ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, ACCREDITED BY NAAC WITH 'A' Grade

PROGRAMME SCHEME & SYLLABI 2021 – 2022

B. Tech. (CE) & M. Tech (CSE)

- **About the department**

  The department of **Computer Engineering** accredited by National Board of Accreditation (NBA) is committed for value added technical education in Computer Engineering. The Department offers B.E. and M.Tech. degree programs. With state-of-the-art infrastructure, the department degree program includes software and hardware courses which cover all aspects of Computer System with an emphasis on practical learning. In addition to core academics, the students are provided with opportunities and platforms to develop and excel in co-curricular and extra-curricular areas such as research, skills development, higher studies, industrial training, and placements. Various student clubs like ACM Chapter, CSI Chapter, and Programming club are active throughout the year. Our faculty members aim at delivering top class education blending their rich research experience with classroom teaching. The Department has "Internet of Things" lab funded by AICTE to demonstrate capabilities and applicability of technologies in industry and every facet of modern life.

- **Vision:**

  To develop globally competent computing community with the ability to make constructive contributions to society.

- **Mission:**

  To develop technocrats with capabilities to address the challenges in computer engineering by providing strong academics and wide industry exposure.

- **Program education objectives**
  - PEO1: - To provide core competence to the graduates of computer engineering in Computing & mathematical fundamentals with analytic approach.
  - PEO2: -**To** uplift the computer engineering graduates to pursue higher studies, career in government/private sector & practice entrepreneurship and demonstrate adaptability towards changes in computing sector.
  - PEO3:- **To** inculcate professionalism in the computer engineering graduates to work in an industry responsibly and collaboratively with conscientious about the potential in computing field in the interest of technology, society and environment.

- **Program outcomes**

  Engineering Graduates 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.

- **Program specific outcomes**

  The Computer Engineering graduates will be able to

1. **PSO1**:- Analyze, design and develop computer based systems with fundamental knowledge of mathematics, algorithms, networking, web design and software management.
2. **PSO2**:- Deal the problems with varying complexity and provide solutions by applying knowledge of Data structures, Database systems, Theory of computation, Computer Architecture, Soft computing & Front end development.
3. **PSO3**:- Model and propose software solutions for industrial & social needs with the exposure of IoT, Data science, Machine Learning & Cyber security.

ST. VINCENT PALLOTTI COLLEGE OF ENGIEERING & TECHNOLOGY, NAGPUR

TEACHING SCHEME

FOUR YEAR BACHELOR OF TECHNOLOGY (B. TECH.) DEGREE COURSE

BRANCH : COMPUTER ENGINEERING

ANNEXURE – I

ST VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY

ACADEMIC OFFICE

Credit Structure for Undergraduate programs

Sr. No	Category	Credits	AICTE Norms
1	Humanities, Social Sciences & Management courses	15	15
2	Basic Science courses	23	25
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc.	18	24
4	Professional core courses	56	48
5	Professional Elective courses relevant to chosen specialization/branch	18	18
6	Open subjects – Electives from other technical and /or emerging subjects	18	18
7	Project work, seminar and internship in industry or elsewhere	20/14	15
8	Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Knowledge Tradition]	0	0
9	Comprehensive Courses [Industry Training and Skill Development, Capstone Course]	4	0
	TOTAL	170	

Scheme of Examination of Bachelor of Technology(Computer Engineering)

Semester Pattern

III Semester B. Tech. (Computer Engineering)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	AS301T	Applied Mathematics – III	3	1	-	4	30	70	100
2	CE301T	Computer Architecture	4			4	30	70	100
3	CE301P	Computer -Lab			2	1	25	25	50
4	CE302T	Data Structures	4			4	30	70	100
5	CE302P	Data Structures lab			4	2	50	50	100
6	CE303T	Digital Circuits and Fundamentals of micro-processor	3	1		4	30	70	100
7	CE304P	Digital Circuits and Fundamentals of micro-processor			4	2	25	25	50
8	H 102	Universal Human Values - 2	3			3	25	25	50
9	CE305P	Sports, Yoga, & Career Development *			2	0			
Total			**16**	**2**	**10**	**24**	**245**	**405**	**650**

