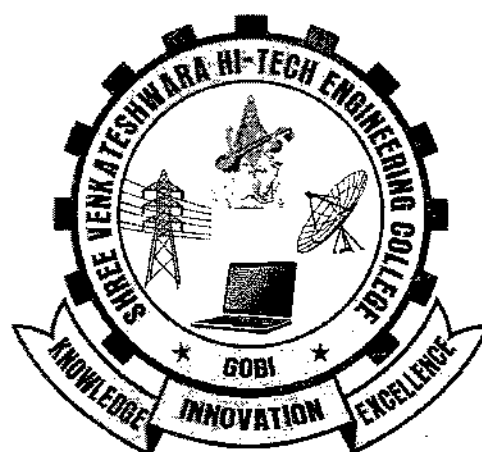


SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE

(Autonomous)

Gobichettipalayam, Erode-638455



Regulation 2025

(Autonomous)

Curriculum and Syllabus

Choice Based Credit System (CBCS)

B.Tech – PHARMACEUTICAL TECHNOLOGY



SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE

(Autonomous)

Gobichettipalayam, Erode -638455

Regulation 2025 (UG)

(Students admitted from AY 2025-26 onwards)

Curriculum and Syllabus

B.Tech - Pharmaceutical Technology

I. Program Educational Objective (PEO)

PEO1	: Career Avenues: To prepare students for prosperous spectrum of career avenues in academia, advanced research, industries of pharmaceutical technology, biomedicine, biotechnology, law, business and government and other pharmaceutical pursuits through dissemination of knowledge and proficiency in engineering and technology fundamentals related to pharmaceutical technology and the ability to solve problems
PEO2	: Professional Endeavors: To transfuse in students the sense of confidence in professional endeavors by application of the derived knowledge and appreciation of economic impact in a societal context
PEO3	: Health and Welfare: To provide collegial and nurturing environment for the students to realize the professional, ethical obligations and their concern to protect the health and welfare of the public, and to be accountable for the social and environmental impact of their practice
PEO4	: Multi-disciplinary Function: To create an enjoyable educational environment in which students participate in multi-disciplinary, team oriented, open-ended curricular and co-curricular activities that prepare them to work either individually and as an integrated team member
PEO5	: Interdisciplinary Research : To facilitate the students to gain the wisdom of fundamentals and advances to practice pharmaceutical technology and interdisciplinary research as career of constructive service to society and higher learning

II. Program Outcomes (POs)

- PO1 : **Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
- PO2 : **Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

[Signature]
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- P03 : Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
- P04 : Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modeling, analysis & interpretation of data to provide valid conclusions. (WK8).
- P05 : Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
- P06 : The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
- P07 : Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
- P08 : Individual and Collaborative Teamwork:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
- P09 : Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
- P010 : Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
- P011 : Life-Long Learning:** Recognize the need for, and have the preparation and ability for (i) Independent and life-long learning (ii) adaptability to new and emerging technologies and (iii) Critical thinking in the broadest context of technological change. (WK8)

III. Program Specific Outcomes (PSOs)

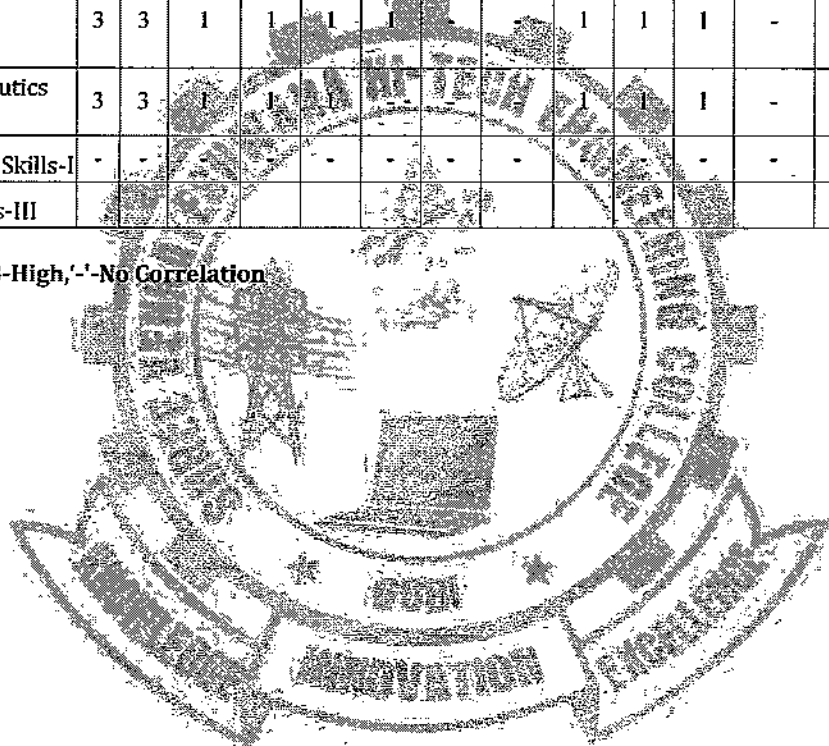
- PS01 : Foundation of Pharmaceutical Technology:** Impart the deeper insights in to the Fundamentals of Pharmaceutical Technology topics and to familiarize them with various upcoming and challenging areas relevant to Pharmaceutical Technology sector.
- PS02 : Modern tools and techniques:** Analyse and perform the experimental procedures to address the societal problems through modern tools and techniques in Pharmaceutical Technology.
- PS03 : Research Ability:** Demonstrate the innovative research ideas and to provide cost-effective and sustainable solutions in Pharmaceutical Technology.

