SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode-638455

Regulation 2023 (Autonomous)

Curriculum and Syllabus

Choice Based Credit System (CBCS)

B.Tech.-Information Technology

	SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
	(Autonomous)
	Gobichettipalayam, Erode -638455
	Regulation 2023 (UG)
	Curriculum and Syllabus
	B.Tech.-Information Technology

## I. Program Educational Objective (PEO)

PEO1 : Basic Skills : Demonstrate technical competence with analytical and critical thinking to understand and meet the diversified requirements of industry and academia.

PEO2 : Technical Skills : Exhibit technical leadership, team skills to provide businesssolutions to real world problems and Pursue lifelong learning, use cutting edge technologies.

PEO3 : Multi-Disciplinary & Managerial Skills : Work in multi-disciplinary industries with social and environmental responsibility, workethics and adaptability to address complex engineering and social problems.

II. Program Outcomes (POs)

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 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.
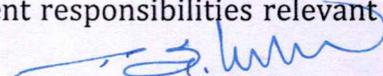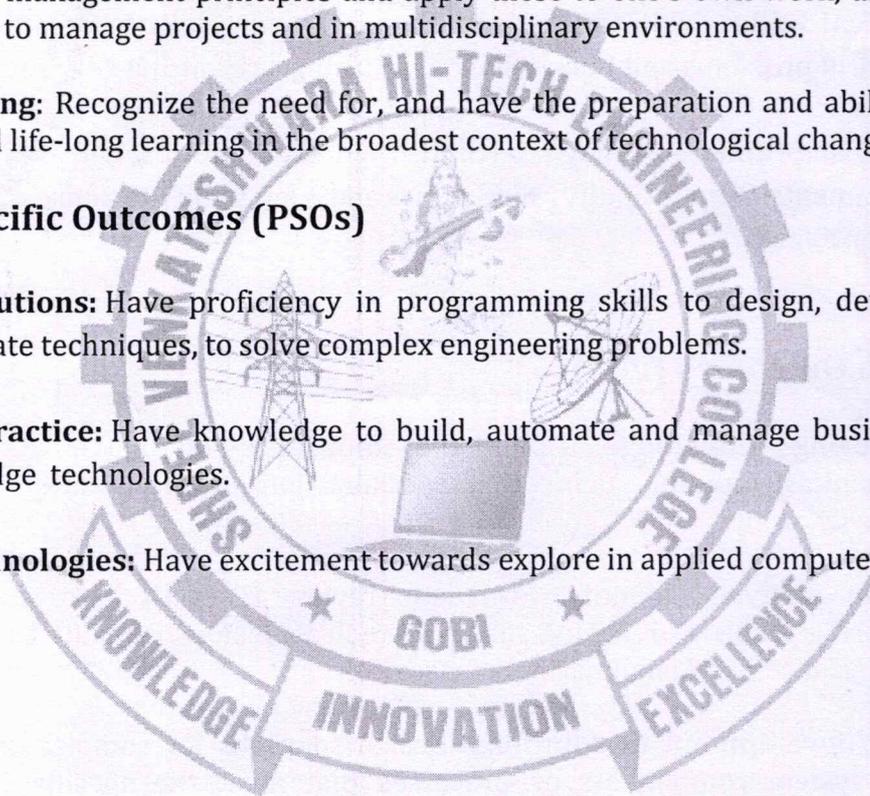
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7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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.

III. Program Specific Outcomes (PSOs)

PSO1 : Computing Solutions: Have proficiency in programming skills to design, develop and apply appropriate techniques, to solve complex engineering problems.

PSO2 : Professional Practice: Have knowledge to build, automate and manage business solutions using cutting edge technologies.