***** Career Development (Interpersonal Skills, Aptitude, and Logical Thinking)

Scheme of Examination of Bachelor of Technology(Computer Engineering)

Semester Pattern

IV Semester B. Tech. (Computer Engineering)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CE401T	Discrete Mathematics	4			4	30	70	100
2	CE402T	Data Communication	4			4	30	70	100
3	CE402P	Data Communication			2	1	25	25	50
4	CE403T	Database Management Systems	4			4	30	70	100
5	CE403P	Database Management Systems Lab			2	1	25	25	50
6	CE404T	Object Oriented Programming	4			4	30	70	100
7	CE404P	Object Oriented Programming Lab			4	2	50	50	100
8	AS401T	Constitution of India	2			0	25	25	50
9	CE405P	Technical Skill Development			2	1		50	50
10	CE406T	Career Development *	2			0			
Total			**20**	**0**	**10**	**21**	**245**	**455**	**700**

***** Career Development (Interpersonal Skills, Aptitude, and Logical Thinking)

Scheme of Examination of Bachelor of Technology(Computer Engineering)

Semester Pattern

V Semester B. Tech. (Computer Engineering)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CE501T	Software Engineering	3			3	30	70	100
2	CE502T	Operating System	2	1		3	25	25	50
3	CE502P	Operating System lab			2	1	30	70	100
4	CE503T	Theory of Computation	2	1		3	30	70	100
5	CE504T	Elective - I	2			2	30	70	100
6	CE505T	Open Elective - I	3			3	30	70	100
7	CE505P	Open Elective - I			2	1	25	25	50
8	AS501T	Economics and Management	4			4	15	35	50
9	AS502T	English for Engineers	2			2	25	25	50
10	CE506P	Technical Skill Development			2	1		50	50
11	CE507P	Career Development *			4	0			
Total			**18**	**2**	**10**	**23**	**240**	**510**	**750**

***** Career Development (Interpersonal Skills and Aptitude)

CE504T	Elective – I
CE504T(i)	Computer Graphics
CE504T(ii)	Artificial Intelligence

	Open Elective – I
CE504T	R Programming

CE504P	Open Elective – I
CE504P	R Programming Lab

Scheme of Examination of Bachelor of Technology(Computer Engineering)

Semester Pattern

VI Semester B. Tech. (Computer Engineering)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assesment	End Sem Examination	Total
1	CE601T	Computer Network	3			3	30	70	100
2	CE602P	Computer Network Lab			2	1	25	25	50
3	CE603T	Design and Analysis of Algorithms	3			3	30	70	100
4	CE603P	Design and Analysis of Algorithms Lab			2	1	25	25	50
6	CE604T	Elective - II	3			3	30	70	100
7	CE605T	Elective - III	2	1		3	30	70	100
8	CE606T	Open Elective-II	3	1		4	30	70	100
9	H 103/4	Foundational Humanities Elective	2			0			
10	CE607P	Project – I			4	2	50	50	100
11	CE608P	Career Development*			4	0			
12	CE609P	Capstone Course – I **			2	1	25	25	50
Total			**16**	**2**	**14**	**21**	**275**	**475**	**750**

* Career Development (Interpersonal Skills and Aptitude)

** Capstone Course – I (Comprehensive knowledge gained in *branch name)*

CE604T	Elective - II
CE604T(i)	Data warehousing and mining
CE604T(ii)	Game Theory

CE605T	Elective - III
CE605T(i)	Digital Image and Video Processing
CE605T(ii)	Application Development for Mobile

CE606T	Open Elective - II
CE606T(i)	Cloud Computing & Virtualization
CE606T(ii)	Python Programming

	Foundational Humanities Elective
H-103	Development of Societies
H 104	Philosophy

Scheme of Examination of Bachelor of Technology(Computer Engineering)