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
I	I	Induction Programme															
		Communicative 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 using C Programming	2	3	3	3	2	-	-	-	-	-	2	2	3	3	3
		Heritage of Tamils	-	-	-	-	-	1	1	1	-	1	-	-	-	-	-
		Idea Lab	2	3	3	3	2	-	-	-	-	-	2	2	3	3	3
		Yoga for Human Excellence	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-
			3	2	1	-	1	3	2	1	-	-	-	1	-	-	-
II	II	Communicative English-II	-	1	1	-	-	-	1	1	2	3	-	2	-	-	-
		Numerical Methods and Differential Equations	3	3	1	1	1	-	-	-	2	2	2	3	-	-	-
		Medical Physics	3	2	2	1	-	1	-	-	-	-	-	2	3	1	-
		Basic Electrical and electronics Engineering	3	3	2	2	-	-	-	-	-	1	-	-	3	3	2
		Python Programming	3	3	1	1	1	1	-	-	-	-	-	-	-	-	-
		Engineering Graphics	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
		Tamils and Technology	2	-	-	-	-	2	2	2	2	2	-	2	-	-	-
		Vision Exploration Lab	3	-	-	3	-	-	-	-	-	-	-	-	2	1	1
III	III	Transform Techniques and Partial differential Equations	3	3	1	1	-	-	-	-	2	-	-	3	-	-	-
		Basic Principles and Calculations in Chemical Engineering	3	3	3	-	-	-	-	-	-	-	-	-	1	-	-
		Microbiology	3	3	2	1	-	-	-	-	-	-	-	-	1	-	-
		Pharmaceutical Chemistry	3	3	2	1	-	-	-	-	-	-	-	1	1	-	-
		Human Anatomy and Physiology	3	3	1	1	1	-	-	-	-	-	-	-	-	1	1

II	III	Biochemistry of Intermediary Metabolism	3	3	2	-	-	-	-	-	-	-	1	1	-	-
		Microbiology Laboratory	2	2	2	1.6	1	-	-	-	-	-	-	2	2	2
		Pharmaceutical Chemistry Laboratory	3	2	1	1	1	-	-	-	1	2	-	-	1	1
		Mandatory Courses-II	3	3	1	1	1	-	-	-	-	1	1	-	-	1
	IV	Probability Theory and Statistical Methods	3	3	-	-	-	-	-	-	3	-	-	2	-	-
		Chemical Engineering Thermodynamics	3	2	1	1	-	-	-	-	-	-	1	-	2	1
		Unit Operations in Process Industries	3	2	1	1	1	-	-	-	-	-	-	2	-	-
		Immunology	3	2	2	2	-	-	-	-	-	-	-	2	1	-
		Physical Pharmaceutics	3	2	2	2	1	-	-	-	1	1	1	-	2	1
		Pharmaceutical Analysis	3	2	2	2	1	-	-	-	1	1	1	-	2	1
		Unit Operations in Process Industries Laboratory	3	3	1	1	1	-	-	-	1	1	1	-	1	-
		Physical Pharmaceutics Laboratory	3	3	1	1	1	-	-	-	1	1	1	-	1	-
		Soft and Analytical Skills-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Mandatory Courses-III														

1 -Low,2-Medium,3-High,'-'-No Correlation



S. No	Course Category	Credits per Semester								Total Credits	Credits in %	Credits as per AU Curriculum	Credits in %
		I	II	III	IV	V	VI	VII	VIII				
1	BS	11	6	4	3					24	14.3	20	8.5
2	HUM	5	4				2	3		14	8.3	18	11.3
3	ES (G)		4							4	2.4	7	4.0
4	ES(PC)	4	8	19	18	15	9	9		82	48.8	77	53.7
5	ES (PE)					6	9	3		18	10.7	15	8.5
6	ES (ET)									0	0	0	0
7	OE							3		3	1.7	3	1.7
8	SD	2	2	0	1	3	2	2	10	23	13.8	24	12.4
9	SL						1					1	
10	MC	✓		✓	✓								
Total Credits / Semester		22	24	23	22	24	23	20	10	168	100	165	100

CATEGORIZATION OF COURSES

- BS – Basic Science (Mathematics, Physics, Chemistry)
- HUM – Humanities (Languages, Management, Heritage, and others)
- ES – Engineering Science (General (G), Programme Core (ES(PC)), Programme Elective (PE), Emerging Technology (ET))
- SD – Skill Development
- SL – Self Learning
- OE – Open Elective
- VA - Value Added Courses
- OC - Off Campus Courses
- MC – Mandatory course

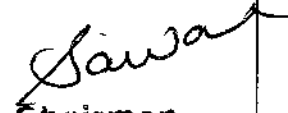
ENROLLMENT FOR B.E./B.TECH. (HONOURS)/MINOR DEGREE (OPTIONAL)

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

Regulation 2025 (UG)
Students Admitted AY 2025-26
Curriculum and Syllabus
B. Tech - Pharmaceutical Technology

SEMESTER I

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Induction Program												
1.	25IPA11	Induction Programme	-	-	-	-	-	0	-	-	-	-
Theory												
2.	25ENI11	Communicative English - I	HUM	3	0	2	5	4	4,5,8,9,16	50	50	100
3.	25MAT11	Matrices and Calculus	BS	3	0	0	3	3	4, 8, 9, 11,	40	60	100
4.	25PHI11	Engineering Physics	BS	3	0	2	5	4	3,4,9,11,12	50	50	100
5.	25CYI11	Engineering Chemistry	BS	3	0	2	5	4	4, 6, 7	50	50	100
6.	25CSI11	Problem Solving using C Programming	ES(PC)	3	0	2	5	4	4, 8, 9, 10,17	50	50	100
7.	25TAT11	Heritage of Tamils	HUM	1	0	0	1	1	3,4,8,11,16	40	60	100
Practicals												
8.	25MEL11	Idea Lab	SD	0	0	4	4	2	4, 8, 9, 11, 12	60	40	100
Mandatory Course												
9.	25MDC11	Yoga for Human Excellence	MC	0	0	1	1	0	3, 4, 5, 10, 16	100	-	100
Total				16	0	13	29	22				

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**SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE****(Autonomous)****Gobichettipalayam, Erode -638455****Regulation 2025 (UG)****Students Admitted AY 2025-26****Curriculum and Syllabus****B. Tech - Pharmaceutical Technology****SEMESTER II**

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25ENI21	Communicative English - II	HUM	2	0	2	4	3	4, 5, 8, 9, 16	50	50	100
2.	25MAT21	Numerical Methods and Differential Equations	BS	3	0	0	3	3	4, 8, 9, 11	40	60	100
3.	25PHT24	Medical Physics	BS	3	0	0	3	3	3, 4, 9, 10,17	40	60	100
4.	25BTI21	Basic Electrical and electronics Engineering	ES(PC)	3	0	2	5	4	4, 7,9, 12	50	50	100
5.	25CSI21	Python Programming	ES(PC)	3	0	2	5	4	4, 8, 9, 10, 17	50	50	100
6.	25MEI21	Engineering Graphics	ES(G)	3	0	2	5	4	4, 8, 9, 11	50	50	100
7.	25TAT21	Tamils and Technology	HUM	1	0	0	1	1	2,4,6, 9, 11	40	60	100
Practicals												
8.	25BTL21	Visionary Solution Lab	SD	0	0	4	4	2	4, 8, 9, 10,12,13, 17	60	40	100
Total				17	0	14	31	24				