PSO3 : Emerging Technologies: Have excitement towards explore in applied computer technologies
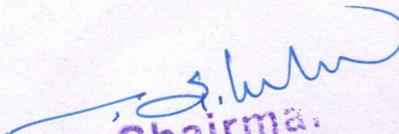
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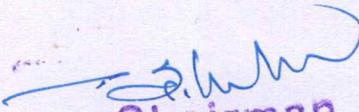| Year	Sem	Course name	PO												PSO		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
I	I	Induction Programme															
		Professional English - I	-	-	-	2	-	1	-	-	2	3	-	3	-	-	-
		Matrices and Calculus	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-
		Engineering Physics	3	3	2	1	2	-	-	-	-	-	-	1	-	-	-
		Engineering Chemistry	3	2	2	1	1	2	3	-	-	-	-	1	-	-	-
		Problem Solving and Python Programming	2	3	3	3	2	-	-	-	-	-	2	2	3	3	3
		தமிழர் மரபு /Heritage of Tamils	-	-	-	-	-	1	1	1	-	1	-	-	-	-	-
		Problem Solving and Python Programming Laboratory	2	3	3	3	2	-	-	-	-	-	2	2	3	3	3
		Physics and Chemistry Laboratory	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-
			3	2	1	-	1	3	2	1	-	-	-	1	-	-	-
		English Laboratory	-	-	-	-	-	-	-	-	1	3	3	-	2	-	-	-
I	II	Professional English - II	-	1	1	-	-	-	1	1	2	3	-	2	-	-	-
		Numerical Methods and Statistics	3	3	1	1	1	-	-	-	2	-	2	3	-	-	-
		Physics for Information Science	3	1	2	1	2	1	1	1	-	-	-	-	-	-	-
		Basic Electrical and Electronics Engineering	3	3	2	2	-	-	-	-	-	1	-	-	3	3	2
		Engineering Graphics	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
		Programming in C	2	2	2	1	2	1	1	1	2	-	3	2	2	2	2
		தமிழரும் தொழில்நுட்பமும் /Tamils and Technology	2	-	-	-	-	2	2	2	2	2	-	2	-	-	-
		Engineering Practices Laboratory	3	-	-	3	-	-	-	-	-	-	-	-	2	1	1
		Programming in C Laboratory	2	2	3	2	1	2	-	-	2	1	2	2	2	2	2
		Communication Laboratory	-	-	2	-	-	-	-	1	3	3	-	3	-	-	-
		Mandatory Course - I Yoga for Human Excellence	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - low, 2 - medium, 3 - high, '-' - no correlation

Mapping of Course Outcome and Programme Outcome

Year	Sem	Course name	PO												PSO		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
II	III	Discrete Mathematics	3	3	2	2	-	2	-	-	-	2	-	2	-	-	-
		Foundations of Data Science	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
		Data Structures and Algorithms	2.2	2.6	2.6	2.6	1.6	-	-	-	3	-	2	2	3	2	2
		Object Oriented Programming	2	1	2	2	2	-	-	-	2	2	1	2	3	2	2
		Digital Principles and Computer Organization	3	3	3	3	1.8	1.6	1	1	1	1	1.6	2.6	1.4	2.6	1.6
		Entrepreneurship and Startup	2	2	2	1.6	1	-	-	-	-	-	-	-	2	2	2
		Data Science Laboratory	2	2	2	2	1	-	-	-	2	2	2	2	2	3	2
		Data Structures and Algorithms Laboratory	2.8	1.8	1.8	0.8	1	-	-	-	2	3	1	2	1.2	2.6	1
		Object Oriented Programming Laboratory	2	2	2	2	-	-	-	-	2	2	2	2	2	2	2
	IV	Database Management Systems	2	2	3	2	1	-	-	-	2	2	2	2	2	2	3
		Theory of Computation	2	2	2	2	1	-	-	-	1	2	2	2	2	2	2
		Operating Systems	2	2	2	2	1	-	-	-	2	2	2	2	2	1	2
		Artificial Intelligence and Machine Learning	2	1	2	2	1	-	-	-	2	2	2	3	2	2	2
		Web Programming	3	3	3	3	3	2	-	-	2	1	2	3	3	2	1
		Environmental Sciences and Sustainability	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Database Management Systems Laboratory	2.8	1.8	1.8	0.8	1	-	-	-	2	3	1	2	1.2	2.6	1
		Mandatory Course - II Soft and Analytical Skills-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - low, 2 - medium, 3 - high, '-' - no correlation

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			PO												PSO		
Year	Sem	Course name	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
III	V	Full Stack Web Development	3	3	2	2	2	1	0	0	1	1	2	2	2	2	1
		Distributed Computing	1.8	2.4	1.8	2.4	2	-	-	-	2.6	2.2	2.2	1.6	2	1.8	1.6
		Computer Networks	-	1-	-	-	1	-	-	-	-	1	-	-	-	1	1
		Object Oriented software Engineering	2	2	1	2	2	-	-	-	-	1	1	2	2	2	1
		Professional Elective I*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Professional Elective II*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Full Stack Web Development Laboratory	3	3	3	2	3	1	1	1	1	1	1	1	2	2	1
		Mandatory Course – III Soft and Analytical Skills-II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Mandatory Course – IV&	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	VI	Embedded Systems and IoT	2.6	2	3	2.4	1.5	-	-	-	1	2.2	2.2	2.4	2.2	1.6	2.6
		Professional Elective III*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Professional Elective IV*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Professional Elective V*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Professional Elective VI*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Open Elective – I**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Mobile Applications Development Laboratory	3	3	3	2	3	1	1	1	1	1	1	1	2	2	1
		Mandatory Course – V&	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
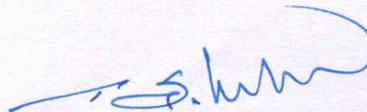
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SUMMARY OF CREDITS