Semester Pattern

VII Semester B. Tech. (Computer Engineering)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CE701T	Compiler Construction	4			4	30	70	100
2	CE701P	Compiler Construction Lab			2	1	25	25	50
3	CE702T	Elective - IV	4			4	15	35	50
4	CE702P	Elective - IV Lab			2	1	25	25	50
5	CE703T	Elective - V	4			4	30	70	100
6	CE704T	Open Elective - III	4			4	30	70	100
7	CE705P	Project - II			8	4	100	100	200
8	CE706T	Summer / Winter Internship *				2		50	50
9	CE707P	Capstone Course – II **			2	1	25	25	50
Total			**16**		**14**	**23**	**280**	**470**	**750**

* Summer / Winter Internship (Evaluation of Four weeks Internship Completion till 6th Semester)

** Capstone Course – II (Comprehensive knowledge gained in Computer Engineering)

CE702T	Elective - IV
CE702T(i)	IOT & Its Applications
CE702T(ii)	Fundamentals of Virtual & Augmented Reality
CE702T(iii)	Cryptography & Network Security

CE702P	Elective - IV
CE702P(i)	IOT & Its Applications Lab
CE702P(ii)	Fundamentals of Virtual & Augmented Reality Lab
CE702T(iii)	Cryptography & Network Security Lab

CE703T	Elective - V
CE703T(i)	Ad Hoc and Sensor Networks
CE703T(ii)	Machine Learning
CE703T(iii)	Real Time Operating System

CE704T	Open Elective - III
CE704T	Cyber Security and Ethics

Scheme of Examination of Bachelor of Technology(Computer Engineering) Semester Pattern

VIII Semester B. Tech. (Computer Engineering)

Option A

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CE801P	Project based on one semester internship in Industry/Research Institute/ National Laboratories/ Incubation Center				12			
Total			**0**	**0**	**0**	**12**	**200**	**200**	**400**

***End Semester Examination will consists of evaluation of Seminar and Project Report**

Option B

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CE802T	Open Elective -IV	3			3	30	70	100
2	CE803T	Open Elective – V	3			3	30	70	100
3	CE804P	Project based on Research/ Industry/ Entrepreneurship			12	6	100	100	
Total			**6**	**0**	**12**	**12**	**160**	**240**	**400**

***Open electives can be MOOCs or Courses offered by department in Online/Offline mode**

	Open Elective IV
CE802T	Block chain Technology

	Open Elective - V
CE803T	Data Analytics & Business Intelligence

Scheme of Examination of Bachelor of Technology (Computer Engineering)-Honors

Semester Pattern

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CEH401T	Advanced Programming	3			3	30	70	100
2	CEH401P	Advanced Programming Lab			2	1	25	25	50
3	CEH501T	Introduction to Industry 4.0 and Industrial Internet of Things	4			4	30	70	100
4	CEH601T	Big Data & Machine Learning	3			3	30	70	100
5	CEH601P	Big Data & Machine Learning Lab			2	1	25	25	50
6	CEH701T	Data Science	4			4	30	70	100
7	CEH801T	Artificial Intelligence: Knowledge Representation and Reasoning	4			4	30	70	100
Total			**13**	**5**	**4**	**20**	**170**	**380**	**550**

Scheme of Examination of Bachelor of Technology (Computer Engineering)-Minors

Semester Pattern

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continues Assessment	End Sem. Examination	Total
1	CEM401T	C & Data Structure	4			4	30	70	100
2	CEM501T	Object Oriented Programming using Java	4			4	30	70	100
3	CEM601T	Software Engineering & Project Management	4			4	30	70	100
4	CEM701T	Database Management System	4			4	30	70	100
5	CEM801T	Introduction to Internet Of Things	4			4	30	70	100
		Total	**20**			**20**	**150**	**350**	**500**

