Knowledge	PO6	<u>GA: 6</u> :The Engineer and Society
PO2	<u>GA: 2</u> Problem Analysis	PO7	<u>GA: 7</u> : Environment and Sustainability
PO3	<u>GA: 3</u> : Design/ Development of solution	PO8	<u>GA: 8</u> :Ethics
PO4	<u>GA: 4</u> : Conduct Investigation of Complex Problems	PO9	<u>GA: 9</u> : Individual and Team Work
PO5	<u>GA: 5</u> : Modern Tool Usage	PO10	<u>GA: 10</u> : Communication
		PO11	<u>GA: 11</u> :Project Management and Finance
		PO12	<u>GA: 12</u> : Lifelong Learning

SY- Structure - Module IV

Code	Course Name	Programme Outcomes												Program Specific Outcomes			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS2065	Data Structures	2.5	3.0	2.66	3.0			2.0	2.0				2.0	3.0	2.0	2.0	2.0
CS2008	Operating Systems	2	2.5	3.0	1.8		2.0	2.0	2.0	3.0	3.0	3.0	3.0		3.0	3.0	2.0
CS2245	Microprocessors & Microcontrollers	3	2.16	2.33	2.0	2.0		2.0	2.0	2.0		2.0	2.0	3.0	3.0	3.0	3.0
CS2246	Computer Graphics and Virtual Reality	2.66	2.83	3.0	1.0	3.0	2.0	1.33	2.0	2.0	2.0	2.0	2.0	3.0	3.0	2.0	2.0
CS2247	Theory of Computation	2	3	2.33	1.33			2					2	3		2	
CS2229	Design Thinking-3	1.57	1.57	1.71	1.71	1.57	2.0	1.0	2.33	2.0	3.0	1.0	1.0				
CS2242	Engineering Design and Innovation-III	2.0	2.0	2.83	2.83	2.6	2.5	2.0	2.0	3.0	1.0	2.16	2.0	3.0	3.0	3.0	3.0

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PO2	<u>GA: 2</u> Problem Analysis	PO7	<u>GA: 7</u> : Environment and Sustainability
PO3	<u>GA: 3</u> : Design/ Development of solution	PO8	<u>GA: 8</u> :Ethics
PO4	<u>GA: 4</u> : Conduct Investigation of Complex Problems	PO9	<u>GA: 9</u> : Individual and Team Work
PO5	<u>GA: 5</u> : Modern Tool Usage	PO10	<u>GA: 10</u> : Communication
		PO11	<u>GA: 11</u> :Project Management and Finance
		PO12	<u>GA: 12</u> : Lifelong Learning

B.Tech. (Computer Engineering)

Pattern 'C-24'

Effective from Academic Year 2024-25

TY- Structure - Module V

Code	Course Name	Programme Outcomes												Program Specific Outcomes			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS3052	Computer Networks (Modules V & VI)	2.84	2.67	2.67	2.0	2	2	3	3	3	3	0	3	3	3	2	2
CS3205	Design and Analysis of Algorithms	2	3	2.66	1.0			2.0					2.0	3		2	
CS3215	Web Technology	2.66	2.66	2.66	1.0	2	2	2	2	2.0	3.0	2.0	3.0	1.0		2.66	2.0
CS3061	Software Modelling and Design	2.66	2.33	2.66		3	2	2	2	2.0	3.0	2.0	3.0	1.0	2.0	2.66	2.0
CS3059	Design Thinking-5	1.57	1.57	1.71	1.71	1.57	2.0	1.0	2.33	2.0	3.0	1.0	1.0				
CS 3060	Engineering Design and Innovation – 3	2.0	2.0	2.83	2.83	2.6	2.5	2.0	2.0	3.0	1.0	2.16	2.0	3.0	3.0	3.0	3.0