S.No	Course Category	Credits per Semester								Total Credits	Credits in %	Credits as per AU Curriculum R21	Credits as per AICTE Model Curriculum 2022
		I	II	III	IV	V	VI	VII	VIII				
1	HSS	4	3					5		12	7.31	12	16
2	BS	12	7	4	2					25	15.2	25	23
3	ES	5	9	4						18	10.9	18	29
4	PC		5	15	19.5	16	5.5			61	37.1	61	59
5	PE					6	12			18	10.9	18	12
6	OE					3	9			12	7.3	12	9
7	EEC	1	2	1	·			4	10	18	10.9	16	15
8	MC		√		√	√/√	√						
	Total Credits / Semester	22	26	24	21.5	22	20.5	18	10	**164**	**100**	162	163

CATEGORIZATION OF COURSES

i. Humanities and Social Sciences including Management Courses (HSS)
ii. Basic Science Courses (BS)
iii. Engineering Science Courses (ES)
iv. Professional Core Courses (PC)
v. Professional Elective Courses (PE)
vi. Open Elective Courses (OE)
vii. Mandatory Courses (MC)
viii. Employability Enhancement Courses (EEC)
ix. Other Courses (OC)

ENROLLMENT FOR B.E. / B. TECH. (HONOURS) / MINOR DEGREE (OPTIONAL)

A student can also optionally register for additional courses (18 credits) and become eligible for the award of B.E. / B. Tech. (Honours) or Minor Degree.

For B.E. / B. Tech. (Honours), a student shall register for the additional courses (18 credits) from semester V onwards. These courses shall be from the same vertical or a combination of different verticals of the same programme of study only.

For minor degree, a student shall register for the additional courses (18 credits) from semester V onwards. All these courses have to be in a particular vertical from any one of the other programmes,
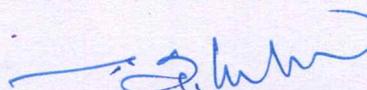
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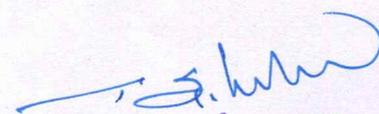## (Autonomous)
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SEMESTER I

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
Induction Program											
1.	23IPA11	Induction Programme	-	-	-	-	-	0	-	-	-
Theory											
2.	23ENT11	Professional English - I	HSS	3	0	0	3	3	40	60	100
3.	23MAT11	Matrices and Calculus	BS	3	1	0	4	4	40	60	100
4.	23PHT11	Engineering Physics	BS	3	0	0	3	3	40	60	100
5.	23CYT11	Engineering Chemistry	BS	3	0	0	3	3	40	60	100
6.	23CST11	Problem Solving and Python Programming	ES	3	0	0	3	3	40	60	100
7.	23TAT11	தமிழர் மரபு /Heritage of Tamils	HSS	1	0	0	1	1	40	60	100
Practical											
8.	23CSL11	Problem Solving and Python Programming Laboratory	ES	0	0	4	4	2	60	40	100
9.	23PCL 11	Physics and Chemistry Laboratory	BS	0	0	4	4	2	60	40	100
10.	23ENL11	English Laboratory	EEC	0	0	2	2	1	60	40	100
			Total	16	1	10	27	22			

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SEMESTER II

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
Theory											
1.	23ENT21	Professional English - II	HSS	2	0	0	2	2	40	60	100
2.	23MAT21	Numerical Methods and Statistics	BS	3	1	0	4	4	40	60	100
3.	23PHT21	Physics for Information Science	BS	3	0	0	3	3	40	60	100
4.	23EET22	Basic Electrical and Electronics Engineering	ES	3	0	0	3	3	40	60	100
5.	23MET21	Engineering Graphics	ES	2	0	4	6	4	40	60	100
6.	23CST21	Programming in C	PC	3	0	0	3	3	40	60	100
7.	23TAT21	தமிழரும் தொழில்நுட்பமும் /Tamils and Technology	HSS	1	0	0	1	1	40	60	100
Practicals											
8.	23MEL21	Engineering Practices Laboratory	ES	0	0	4	4	2	60	40	100
9.	23CSL21	Programming in C Laboratory	PC	0	0	4	4	2	60	40	100
10.	23ENL21	Communication Laboratory	EEC	0	0	4	4	2	60	40	100
Mandatory Courses											
11.	23MDC21	Mandatory Course - I Yoga for Human Excellence	MC	0	0	1	1	0	100	-	100
			Total	17	1	17	35	26			

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SEMESTER III

S.No	Course Code	Course Title	Category	Periods / Week L	T	P	Total Contact Period	Credits	Max.Marks CA	ES	TM
Theory											
1.	23MAT31	Discrete Mathematics	BS	3	1	0	4	4	40	60	100
2.	23CST31	Foundations of Data Science	PC	3	0	0	3	3	40	60	100
3.	23ITT31	Data Structures and Algorithms	PC	3	0	0	3	3	40	60	100
4.	23CST33	Object Oriented Programming	PC	3	0	0	3	3	40	60	100
5.	23ECI32	Digital Principles and Computer Organization	ES	3	0	2	5	4	50	50	100
6.	23EST31	Entrepreneurship and Startup	EEC	1	0	0	1	1	100	-	100
Practical											
7.	23CSL31	Data Science Laboratory	PC	0	0	4	4	2	60	40	100
8.	23ITL31	Data Structures and Algorithms Laboratory	PC	0	0	4	4	2	60	40	100
9.	23CSL33	Object Oriented Programming Laboratory	PC	0	0	4	4	2	60	40	100
			Total	16	1	14	31	24			