List of Open Electives

S.N.	Semester	Course Code	Course Name
1	**5**	CE504T	R Programming
2	**5**	CE504P	R Programming Lab
3	**6**	CE606T(i)	Cloud Computing & Virtualization
4	**6**	CE606T(ii)	Python Programming
5	**7**	CE704T	Cyber Security and Ethics
6	**8**	CE802T	Block chain Technology
7	**8**	CE803T	Data Analytics & Business Intelligence

ST. VINCENT PALLOTTI COLLEGE OF ENGIEERING & TECHNOLOGY, NAGPUR

TEACHING SCHEME

TWO YEAR MASTER OF TECHNOLOGY (M. Tech.) DEGREE COURSE

BRANCH : COMPUTER SCIENCE & ENGINEERING

Credit Structure for Postgraduate program in Computer Science & Engineering

Sr. No	Category	Credits
1	Professional core courses	32
2	Professional Elective courses	9
3	Dissertation &seminar	28
4	Open Elective Courses	3
5	Foundation Course	3
TOTAL		75

Scheme of Examination of Master of Technology(Computer Science & Engineering)

Semester Pattern

I Semester M. Tech. (CSE)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CSE101T	Mathematical Modelling	4			4	40	60	100
2	CSE102T	Advanced Operating System Design	4			4	40	60	100
3	CSE102P	Advanced Operating System Design Lab			2	1	25	25	50
4	CSE103T	High Performance Computer Architecture	4			4	40	60	100
5	CSE104T	Advanced Database Management Systems	4			4	40	60	100
6	CSE104P	Advanced Database Management Systems Lab			2	1	25	25	50
7	CSE105T	Elective - I	3			3	40	60	100
8	CSE106T	Open Elective	3			3	40	60	100
Total			**22**	**0**	**4**	**24**	**290**	**410**	**700**

CSE105T	Elective - I
CSE105T(i)	Artificial Intelligence & Machine Learning
CSE105T(ii)	Software Architecture
CSE105T(iii)	Natural Language Processing

CSE106T	Open Elective
CSE106T(i)	Soft Computing
CSE106T(ii)	Blockchain Technology
CSE106T(iii)	Business Intelligence

Scheme of Examination of Master of Technology(Computer Science & Engineering)

Semester Pattern

II Semester M. Tech. (CSE)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CSE201T	Wireless and Mobile Ad Hoc Networks	4			4	40	60	100
2	CSE201P	Wireless and Mobile Ad Hoc Networks Lab			2	1	25	25	50
3	CSE202T	Design of Distributed Systems	4	1		5	40	60	100
4	CSE203T	Advances in Algorithms	4			4	40	60	100
5	CSE203P	Advances in Algorithms Lab			2	1	25	25	50
6	CSE204T	Foundation Course - Research Methodology	3			3	40	60	100
7	CSE205T	Elective - II	3			3	40	60	100
8	CSE206T	Elective - III				3	50		50
Total					**18**	**1**	**4**	**24**	**300**

CSE205T	Elective - II
CSE205T(i)	Big Data Analytics & Knowledge Mining
CSE205T(ii)	Cryptography and Network Security
CSE205T(iii)	Cloud Computing and Virtualization

CSE206T	Elective - III
CSE206T(i)	8 to 10 week Certificate Course

Scheme of Examination of Master of Technology(Computer Science & Engineering)

Semester Pattern

III Semester M. Tech. (CSE)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CSE301P	Seminar & Dissertation			24	12	100	100	200
Total					**24**	**12**	**100**	**100**	**200**

Scheme of Examination of Master of Technology(Computer Science & Engineering)

Semester Pattern

IV Semester M. Tech. (CSE)

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	CSE401P	Project & Dissertation				16	200	200	400
Total						**16**	**200**	**200**	**400**

Scheme of Examination of Master of Technology(Computer Science & Engineering)

List of Open Electives

S.N.	Semester	Course Code	Course Name
1	**1**	CSE106T(i)	Soft Computing
2	**1**	CSE106T(ii)	Blockchain Technology
3	**1**	CSE106T(iii)	Business Intelligence