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

Regulation 2025 (UG)
Students Admitted AY 2025-26
Curriculum and Syllabus
B. Tech - Pharmaceutical Technology

SEMESTER III

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25MAT32	Transform Techniques and Partial Differential Equations	BS	3	1	0	4	4	4, 8, 9, 11, 13	40	60	100
2.	25PTT31	Basic Principles and Calculations in Chemical Engineering	ES(PC)	2	1	0	3	3	4, 7, 8, 9, 12, 13	40	60	100
3.	25PTT32	Microbiology	ES(PC)	3	0	0	3	3	2,3,4,6,7, 9,12,13	40	60	100
4.	25PTT33	Pharmaceutical Chemistry	ES(PC)	3	0	0	3	3	3,4,9,12	40	60	100
5.	25PTT34	Human Anatomy and Physiology	ES(PC)	3	0	0	3	3	3,4,9	40	60	100
6.	25PTI31	Biochemistry of Intermediary Metabolism	ES(PC)	3	0	2	5	4	2,3,4,9	50	50	100
Practicals												
7.	25PTL31	Microbiology Laboratory	ES(PC)	0	0	3	3	1.5	3,4,6,9	60	40	100
8.	25PTL32	Pharmaceutical Chemistry Laboratory	ES(PC)	0	0	3	3	1.5	2, 3, 4, 6, 12, 15	60	40	100
Mandatory Course												
9.		Mandatory Course – II&	MC	1	0	2	3	0	-	100	-	100
Total				19	1	8	28	23				

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

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**SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE****(Autonomous)****Gobichettipalayam, Erode -638455****Regulation 2025 (UG)
Students Admitted AY 2025-26****Curriculum and Syllabus
B. Tech - Pharmaceutical Technology****SEMESTER IV**

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25MAT41	Probability Theory and Statistical Methods	BS	3	0	0	3	3	2,4,8,9,12	40	60	100
2.	25PTT41	Chemical Engineering Thermodynamics	ES(PC)	2	1	0	3	3	2,3,4,9,15	40	60	100
3.	25BTT42	Unit Operations in Process Industries	ES(PC)	3	0	0	3	3	4,7,8,9,12,13	40	60	100
4.	25PTT42	Immunology	ES(PC)	3	0	0	3	3	2,3,4,7,8,9,12	40	60	100
5.	25PTT43	Physical Pharmaceutics	ES(PC)	3	0	0	3	3	2,3,4,9,12	40	60	100
6.	25PTT44	Pharmaceutical Analysis	ES(PC)	3	0	0	3	3	4,6,7,9,11,13	40	60	100
7.	25SDC41	Soft and Analytical Skills - I	SD	1	0	0	1	1	4,8,10	100	0	100
Practicals												
8.	25PTL41	Physical Pharmaceutics Laboratory	ES(PC)	0	0	3	3	1.5	4,7,8,9,12,13	60	40	100
9.	25BTL42	Unit Operations Laboratory	ES(PC)	0	0	3	3	1.5	3,4,9,12	60	40	100
Mandatory Courses												
10.		Mandatory Course – III&&	MC	3	0	0	3	0		100	-	100
Total				23	0	6	29	22				

&&Mandatory Course-III is a Non-credit Course

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**SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE****(Autonomous)****Gobichettipalayam, Erode -638455****Regulation 2025 (UG)****Students Admitted AY 2025-26****Curriculum and Syllabus****B. Tech - Pharmaceutical Technology****SEMESTER V**

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25PTT51	Pharmaceutical Dosage Forms	ES(PC)	3	0	0	3	3		40	60	100
2.	25PTT52	Fluid Mechanics	ES(PC)	3	0	0	3	3		40	60	100
3.	25PTT53	Pharmacology	ES(PC)	3	0	0	3	3		40	60	100
4.	25PTT54	Heat Transfer	ES(PC)	3	0	0	3	3		40	60	100
5.		Programme Elective – I*	ES(PE)	3	0	0	3	3		40	60	100
6.		Programme Elective –II*	ES(PE)	3	0	0	3	3		40	60	100
7.	25PTI57	Industry oriented course - I	SD	1	0	2	3	2	-	50	50	100
Practicals												
8.	25PTL51	Dosage Forms Laboratory	ES(PC)	0	0	3	3	1.5		60	40	100
9.	25PTL52	Pharmacology Laboratory	ES(PC)	0	0	3	3	1.5		60	40	100
10.		Summer Internship \$	SD	0	0	0	0	1		100	-	100
Mandatory Course												
11.	25SDC51	Soft and Analytical Skills - II	SD	1	0	0	1	0		100	-	100
Total				20	0	8	28	24				
For Honours Degree												
1.		Capstone Design Project – Level I	CDP	0	0	12	12	6				
or												
1.		Honours Elective -I	T	3	0	0	3	3				
2.		Honours Elective -II	T	3	0	0	3	3				
For Minor Degree												
1.		Minor Elective-I	T	3	0	0	3	3				
2.		Minor Elective -II	T	3	0	0	3	3				

*Programme Elective-I shall be chosen from the list of Programme electives (Verticals) offered by same Programme.

\$ The students undergone summer internship during IV semester summer vacation will be evaluated in V semester.

*Honors Degree Elective-I & II and Minor Degree Elective-I & II shall be chosen from the list of Programme electives.

**SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE****(Autonomous)****Gobichettipalayam, Erode -638455****Regulation 2025 (UG)****Students Admitted AY 2025-26****Curriculum and Syllabus****B. Tech - Pharmaceutical Technology****SEMESTER VI**

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25PTT61	Mass Transfer Operations	ES(PC)	3	0	0	3	3		40	60	100
2.	25PTT62	Instrumental Techniques in Drug Analysis	ES(PC)	3	0	0	3	3		40	60	100
3.		Programme Elective III *	OE	3	0	0	3	3		40	60	100
4.		Programme Elective IV *	ES(PE)	3	0	0	3	3		40	60	100
5.		Programme Elective – V*	ES(PE)	3	0	0	3	3		40	60	100
6.		Self-Learning Course – I	SL	1	0	0	1	1	-	100	-	100
7.		Industry oriented course - II	SD	1	0	2	3	2	-	50	50	100
8.		Climate Change and Sustainability	HUM	2	0	0	2	2	4, 6, 7, 11, 12, 13, 14, 15	40	60	100
Practicals												
9.	25PTL61	Heat and Mass Transfer Operations Laboratory	ES(PC)	0	0	3	3	1.5		60	40	100
10.	25PTL62	Instrumental Techniques in Drug Analysis Laboratory	ES(PC)	0	0	3	3	1.5		60	40	100
Total				-	-	-	-	23				
For Honours Degree												
1.		Capstone Design Project – Level II	CDP	0	0	12	12	6		SDC		
or												
3.		Honours Elective -III	T	3	0	0	3	3				
4.		Honours Elective -IV	T	3	0	0	3	3				
For Minor Degree												
3.		Minor Elective-III	T	3	0	0	3	3				
4.		Minor Elective -IV	T	3	0	0	3	3				

*Programme Elective-III to IV shall be chosen from the list Programme electives (Vertical) offered by same Programme.