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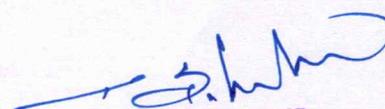### Gobichettipalayam, Erode -638455

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SEMESTER IV

S.No	Course Code	Course Title	Category	L	T	P	Total Contact Period	Credits	CA	ES	TM
				Periods / Week					Max.Marks		
Theory											
1.	23CST41	Database Management Systems	PC	3	0	0	3	3	40	60	100
2.	23CST42	Theory of Computation	PC	3	0	0	3	3	40	60	100
3.	23CSI41	Operating Systems	PC	3	0	2	5	4	50	50	100
4.	23CSI42	Artificial Intelligence and Machine Learning	PC	3	0	2	5	4	50	50	100
5.	23ITI41	Web Programming	PC	3	0	2	5	4	50	50	100
6.	23CYT41	Environmental Sciences and Sustainability	BS	2	0	0	2	2	40	60	100
Practicals											
7.	23CSL41	Database Management Systems Laboratory	PC	0	0	3	3	1.5	60	40	100
Mandatory Courses											
8.	23MDC41	Mandatory Course - II Soft and Analytical Skills-I	MC	1	0	0	1	0	100	-	100
			Total	18	0	9	27	21.5			

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SEMESTER V

S.No	Course Code	Course Title	Category	Periods / Week L	Periods / Week T	Periods / Week P	Total Contact Period	Credits	Max.Marks CA	Max.Marks ES	Max.Marks TM
Theory											
1.	23ITT51	Full Stack Web Development	PC	3	0	0	3	3	40	60	100
2.	23CST52	Distributed Computing	PC	3	0	0	3	3	40	60	100
3.	23CSI51	Computer Networks	PC	3	0	2	5	4	50	50	100
4.	23CSI52	Object Oriented software Engineering	PC	3	0	2	5	4	50	50	100
5.		Professional Elective I*	PE	-	-	-		3	-	-	100
6.		Professional Elective II*	PE	-	-	-		3	-	-	100
Practicals											
7.	23ITL51	Full Stack Web Development Laboratory	PC	0	0	4	4	2	60	40	100
Mandatory Courses											
8.	23MDC51	Mandatory Course – III Soft and Analytical Skills-II	MC	1	0	0	1	0	100	-	100
9.		Mandatory Course – IV&	MC	3	0	0	3	0	100	-	100
		Total						22			

* Professional Elective – I & II shall be chosen from the list of Professional electives (Verticals) offered by same Programme

& Mandatory Course-IV is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-IV)

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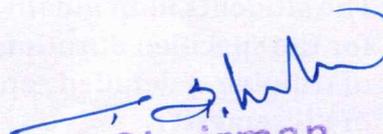## Curriculum and Syllabus
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SEMESTER VI

S.No	Course Code	Course Title	Category	L	T	P	Total Contact Period	Credits	CA	ES	TM
Theory											
1.	23ECI62	Embedded Systems and IoT	PC	3	0	2	5	4	50	50	100
2.		Professional Elective III*	PE	-	-	-		3	-	-	100
3.		Professional Elective IV*	PE	-	-	-		3	-	-	100
4.		Professional Elective V*	PE	-	-	-		3	-	-	100
5.		Professional Elective VI*	PE	-	-	-		3	-	-	100
6.		Open Elective – I**	OE	-	-	-		3	-	-	100
Practicals											
7.	23ITL61	Mobile Applications Development Laboratory	PC	0	0	3	3	1.5	60	40	100
Mandatory											
8.		Mandatory Course-V&	MC	3	0	0	3	0	100	-	100
						Total		**20.5**			

* Professional Elective – III to VI shall be chosen from the list of Professional electives (Verticals) offered by same Programme

** Open Elective – I shall be chosen from the list of open electives offered by other Programmes

& Mandatory Course-V is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-V)

@ The students individually undergo training in reputed Firms/Research Institute/Laboratories for the specified duration (04 weeks) during VI semester summer vacation. After completion of training, a detailed report should be submitted within ten days from the commencement of VII semester.