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PO2	<u>GA: 2</u> Problem Analysis	PO7	<u>GA: 7</u> : Environment and Sustainability
PO3	<u>GA: 3</u> : Design/ Development of solution	PO8	<u>GA: 8</u> :Ethics
PO4	<u>GA: 4</u> : Conduct Investigation of Complex Problems	PO9	<u>GA: 9</u> : Individual and Team Work
PO5	<u>GA: 5</u> : Modern Tool Usage	PO10	<u>GA: 10</u> : Communication
		PO11	<u>GA: 11</u> :Project Management and Finance
		PO12	<u>GA: 12</u> : Lifelong Learning

TY- Structure - Module VI

Code	Course Name	Programme Outcomes												Program Specific Outcomes			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
Coursera	Coursera																
CS3202	Artificial Intelligence	2.0	2.8	3.0	1.8			3.00	2.00	2.00	2.00		2.16	2.33	2.0	2.50	2.00
CS3220	Cyber Security	2.67	2.5	2.2	2.2	2	2.5	2.5	3	1.8	3	2.67	2.25	3	3	1.5	2.8
CS3053	Compiler Design	2.67	2.83	2	1.75	2	2	3	2	1	0	0	2	3	3	3	2
CS3059	Design Thinking-5	1.57	1.57	1.71	1.71	1.57	2.0	1.0	2.33	2.0	3.0	1.0	1.0				
CS 3060	Engineering Design and Innovation - 3	2.0	2.0	2.83	2.83	2.6	2.5	2.0	2.0	3.0	1.0	2.16	2.0	3.0	3.0	3.0	3.0

PO1	<u>GA: 1</u> Engineering Knowledge	PO6	<u>GA: 6</u> :The Engineer and Society
PO2	<u>GA: 2</u> Problem Analysis	PO7	<u>GA: 7:</u> Environment and Sustainability
PO3	<u>GA: 3:</u> Design/ Development of solution	PO8	<u>GA: 8</u> : Ethics
PO4	<u>GA: 4:</u> Conduct Investigation of Complex Problems	PO9	<u>GA: 9:</u> Individual and Team Work
PO5	<u>GA: 5:</u> Modern Tool Usage	PO10	<u>GA: 10:</u> Communication
		PO11	<u>GA: 11</u> : Project Management and Finance
		PO12	<u>GA: 12:</u> Lifelong Learning

B.Tech. (Computer Engineering)

Pattern 'D-24'

Effective from Academic Year 2024-25

B. Tech. Structure - Module VII

Code	Course Name	Programme Outcomes												Program Specific Outcomes			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
	*Elective 1 (OE-1)																
Coursera	Coursera																
	*Elective 2 (OE-2)																
CS4275 Swayam	Introduction to Machine Learning																
CS4276 Swayam	Deep Learning																
CS4225	Major Project	2.0	2.8	2.75	2.83	2.0	3.0	3.0	2.0	3.0	2.75	2.0	3.0	3.0	1.75	3.0	3.0

PO1	<u>GA: 1</u> Engineering Knowledge	PO6	<u>GA: 6</u> :The Engineer and Society
PO2	<u>GA: 2</u> Problem Analysis	PO7	<u>GA: 7</u> : Environment and Sustainability
PO3	<u>GA: 3</u> : Design/ Development of solution	PO8	<u>GA: 8</u> : Ethics
PO4	<u>GA: 4</u> : Conduct Investigation of Complex Problems	PO9	<u>GA: 9</u> : Individual and Team Work
PO5	<u>GA: 5</u> : Modern Tool Usage	PO10	<u>GA: 10</u> : Communication
		PO11	<u>GA: 11</u> : Project Management and Finance
		PO12	<u>GA: 12</u> : Lifelong Learning