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

**SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE****(Autonomous)****Gobichettipalayam, Erode -638455****Regulation 2025 (UG)****Students Admitted AY 2025-26****Curriculum and Syllabus****B. Tech - Pharmaceutical Technology****SEMESTER VII**

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25PTT71	Regulatory Requirements in Pharmaceutical Industries	ES(PC)	3	0	0	3	3		40	60	100
2.	25PTT72	Biopharmaceutics and Pharmacokinetics	ES (PC)	3	0	0	3	3		40	60	100
3.	25PTT73	Computer aided Drug Design	ES (PC)	3	0	0	3	3		40	60	100
4.	25UHV71	Universal Human Values - II	ES(PC)	3	0	0	3	3		40	60	100
5.		Programme Elective – VI*	ES(PC)	-	-	-	-	3	-	40	60	100
6.		Open Elective – I	OE	3	0	0	3	3		40	60	100
Practicals												
7.	25PTL71	Mini Project	SD	0	0	4	4	2		60	40	100
Total				-	-	-	-	20				
For Honours Degree												
1.		Capstone Design Project – Level III	CDP	0	0	12	12	6	SDC			
or												
5.		Honours Elective -V	T	3	0	0	3	3				
6.		Honours Elective -VI	T	3	0	0	3	3				
For Minor Degree												
5.		Minor Elective-V	T	3	0	0	3	3				
6.		Minor Elective -VI	T	3	0	0	3	3				

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SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE

(Autonomous)

Gobichettipalayam, Erode -638455

Regulation 2025 (UG)

Students Admitted AY 2025-26

Curriculum and Syllabus

B. Tech - Pharmaceutical Technology

SEMESTER VIII

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25PTL81	Project Work / Internship#	SD	0	0	20	20	10	4, 8, 9, 12, 17	40	60	100
Total				0	0	20	20	10				

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MANDATORY COURSES II &

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max. Marks		
				L	T	P				CA	ES	TM
1.	25MCT31	Introduction to Women and Gender Studies	MC	3	0	0	3	0	4, 5, 10, 16	100	-	100
2.	25MCT32	Elements of Literature	MC	3	0	0	3	0	4, 5, 10, 16	100	-	100
3.	25MCT33	Film Appreciation	MC	3	0	0	3	0	4, 10, 11, 16	100	-	100
4.	25MCT34	Disaster Risk Reduction and Management	MC	3	0	0	3	0	3, 6, 11, 13, 15	100	-	100

MANDATORY COURSES III &&

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max. Marks		
				L	T	P				CA	ES	TM
1.	25MCT41	Well Being with Traditional Practices - Yoga, Ayurveda and Siddha	MC	3	0	0	3	0	3, 4, 12	100	-	100
2.	25MCT42	History of Science and Technology in India	MC	3	0	0	3	0	4, 8, 9, 11	100	-	100
3.	25MCT43	Political and Economic Thought for a Humane Society	MC	3	0	0	3	0	1, 4, 8, 10, 16	100	-	100
4.	25MCT44	State, Nation Building and Politics in India	MC	3	0	0	3	0	4, 10, 11, 16	100	-	100
5.	25MCT45	Industrial Safety	MC	3	0	0	3	0	3, 8, 9, 12, 16	100	-	100


Chairman
B.S/Pharma.Tech

PROFESSIONAL SCHEMES

Programme Schemes	Scheme I Bioprocess Technology	Scheme II Biological Sciences	Scheme III Medical Pharmaceutical Technology	Scheme IV Food Technology	Scheme V Emerging Technology	Scheme VI Quality and Regulatory Affairs
1.	Bioprocess control and Instrumentation	Developmental Biology	Vaccine technology	Food Microbiology	Computer aided drug designing	Clinical Trials and Health care policies in Pharmaceutical Technology
2.	Fermentation Technology	Bio-conjugate Technology and Applications	Molecular Basis of Diseases and Therapeutics	Food Chemistry	Methods in Molecular diagnostics	Total Quality management for biotechnologist
3.	Biofuel Technology	Fundamentals in Metabolic Engineering	Biopharmaceutical Technology	Food Processing and Preservation	IoT Concepts and Applications	Quality assurance and quality control in Pharmaceutical Technology
4.	Bioprocess Economics and Plant Design	Marine Pharmaceutical Technology	Biosimilars and Monoclonal Antibody Production	Food Analysis	Data Science Fundamentals	Good Manufacturing Processes
5.	Process Equipment and Plant Design	Environmental Pharmaceutical Technology	Molecular Pathogenesis	Food Additives and Flavors	Biophysics	Intellectual property rights in Pharmaceutical Technology
6.	Mass Transfer Operations	Computational Biology	Genomics and Proteomics	Food Packaging Technology	Molecular Modelling	Industrial Hazard Management
7	Foundation Skills in integrated Product Development	System biology	Stem Cell Technology	Functional Foods and Nutraceuticals	Augmented Reality /Virtual Reality	Bioethics
8	Bioreactor Design and Scale-Up	Neurobiology and Cognitive Sciences	Pharmacogenomics	Food Quality Assurance and Quality Control	Tissue Engineering and Biomaterials	Pharmaceutical Technology products & it's Validation

Saurav

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BoS/Pharma.Tech

Registration of Professional Elective Courses from Verticals:

Programme 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 Programme Electives from a particular vertical or from different verticals. Further, only one Programme 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 2025.