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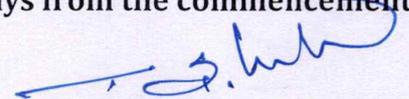## B.Tech.-Information Technology

SEMESTER VII

S.No	Course Code	Course Title	Category	Periods / Week L	Periods / Week T	Periods / Week P	Total Contact Period	Credits	Max.Marks CA	Max.Marks ES	Max.Marks TM
		Theory									
1.	23UHV71	Universal Human Values - 2	HSS	3	0	0	3	3	40	60	100
2.		Elective – Management#	HSS	3	0	0	3	3	40	60	100
3.		Open Elective – II**	OE	-	-	-	-	3	-	-	100
4.		Open Elective – III**	OE	-	-	-	-	3	-	-	100
5.		Open Elective – IV**	OE	-	-	-	-	3	-	-	100
		Practicals									
6.	23ITL71	Summer Internship@	EEC	0	0	0	0	2	100	-	100
7.	23ITL72	Mini Project	EEC	0	0	2	2	1	100	-	100
		Total		14	0	4	18	18			

Elective - Management shall be chosen from the list of Elective Management courses.

** Open Elective – II to IV Shall be chosen from the list of open electives offered by other Programmes

@ - The students undergone summer internship during VI semester summer vacation and same will be evaluated in VII semester.

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SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode -638455

Regulation 2023 (UG)
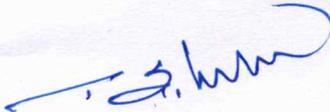### Curriculum and Syllabus
B.Tech.-Information Technology

SEMESTER VIII

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
		Practicals									
1.	23ITL81	Project Work	EEC	0	0	20	20	10	60	40	100
			Total	**0**	**0**	**20**	**20**	**10**			

**TOTAL CREDITS: 164**

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PROFESSIONAL ELECTIVE COURSES: VERTICALS

Vertical I Data Science	Vertical II Full Stack Development for IT	Vertical III Cloud Computing and Data Center Technologies	Vertical IV Cyber Security and Data Privacy	Vertical V Creative Media	Vertical VI Emerging Technologies	Vertical VII Artificial Intelligence and Machine Learning
Exploratory Data Analysis	Cloud Computing	Cloud Computing	Ethical Hacking	Augmented Reality/Virtual Reality	Augmented Reality/Virtual Reality	Knowledge Engineering
Recommender Systems	App Development	Virtualization	Digital and Mobile Forensics	Multimedia and Animation	Robotic Process Automation	Soft Computing
Neural Networks and Deep Learning	Cloud Services Management	Cloud Services Management	Social Network Security	Video Creation and Editing	Neural Networks and Deep Learning	Neural Networks and Deep Learning
Text and Speech Analysis	UI and UX Design	Data Warehousing	Modern Cryptography	UI and UX Design	Cyber security	Text and Speech Analysis
Business Analytics	Software Testing and Automation	Storage Technologies	Engineering Secure Software Systems	Digital marketing	Quantum Computing	Optimization Techniques
Image and Video Analytics	Web Application Security	Software Defined Networks	Cryptocurrency and Blockchain Technologies	Visual Effects	Cryptocurrency and Blockchain Technologies	Game Theory
Computer Vision	DevOps	Stream Processing	Network Security	Game Development	Game Development	Cognitive Science
Big Data Analytics	Principles of Programming Languages	Security and Privacy in Cloud	Security and Privacy in Cloud	Multimedia Data Compression and Storage	3D Printing and Design	Ethics And AI

Registration of Professional Elective Courses from Verticals:

Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called verticals that represent a particular area of specialization / diversified group. Students are permitted to choose all the Professional Electives from a particular vertical or from different verticals. Further, only one Professional Elective course shall be chosen in a semester horizontally (row-wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI.

The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E./B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to the Regulations 2023, (Clause 12).
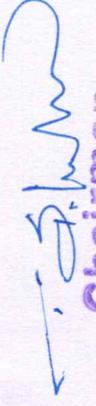
MANDATORY COURSES IV

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	23MDC52	Introduction to Women and Gender Studies	MC	3	0	0	3	0	100	-	100
2.	23MDC53	Elements of Literature	MC	3	0	0	3	0	100	-	100
3.	23MDC54	Film Appreciation	MC	3	0	0	3	0	100	-	100
4.	23MDC55	Disaster Risk Reduction and Management	MC	3	0	0	3	0	100	-	100

MANDATORY COURSES V

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	23MDC61	Well Being with Traditional Practices -Yoga, Ayurveda and Siddha	MC	3	0	0	3	0	100	-	100
2.	23MDC62	History of Science and Technology in India	MC	3	0	0	3	0	100	-	100
3.	23MDC63	Political and EconomicThought for a Humane Society	MC	3	0	0	3	0	100	-	100
4.	23MDC64	State, Nation Building and Politics in India	MC	3	0	0	3	0	100	-	100
5.	23MDC65	Industrial Safety	MC	3	0	0	3	0	100	-	100