B. Tech. Structure - Module VII

Code	Course Name	Programme Outcomes												Program Specific Outcomes			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
	*Elective 1 (OE-1)																
MD4202	Project Management	2.0	1.5			3.0	1.0	1.0		1.33	1.0	3.0	1.0		2.0		3.0
LL4001	Generative AI																
	*Elective 2 (OE-2)																
CS4217	Human Computer Interaction	2.5	2.6	3.0	2.0	2.0	3.0	2.0	2.0	2.0	2.0	1.0	2.0			2.5	2.0
CS4272	Neural Networks																
CS4222	Image Processing	2.8	2.16	2.7	1.88	3	2.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	3.0	3.0
ET4230	Natural Language Processing	3	2.16	3	2.6	3	2			1		3	2	2.5	2.6	3	3
	*Elective 3 (OE-3)																
CS4275 Swayam	Introduction to Machine Learning																
CS4276 Swayam	Deep Learning																
CS4225	Major Project	2.0	2.8	2.75	2.83	2.0	3.0	3.0	2.0	3.0	2.75	2.0	3.0	3.0	1.75	3.0	3.0

PO1	<u>GA: 1</u> Engineering Knowledge	PO6	<u>GA: 6</u> :The Engineer and Society
PO2	<u>GA: 2</u> Problem Analysis	PO7	<u>GA: 7</u>: Environment and Sustainability
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PO4	<u>GA: 4</u>: Conduct Investigation of Complex Problems	PO9	<u>GA: 9</u>: Individual and Team Work
PO5	<u>GA: 5</u>: Modern Tool Usage	PO10	<u>GA: 10</u>: Communication
		PO11	<u>GA: 11</u> :Project Management and Finance
		PO12	<u>GA: 12</u>: Lifelong Learning

B. Tech. Structure - Module VII (Internship)

Code	Course Name	Programme Outcomes												Program Specific Outcomes			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
	*Elective Group 3 (OE-3)																
Coursera	Coursera																
CS4232	Industry Internship	2.0	3.0	2.66	2.0	3.0	2.0	3.0	2.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	2.66
CS4234	International Internship																
CS4202	Research Internship	2.8	2.75	2.75	2.33	3.0	2.5	2.5	2.0	3.0	2.75	2.0	3.0	3.0	3.0	3.0	3.0

PO1	<u>GA: 1</u> Engineering Knowledge	PO6	<u>GA: 6</u> :The Engineer and Society
PO2	<u>GA: 2</u> Problem Analysis	PO7	<u>GA: 7</u>: Environment and Sustainability
PO3	<u>GA: 3</u>: Design/ Development of solution	PO8	<u>GA: 8</u> : Ethics
PO4	<u>GA: 4</u>: Conduct Investigation of Complex Problems	PO9	<u>GA: 9</u>: Individual and Team Work
PO5	<u>GA: 5</u>: Modern Tool Usage	PO10	<u>GA: 10</u>: Communication
		PO11	<u>GA: 11</u> : Project Management and Finance
		PO12	<u>GA: 12</u>: Lifelong Learning

B. Tech. Structure - Module VII (Internship)

Code	Course Name	Programme Outcomes												Program Specific Outcomes			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CS4232	Industry Internship	2.0	3.0	2.66	2.0	3.0	2.0	3.0	2.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	2.66
CS4234	International Internship																
CS4202	Research Internship	2.8	2.75	2.75	2.33	3.0	2.5	2.5	2.0	3.0	2.75	2.0	3.0	3.0	3.0	3.0	3.0

PO1	<u>GA: 1</u> Engineering Knowledge	PO6	<u>GA: 6</u> :The Engineer and Society
PO2	<u>GA: 2</u> Problem Analysis	PO7	<u>GA: 7</u> : Environment and Sustainability
PO3	<u>GA: 3</u> : Design/ Development of solution	PO8	<u>GA: 8</u> : Ethics
PO4	<u>GA: 4</u> : Conduct Investigation of Complex Problems	PO9	<u>GA: 9</u> : Individual and Team Work
PO5	<u>GA: 5</u> : Modern Tool Usage	PO10	<u>GA: 10</u> : Communication
		PO11	<u>GA: 11</u> : Project Management and Finance
		PO12	<u>GA: 12</u> : Lifelong Learning