Sawar

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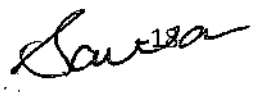
PROGRAMME ELECTIVE COURSES: SCHEMES

SCHEME I: BIOPROCESS TECHNOLOGY

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25BTE11	Bioprocess control and Instrumentation	PE	3	0	0	3	3	3, 4, 7, 8, 9, 12	40	60	100
2.	25BTE12	Fermentation Technology	PE	3	0	0	3	3	2, 3, 4, 7, 8, 9, 12	40	60	100
3.	25BTE13	Biofuel Technology	PE	3	0	0	3	3	7, 8, 9, 12, 13	40	60	100
4.	25BTE14	Bioprocess Economics and Plant Design	PE	3	0	0	3	3	4, 8, 9, 12, 17	40	60	100
5.	25BTE15	Process Equipment and Plant Design	PE	3	0	0	3	3	4, 7, 8, 9, 12, 13	40	60	100
6.	25BTE16	Mass Transfer Operations	PE	3	0	0	3	3	4, 6, 7, 8, 9, 12, 13	40	60	100
7.	25BTE17	Foundation Skills in integrated Product Development	PE	3	0	0	3	3	3, 4, 7, 8, 9, 12	40	60	100
8.	25BTE18	Bioreactor Design and Scale-Up	PE	3	0	0	3	3	2, 3, 4, 7, 8, 9, 12	40	60	100

VERTICAL II: BIOLOGICAL SCIENCES

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25BTE21	Developmental Biology	PE	3	0	0	3	3	3, 4, 9, 15	40	60	100
2.	25BTE22	Bio-conjugate Technology and Applications	PE	3	0	0	3	3	3, 4, 9, 12	40	60	100
3.	25BTE23	Fundamentals in Metabolic Engineering	PE	3	0	0	3	3	2, 3, 4, 7, 9, 12	40	60	100
4.	25BTE24	Marine Pharmaceutical Technology	PE	3	0	0	3	3	2, 3, 4, 6, 12, 14	40	60	100
5.	25BTE25	Environmental Pharmaceutical Technology	PE	3	0	0	3	3	3, 6, 7, 12, 13, 14, 15	40	60	100
6.	25BTE26	Computational Biology	PE	3	0	0	3	3	3, 4, 8, 9, 17	40	60	100


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PROGRAMME ELECTIVE COURSES: SCHEMES

SCHEME I: BIOPROCESS TECHNOLOGY

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25BTE11	Bioprocess control and Instrumentation	PE	3	0	0	3	3	3, 4, 7, 8, 9, 12	40	60	100
2.	25BTE12	Fermentation Technology	PE	3	0	0	3	3	2, 3, 4, 7, 8, 9, 12	40	60	100
3.	25BTE13	Biofuel Technology	PE	3	0	0	3	3	7, 8, 9, 12, 13	40	60	100
4.	25BTE14	Bioprocess Economics and Plant Design	PE	3	0	0	3	3	4, 8, 9, 12, 17	40	60	100
5.	25BTE15	Process Equipment and Plant Design	PE	3	0	0	3	3	4, 7, 8, 9, 12, 13	40	60	100
6.	25BTE16	Mass Transfer Operations	PE	3	0	0	3	3	4, 6, 7, 8, 9, 12, 13	40	60	100
7.	25BTE17	Foundation Skills in Integrated Product Development	PE	3	0	0	3	3	3, 4, 7, 8, 9, 12	40	60	100
8.	25BTE18	Bioreactor Design and Scale-Up	PE	3	0	0	3	3	2, 3, 4, 7, 8, 9, 12	40	60	100

VERTICAL II: BIOLOGICAL SCIENCES

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25BTE21	Developmental Biology	PE	3	0	0	3	3	3, 4, 9, 15	40	60	100
2.	25BTE22	Bio-conjugate Technology and Applications	PE	3	0	0	3	3	3, 4, 9, 12	40	60	100
3.	25BTE23	Fundamentals in Metabolic Engineering	PE	3	0	0	3	3	2, 3, 4, 7, 9, 12	40	60	100
4.	25BTE24	Marine Pharmaceutical Technology	PE	3	0	0	3	3	2, 3, 4, 6, 12, 14	40	60	100
5.	25BTE25	Environmental Pharmaceutical Technology	PE	3	0	0	3	3	3, 6, 7, 12, 13, 14, 15	40	60	100
6.	25BTE26	Computational Biology	PE	3	0	0	3	3	3, 4, 8, 9, 17	40	60	100

7	25BTE27	System biology	PE	3	0	0	3	3	3, 4, 9, 17	40	60	100
8	25BTE28	Neurobiology and Cognitive Sciences	PE	3	0	0	3	3	3, 4, 9	40	60	100

VERTICAL III: MEDICAL PHARMACEUTICAL TECHNOLOGY

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25BTE31	Vaccine technology	PE	3	0	0	3	3	3, 4, 9	40	60	100
2.	25BTE32	Molecular Basis of Diseases and Therapeutics	PE	3	0	0	3	3	3, 4, 9	40	60	100
3.	25BTE33	Biopharmaceutical Technology	PE	3	0	0	3	3	3, 4, 8, 9, 12	40	60	100
4.	25BTE34	Biosimilars and Monoclonal Antibody Production	PE	3	0	0	3	3	3, 4, 8, 9	40	60	100
5.	25BTE35	Molecular Pathogenesis	PE	3	0	0	3	3	3, 4, 9	40	60	100
6.	25BTE36	Genomics and Proteomics	PE	3	0	0	3	3	3, 4, 9, 17	40	60	100
7.	25BTE37	Stem Cell Technology	PE	3	0	0	3	3	3, 4, 9	40	60	100
8.	25BTE38	Pharmacogenomics	PE	3	0	0	3	3	3, 4, 9	40	60	100

VERTICAL IV-FOOD TECHNOLOGY

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25BTE41	Food Microbiology	PE	3	0	0	3	3	2, 3, 4, 6, 12	40	60	100
2.	25BTE42	Food Chemistry	PE	3	0	0	3	3	2, 3, 4, 12	40	60	100
3.	25BTE43	Food Processing and Preservation	PE	2	1	0	3	3	2, 3, 4, 8, 9, 12	40	60	100
4.	25BTE44	Food Analysis	PE	3	0	0	3	3	2, 3, 4, 6, 12	40	60	100
5.	25BTE45	Food Additives and Flavours	PE	3	0	0	3	3	2, 3, 4, 12	40	60	100

6.	25BTE46	Food Packaging Technology	PE	3	0	0	3	3	2, 3, 4, 9, 12	40	60	100
7.	25BTE47	Functional Foods and Nutraceuticals	PE	3	0	0	3	3	2, 3, 4, 12	40	60	100
8.	25BTE48	Food Quality Assurance and Quality Control	PE	3	0	0	3	3	2, 3, 4, 9, 12	40	60	100