ELECTIVE – MANAGEMENT COURSES

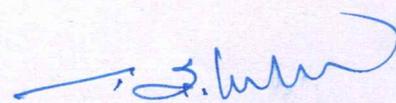| S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	23MSE71	Principles of Management	HSS	3	0	0	3	3	40	60	100
2.	23MSE72	Total Quality Management	HSS	3	0	0	3	3	40	60	100
3.	23MSE73	Engineering Economics and Financial Accounting	HSS	3	0	0	3	3	40	60	100
4.	23MSE74	Human Resource Management	HSS	3	0	0	3	3	40	60	100
5.	23MSE75	Knowledge Management	HSS	3	0	0	3	3	40	60	100
6.	23MSE76	Industrial Management	HSS	3	0	0	3	3	40	60	100

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PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL 1: DATA SCIENCE

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	23CSE11	Exploratory Data Analysis	PE	2	0	2	4	3	50	50	100
2.	23CSE12	Recommender Systems	PE	2	0	2	4	3	50	50	100
3.	23CSE13	Neural Networks and Deep Learning	PE	2	0	2	4	3	50	50	100
4.	23CSE14	Text and Speech Analysis	PE	2	0	2	4	3	50	50	100
5.	23CSE15	Business Analytics	PE	2	0	2	4	3	50	50	100
6.	23CSE16	Image and Video Analytics	PE	2	0	2	4	3	50	50	100
7.	23CSE17	Computer Vision	PE	2	0	2	4	3	50	50	100
8.	23CSE18	Big Data Analytics	PE	2	0	2	4	3	50	50	100

VERTICAL 2: FULL STACK DEVELOPMENT for IT

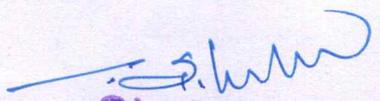| S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	23CSE31	Cloud Computing	PE	2	0	2	4	3	50	50	100
2.	23CSE22	App Development	PE	2	0	2	4	3	50	50	100
3.	23CSE23	Cloud Services Management	PE	2	0	2	4	3	50	50	100
4.	23CSE24	UI and UX Design	PE	2	0	2	4	3	50	50	100
5.	23CSE25	Software Testing and Automation	PE	2	0	2	4	3	50	50	100
6.	23CSE26	Web Application Security	PE	2	0	2	4	3	50	50	100
7.	23CSE27	DevOps	PE	2	0	2	4	3	50	50	100
8.	23CSE28	Principles of Programming Languages	PE	3	0	0	3	3	40	60	100

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VERTICAL 3: CLOUD COMPUTING AND DATA CENTER TECHNOLOGIES

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	23CSE31	Cloud Computing	PE	2	0	2	4	3	50	50	100
2.	23CSE32	Virtualization	PE	2	0	2	4	3	50	50	100
3.	23CSE23	Cloud Services Management	PE	2	0	2	4	3	50	50	100
4.	23CSE34	Data Warehousing	PE	2	0	2	4	3	50	50	100
5.	23CSE35	Storage Technologies	PE	3	0	0	3	3	40	60	100
6.	23CSE36	Software Defined Networks	PE	2	0	2	4	3	50	50	100
7.	23CSE37	Stream Processing	PE	2	0	2	4	3	50	50	100
8.	23CSE38	Security and Privacy in Cloud	PE	2	0	2	4	3	50	50	100

VERTICAL 4: CYBER SECURITY AND DATA PRIVACY

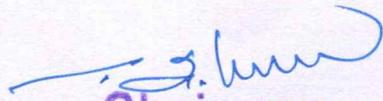| S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	23CSE41	Ethical Hacking	PE	2	0	2	4	3	50	50	100
2.	23CSE42	Digital and Mobile Forensics	PE	2	0	2	4	3	50	50	100
3.	23CSE43	Social Network Security	PE	2	0	2	4	3	50	50	100
4.	23CSE44	Modern Cryptography	PE	2	0	2	4	3	50	50	100
5.	23CSE45	Engineering Secure Software Systems	PE	2	0	2	4	3	50	50	100
6.	23CSE46	Cryptocurrency and Blockchain Technologies	PE	2	0	2	4	3	50	50	100
7.	23CSE47	Network Security	PE	2	0	2	4	3	50	50	100
8.	23CSE38	Security and Privacy in Cloud	PE	2	0	2	4	3	50	50	100

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VERTICAL 5: CREATIVE MEDIA

| S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	23CSE51	Augmented Reality/Virtual Reality	PE	2	0	2	4	3	50	50	100
2.	23CSE52	Multimedia and Animation	PE	2	0	2	4	3	50	50	100
3.	23CSE53	Video Creation and Editing	PE	2	0	2	4	3	50	50	100
4.	23CSE24	UI and UX Design	PE	2	0	2	4	3	50	50	100
5.	23CSE55	Digital marketing	PE	2	0	2	4	3	50	50	100
6.	23CSE56	Visual Effects	PE	2	0	2	4	3	50	50	100
7.	23CSE57	Game Development	PE	2	0	2	4	3	50	50	100
8.	23CSE58	Multimedia Data Compression and Storage	PE	2	0	2	4	3	50	50	100

VERTICAL 6: EMERGING TECHNOLOGIES

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	23CSE51	Augmented Reality/Virtual Reality	PE	2	0	2	4	3	50	50	100
2.	23CSE62	Robotic Process Automation	PE	2	0	2	4	3	50	50	100
3.	23CSE13	Neural Networks and Deep Learning	PE	2	0	2	4	3	50	50	100
4.	23CSE64	Cyber security	PE	2	0	2	4	3	50	50	100
5.	23CSE65	Quantum Computing	PE	2	0	2	4	3	50	50	100
6.	23CSE46	Cryptocurrency and Blockchain Technologies	PE	2	0	2	4	3	50	50	100
7.	23CSE57	Game Development	PE	2	0	2	4	3	50	50	100
8.	23CSE68	3D Printing and Design	PE	2	0	2	4	3	50	50	100

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VERTICAL 7: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	23CSE71	Knowledge Engineering	PE	2	0	2	4	3	50	50	100
2.	23CSE72	Soft Computing	PE	2	0	2	4	3	50	50	100
3.	23CSE13	Neural Networks and Deep Learning	PE	2	0	2	4	3	50	50	100
4.	23CSE14	Text and Speech Analysis	PE	2	0	2	4	3	50	50	100
5.	23CSE75	Optimization Techniques	PE	2	0	2	4	3	50	50	100
6.	23CSE76	Game Theory	PE	2	0	2	4	3	50	50	100
7.	23CSE77	Cognitive Science	PE	2	0	2	4	3	50	50	100
8.	23CSE78	Ethics And AI	PE	2	0	2	4	3	50	50	100
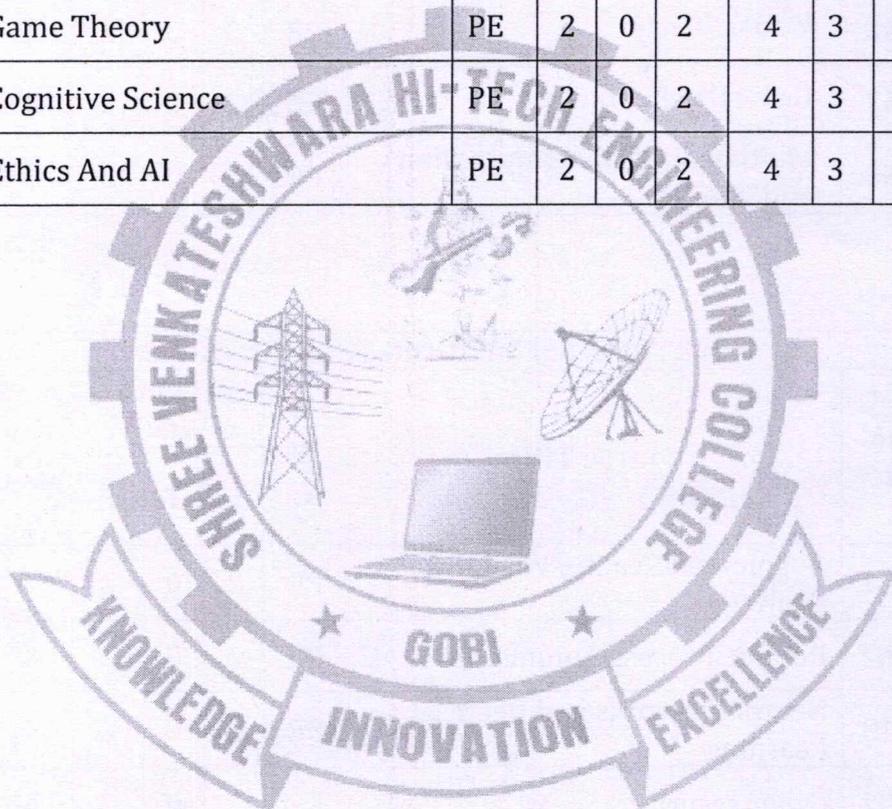
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2.	23ME012	Energy Technology	OE	3	0	0	3	3	40	60	100
3.	23ME013	Reverse Engineering	OE	3	0	0	3	3	40	60	100
4.	23ME014	Fire Safety Engineering	OE	3	0	0	3	3	40	60	100
5.	23ME015	Nano Technology	OE	3	0	0	3	3	40	60	100
6.	23ME016	Entrepreneurship Development	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT ARTIFICIAL INTELLIGENCE AND DATA SCIENCE											
1	23ADO11	Introduction to Big Data	OE	3	0	0	3	3	40	60	100
2	23ADO12	Principles of Data Science	OE	3	0	0	3	3	40	60	100
3	23ADO13	Data Visualization and its Applications	OE	3	0	0	3	3	40	60	100
4	23ADO14	Data Warehousing and Mining	OE	3	0	0	3	3	40	60	100
5	23ADO15	Principles of Cyber Security	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT INFORMATION TECHNOLOGY											
1	23ITO11	Basics of Java Programming	OE	3	0	0	3	3	40	60	100
2	23ITO12	Ethical Hacking	OE	3	0	0	3	3	40	60	100
3	23ITO13	E-Commerce and Applications	OE	3	0	0	3	3	40	60	100
4	23ITO14	Basics of Android Application Development	OE	3	0	0	3	3	40	60	100
5	23ITO15	Introduction to Web Design	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY											
1	23PTO11	Nutraceuticals	OE	3	0	0	3	3	40	60	100
2	23PTO12	IPR for Pharma Industry	OE	3	0	0	3	3	40	60	100
3	23PTO13	Pharmaceutical Nanotechnology	OE	3	0	0	3	3	40	60	100
4	23PTO14	Basics of Human Anatomy and physiology	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT BIOMEDICAL ENGINEERING											
1	23BMO11	Biosensors and Instrumentation	OE	3	0	0	3	3	40	60	100
2	23BMO12	Medical Robotics	OE	3	0	0	3	3	40	60	100
3	23BMO13	Biometric systems and their applications	OE	3	0	0	3	3	40	60	100
4	23BMO14	Healthcare Management systems	OE	3	0	0	3	3	40	60	100
5	23BMO15	IoT in Healthcare	OE	3	0	0	3	3	40	60	100