VERTICAL V-EMERGING TECHNOLOGY

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
1.	25BTE51	Computer aided drug designing	PE	3	0	0	3	3	3, 4, 8, 9	40	60	100
2.	25BTE52	Methods in Molecular Diagnostics	PE	3	0	0	3	3	3, 4, 9.	40	60	100
3.	25BTE53	IoT Concepts and Applications	PE	2	1	0	3	3	4, 7, 8, 9, 11	40	60	100
4.	25BTE54	Data Science Fundamentals	PE	3	0	0	3	3	4, 8, 9, 10, 17	40	60	100
5.	25BTE55	Biophysics	PE	3	0	0	3	3	3, 4, 9	40	60	100
6.	25BTE56	Molecular Modelling	PE	3	0	0	3	3	3, 4, 9	40	60	100
7.	25BTE57	Augmented Reality /Virtual Reality	PE	3	0	0	3	3	4, 8, 9, 10	40	60	100
8.	25BTE58	Tissue Engineering and Biomaterials	PE	3	0	0	3	3	3, 4, 9, 12	40	60	100

VERTICAL VI-EMERGING TECHNOLOGY

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max. Marks		
				L	T	P				CA	ES	TM
1.	25BTE61	Clinical Trials and Health care policies in Pharmaceutical Technology	PE	3	0	0	3	3	3, 4, 9, 15	40	60	100
2.	25BTE62	Total Quality management for biotechnologist	PE	3	0	0	3	3	3, 4, 9, 12	40	60	100
3.	25BTE63	Quality assurance and quality control in Pharmaceutical Technology	PE	2	1	0	3	3	2, 3, 4, 7, 9, 12	40	60	100
4.	25BTE64	Good Manufacturing Processes	PE	3	0	0	3	3	2, 3, 4, 6, 12, 14	40	60	100

5.	25BTE65	Intellectual property rights in Pharmaceutical Technology	PE	3	0	0	3	3	3, 6, 7, 12, 13, 14, 15	40	60	100
6.	25BTE66	Industrial Hazard Management	PE	3	0	0	3	3	3, 4, 8, 9, 17	40	60	100
7.	25BTE67	Bioethics	PE	3	0	0	3	3	3,5,6,8,9	40	60	100
8.	25BTE68	Pharmaceutical Technology Products & their Validation	PE	3	0	0	3	3	3,5,6,8,10	40	60	100

OPEN ELECTIVES

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
OFFERED BY DEPARTMENT OF CIVIL ENGINEERING												
1	25CE011	Civil and Infrastructure Engineering	OE	3	0	0	3	3		40	60	100
2	25CE012	Environmental Pollution and waste management	OE	3	0	0	3	3		40	60	100
3	25CE013	Environmental Impact Assessment	OE	3	0	0	3	3		40	60	100
4	25CE014	Building Services	OE	3	0	0	3	3		40	60	100
5	25CE015	Water, Sanitation and Health	OE	3	0	0	3	3		40	60	100
OFFERED BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING												
1	25CS011	Foundation of AR/VR	OE	2	0	2	4	3		50	50	100
2	25CS012	Web Designing	OE	2	0	2	4	3		50	50	100
3	25CS013	Blockchain fundamentals	OE	2	0	2	4	3		50	50	100
4	25CS014	Knowledge Management	OE	2	0	2	4	3		50	50	100
5	25CS015	Cloud Computing Essentials	OE	2	0	2	4	3		50	50	100
OFFERED BY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING												
1	25ECO11	Basics of electronics in automation	OE	3	0	0	3	3		40	60	100
2	25ECO12	Optical engineering	OE	3	0	0	3	3		40	60	100
3	25ECO13	E-waste management	OE	3	0	0	3	3		40	60	100
4	25ECO14	Consumer electronics	OE	3	0	0	3	3		40	60	100

5	25EC015	Principles of communication engineering	OE	3	0	0	3	3		40	60	100
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OFFERED BY DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

1.	25EE011	Renewable Energy Sources	OE	3	0	0	3	3		40	60	100
2.	25EE012	Electrical Vehicle -	OE	3	0	0	3	3	-----	40	60	100
3.	25EE013	Energy Auditing and Conservation	OE	3	0	0	3	3		40	60	100
4.	25EE014	Domestic and Industrial Electrical Installations	OE	3	0	0	3	3		40	60	100
5.	25EE015	Microcontroller Based System Design	OE	3	0	0	3	3		40	60	100

OFFERED BY DEPARTMENT OF MECHANICAL ENGINEERING

1	25ME011	Industrial Instrumentation	OE	3	0	0	3	3		40	60	100
2	25ME012	Energy Technology	OE	3	0	0	3	3		40	60	100
3	25ME013	Reverse Engineering	OE	3	0	0	3	3		40	60	100
4	25ME014	Fire Safety Engineering	OE	3	0	0	3	3		40	60	100
5	25ME015	Nano Technology	OE	3	0	0	3	3		40	60	100
6	25ME016	Entrepreneurship Development	OE	3	0	0	3	3		40	60	100

OFFERED BY DEPARTMENT ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

1	25AD011	Introduction to Big Data	OE	2	0	2	4	3		50	50	100
2	25AD012	Principles of Data Science	OE	2	0	2	4	3		50	50	100
3	25AD013	Data Visualization and its Applications	OE	2	0	2	4	3		50	50	100
4	25AD014	Data Warehousing and Mining	OE	2	0	2	4	3		50	50	100
5	25AD015	Principles of Cyber Security	OE	2	0	2	4	3		50	50	100

OFFERED BY DEPARTMENT INFORMATION TECHNOLOGY

1	25IT011	Basics of Java Programming	OE	2	0	2	4	3		50	50	100
2	25IT012	Ethical Hacking	OE	2	0	2	4	3		50	50	100
3	25IT013	E-Commerce and Applications	OE	2	0	2	4	3		50	50	100
4	25IT014	Basics of Android Application Development	OE	2	0	2	4	3		50	50	100
5	25IT015	Introduction to Web Design	OE	2	0	2	4	3		50	50	100