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OPEN ELECTIVES

Sl. No	Course Code	Course Title	Category	Periods /Week			Total Contact Periods	Credits	Max. Marks		
				L	T	P			CA	ES	TM
OFFERED BY DEPARTMENT OF CIVIL ENGINEERING											
1	23CEO11	Civil and Infrastructure Engineering	OE	3	0	0	3	3	40	60	100
2	23CEO12	Environmental Pollution and waste management	OE	3	0	0	3	3	40	60	100
3	23CEO13	Environmental Impact Assessment	OE	3	0	0	3	3	40	60	100
4	23CEO14	Building Services	OE	3	0	0	3	3	40	60	100
5	23CEO15	Water, Sanitation and Health	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING											
1	23CSO11	Foundation of AR/VR	OE	3	0	0	3	3	40	60	100
2	23CSO12	Web Designing	OE	3	0	0	3	3	40	60	100
3	23CSO13	Block Chain fundamentals	OE	3	0	0	3	3	40	60	100
4	23CSO14	Knowledge Management	OE	3	0	0	3	3	40	60	100
5	23CSO15	Cloud Computing Essentials	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING											
1	23ECO11	Basics of Electronics in Automation	OE	3	0	0	3	3	40	60	100
2	23ECO12	Wireless Optical Communication	OE	3	0	0	3	3	40	60	100
3	23ECO13	Soft Computing techniques	OE	3	0	0	3	3	40	60	100
4	23ECO14	Consumer electronics	OE	3	0	0	3	3	40	60	100
5	23ECO15	Principles of communication Engineering	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING											
1	23EEO11	Renewable Energy Sources	OE	3	0	0	3	3	40	60	100
2	23EEO12	Electrical Vehicle	OE	3	0	0	3	3	40	60	100
3	23EEO13	Energy Auditing and Conservation	OE	3	0	0	3	3	40	60	100
4	23EEO14	Domestic and Industrial Electrical Installations	OE	3	0	0	3	3	40	60	100
5	23EEO15	Microcontroller Based System Design	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF MECHANICAL ENGINEERING											
1.	23MEO11	Industrial Instrumentation	OE	3	0	0	3	3	40	60	100

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OFFERED BY DEPARTMENT OF BIOTECHNOLOGY

1.	23BTO11	Biofertilizer Technology	OE	3	0	0	3	3	40	60	100
2.	23BTO12	Ecology	OE	3	0	0	3	3	40	60	100
3.	23BTO13	Biotechnology for Forensics	OE	3	0	0	3	3	40	60	100
4.	23BTO14	Microbiology and Macromolecule	OE	3	0	0	3	3	40	60	100
5.	23BT015	Biodiversity and Taxonomy	OE	3	0	0	3	3	40	60	100

OFFERED BY DEPARTMENT CSE (CYBER SECURITY)

1	23CRO11	Mobile Device Security	OE	3	0	0	3	3	40	60	100
2	23CRO12	Malware Analysis	OE	3	0	0	3	3	40	60	100
3	23CRO13	Hardware Security	OE	3	0	0	3	3	40	60	100
4	23CRO14	Web and Mobile Application Security	OE	3	0	0	3	3	40	60	100
5	23CRO15	Information Security	OE	3	0	0	3	3	40	60	100

OFFERED BY DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

1	23AMO11	Ai For Everyone	OE	3	0	0	3	3	40	60	100
2	23AMO12	Machine Learning and its Applications	OE	3	0	0	3	3	40	60	100
3	23AMO13	Quantum AI	OE	3	0	0	3	3	40	60	100
4	23AMO14	Reinforcement Learning	OE	3	0	0	3	3	40	60	100
5	23AMO15	Network Automation Using AIML	OE	3	0	0	3	3	40	60	100

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