OFFERED BY DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY

1	25PY011	Nutraceuticals	OE	3	0	0	3	3		40	60	100
2	25PY012	IPR for Pharma Industry	OE	3	0	0	3	3		40	60	100
3	25PY013	Pharmaceutical Nanotechnology	OE	3	0	0	3	3		40	60	100
4	25PY014	Basics of Human Anatomy and Physiology	OE	3	0	0	3	3		40	60	100

OFFERED BY DEPARTMENT BIOMEDICAL ENGINEERING

1	25BM011	Biomedical Instrumentation	OE	3	0	0	3	3		40	60	100
2	25BM012	Medical Optics	OE	3	0	0	3	3		40	60	100
3	25BM013	Biometric systems and their applications	OE	3	0	0	3	3		40	60	100
4	25BM014	Healthcare Management Systems	OE	3	0	0	3	3		40	60	100
5	25BM015	IOT in Medicine	OE	3	0	0	3	3		40	60	100

OFFERED BY DEPARTMENT BIO TECHNOLOGY

1	25BT011	Pharmaceutical Technology for Engineers	OE	3	0	0	3	3		40	60	100
2	25BT012	Enzyme Technology	OE	3	0	0	3	3		40	60	100
3	25BT013	Introduction to Plant Pharmaceutical Technology	OE	3	0	0	3	3		40	60	100
4	25BT014	Biofuels	OE	3	0	0	3	3		40	60	100
5	25BT015	Forensic Technology	OE	3	0	0	3	3		40	60	100

25IPA11
SDG No. 3,4,10,11,16

INDUCTION PROGRAMME
(Common to B.E./B.Tech. all Branches)

L	T	P	C
-	-	-	0

This is a mandatory **2 week programme** to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over.

The induction programme has been introduced by AICTE with the following objective:

"Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed."

"One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character." Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

(i) Ice breaking :

Ice-breaking activities were conducted within the respective departments/branches to facilitate interaction among students. These sessions helped participants become acquainted with one another, fostered a sense of belonging, and encouraged teamwork and effective communication. The activities created a friendly and engaging learning environment.

(ii) Creative Arts and Physical Activities:

Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it every day for the duration of the program. These would allow for creative expression and it would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later. Physical Activities would involve a daily routine of physical activity with games and sports, gardening, etc.

(iii) Universal Human Values:

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human

Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and don't's, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing.

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

(iv) Literary Activity:

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

(v) Proficiency Modules:

This would address some lacunas that students might have, for example, English, computer familiarity etc.

(vi) Lectures by Eminent People:

Motivational lectures by eminent people from all walks of life should be arranged to give the students exposure to people who are socially active or in public life.

(vii) Visits to Local Area:

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

(viii) Familiarization to Dept./Branch & Innovations:

They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

(ix) Department Specific Activities:

About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking etc.) that are relevant to the particular branch of Engineering/Technology/Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop.

For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

(x) Life at SVHEC and its activities:

A campus tour was organized to familiarize students with the college infrastructure and facilities. During the tour, students visited various academic blocks, laboratories, library, seminar halls, sports facilities, administrative offices, and other important locations within the campus. The session helped students gain a better understanding of the resources available to support their academic and personal development while fostering a sense of comfort and belonging in the new environment.

A session on college activities was conducted to introduce students to the various academic, co-curricular, and extracurricular opportunities available on campus. Students were informed about clubs, professional societies, cultural events, sports activities, community service initiatives, and skill development programmes. The session encouraged active participation and highlighted the importance of holistic development alongside academic excellence.

Induction Programme is totally an activity based programme and therefore there shall be no tests / assessments during this programme.

REFERENCES:

1. Guide to Induction program from AICTE

COURSE OUTCOMES:

At the end of the course the students will be able

- CO1:** To listen to and understand general and complex academic information
CO2: To listen to and understand different points of view in a discussion
CO3: To speak fluently and accurately in formal and informal communicative contexts
CO4: To describe products and processes and explain their uses clearly as well as accurately
CO5: To express their opinions effectively in both formal and informal discussions

E. RESOURCES:

- <https://www.ted.com/about/programs-initiatives/ted-talks-education>
- <https://learnenglish.britishcouncil.org/>

CO's & PO's MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C01	-	-	-	-	-	-	-	3	3	-	3
C02	-	-	-	-	-	-	-	3	3	-	3
C03	-	-	-	-	-	-	1	2	3	-	2
C04	-	-	-	-	-	-	-	2	3	-	2
C05	-	-	-	-	-	-	1	3	3	-	2
AVR							1.00	2.60	3.00		2.40

25ENI11	COMMUNICATIVE ENGLISH-I	L	T	P	C
SDG No. 4,5,8,9,16	(Common to B.E./B.Tech. All Branches)	3	0	2	4

COURSE OBJECTIVES:

- To build a strong foundation in basic grammar and communication skills through structured activities in listening, speaking, reading and writing.
- To develop the ability to express, describe and summarize ideas clearly using appropriate language structures and professional formats.
- To enhance technical communication by practicing structured descriptions, storytelling and data-based writing tasks.
- To enable clear and logical expression through organized speech, note-making and grammar-focused writing.
- To refine expressive and comparative communication skills using advanced vocabulary, professional formats and contextual grammar.

UNIT-I	BUILDING BLOCKS OF COMMUNICATION	6+6
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Grammar : Parts of Speech - Verbs - Word formation - Articles
Listening : Listening to Short Conversations & Descriptions
Speaking : Introducing oneself - Narrating Personal Experience
Reading : Reading Comprehension - Skimming - Scanning - Speed reading
Writing : Formal Letter Writing (Seeking Permission for Industrial Visit & In plant Training) - Instruction Writing

UNIT-II	PROFESSIONAL AND SOCIAL COMMUNICATION	6+6
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Grammar : Conjunction- Preposition- Cause And Effect Expression- Purpose and Means
Listening : Listening for Specific Information (Gap Filling); Listening the Announcement for Data
Speaking : Introducing the Peers- Describing about Person, Place, Things, Food, Culture, etc.
Reading : Reading Newspaper Articles & Technical Blogs
Writing : Professional Email Writing – Checklist

UNIT-III	COMPREHENSION AND PRESENTATION SKILLS	6+6
Grammar	: Types of Sentence - Negatives -Types of Question (Y/N & WH) - Degrees of Comparison.	
Listening	: Listening to TED Talks and Short Technical Reels	
Speaking	: Story Telling & Role Play	
Reading	: Reading comprehension- Reading Print Interview and Answering to the Questions	
Writing	: Paragraph Writing- Data Interpretation & Transcoding (Bar, Pie & Flow Chart)	

UNIT-IV	ENGLISH FOR WORKPLACE READINESS	6+6
Grammar	: Tense (Simple, Continuous, Perfect & Perfect Continuous)	
Listening	: Listening to Inspirational Speech & Professional Interviews	
Speaking	: Extempore Speech- Asking for Information (Direction & General Enquiries)	
Reading	: Reading Engineering/ Technical Essays - Reading Brochures	
Writing	: Note Making & Note Taking - Recommendation Writing	

UNIT-V	ENGLISH FOR FORMAL AND FUNCTIONAL COMMUNICATION	6+6
Grammar	: Modal Auxiliaries - Homophones & Homonyms - Numerical Adjectives - Phrasal Verbs	
Listening	: Listening to Telephonic Conversation- Listening to Product Description	
Speaking	: Master of Ceremony(MoC): Welcome Address & Vote of Thanks	
Reading	: Reading Graphical Materials for Comparison - Reading Advertisement	
Writing	: Report Writing (Accident/ Survey) - Compare and Contrast Essay Writing	

TOTAL : 60 PERIODS

COURSE OUTCOMES:

At the end of the course,

CO1: Learners will be able to apply basic grammar rules and effectively use LSRW skills for formal and informal communication.

CO2: Learners will be able to construct coherent descriptions and summaries using appropriate connectors, prepositions, and professional vocabulary.

CO3: Learners will be able to describe processes and products clearly in spoken and written formats using suitable sentence structures and data interpretation skills.

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CO4: Learners will be able to classify information, make recommendations, and present structured content through both oral and written communication.

CO5: Learners will be able to express opinions, compare information, and write detailed reports using advanced grammar, graphical references, and formal structures.

TEXT BOOKS:

1. Department of English, AnnaUniversity, "English for Engineers & Technologists" Orient Blackswan Private Ltd, 2020.
2. Dr.Veena Selvam, Dr.Sujatha Priyadarshini, & CO, Department of English, Anna University, "English for Science & Technology" Cambridge University Press, 2021.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeeta Sharma, "Technical Communication – Principles and Practices", Oxford Univ. Press, New Delhi, 2016.
2. Lakshminarayanan, "A Course Book on Technical English", Scitech Publications (India) Pvt.Ltd. 2012.
3. Aysha Viswamohan, "English For Technical Communication (With CD)", McGraw Hill Education, ISBN : 0070264244, 2008.
4. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna Publishing House, 2016.

E. RESOURCES:

- <https://learnenglish.britishcouncil.org/>

COs-Pos MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	-	2	3	-	3
CO2	-	-	-	-	-	-	-	2	3	-	2
CO3	-	-	-	1	-	-	-	3	3	-	3
CO4	-	-	-	1	-	-	-	3	3	-	3
CO5	-	-	-	-	-	-	-	2	3	-	2
AVR	-	-	-	1.00	-	-	-	2.40	3.00	-	2.60

1- Low, 2- Medium, 3-High, "-" No Correlation

25MAT11

MATRICES AND CALCULUS
(Common to B.E./B.Tech. all Branches)

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To understand the concepts of eigen values, eigenvectors and quadratic forms.
- To develop the skill on the geometric properties of curves using differential calculus.
- To equip students to analyze and optimize the functions of several variables.
- To make the students understand various techniques of integration
- To apply vector calculus and its principles to evaluate vector fields.

UNIT-I

MATRICES

9

Eigen values and Eigen vectors of a real matrix – Characteristic equation–Properties of Eigen values and Eigen vectors – Cayley - Hamilton theorem – Reduction of a quadratic form to canonical form by orthogonal transformation–Nature of quadratic forms.

UNIT-II

DIFFERENTIAL CALCULUS

9

Curvature – Radius of curvature (Cartesian Co – ordinates only) – Centre of curvature and Circle of curvature – Involute and Evolute (Parabola, Ellipse)

UNIT-III

FUNCTIONS OF SEVERAL VARIABLES

9

Euler's theorem for homogenous functions - Jacobians – Taylor's series expansion – Maxima and Minima for functions of two variables – Methods of Lagrangian multipliers.

UNIT-IV

INTEGRAL CALCULUS

9

Definite and Indefinite integrals - Substitution rule - Techniques of Integration : Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Improper integrals.

UNIT-V

VECTOR CALCULUS

9

Irrotational and solenoidal vector fields – Green's theorem in plane , Gauss divergence theorem and Stoke's theorem (Cube, Cuboid and Rectangular parallelepiped only).

TOTAL: 45 PERIODS

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COURSE OUTCOMES:

At the end of the course the students will be able to :

- CO1: Assimilate the eigen values and eigen vectors in reduction of quadratic form into canonical form.
- CO2: Analyze the center of curvature, circle of curvature and develop the evolutes.
- CO3: Expand the Taylor series and calculate the extreme value for function of several variables.
- CO4: Apply different methods of integration in solving practical problems
- CO5: Apply the divergence and curl in vector integral theorems of vector fields.

TEXTBOOKS :

1. James Stewart, "Calculus : Early Transcendental", Cengage Learning, 9th Edition, New Delhi, 2023. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8]
2. Grewal. B. S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 45th Edition, 2020.

REFERENCE BOOKS :

1. Thomas. G. B., Hass. J, and Weir. M.D, "Thomas Calculus", 14th Edition, Pearson India, 2022
2. Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2021
3. Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2019
4. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2019

CO's - PO's MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	1	-	-	-	2	-	2	3
CO2	3	3	2	2	-	-	-	3	-	2	3
CO3	3	3	2	2	-	-	-	3	-	2	3
CO4	3	3	2	1	-	-	-	2	-	2	3
CO5	3	2	2	1	-	-	-	2	-	2	3
AVG	3.00	2.80	2.00	1.40	-	-	-	2.40	-	2.00	3.00

1- Low, 2- Medium , 3-High, "-" No Correlation

25PHI11

ENGINEERING PHYSICS
(B.E./B. Tech. - Common to all branches)

L	T	P	C
3	0	2	4

COURSE OBJECTIVES:

- To make the students effectively achieve an understanding of mechanics
- Provide knowledge of elastic property, thermal property of materials and its applications
- Impart knowledge of laser and their applications
- Introduce the essential principles of fiber optics and its applications
- Equipping the students to successfully understand the importance of quantum physics

UNIT-I

MECHANICS

10

Multi-particle dynamics: Center of mass (CM) – CM of continuous bodies – Motion of the CM – Moment of inertia – Theorems of M.I. – M.I of a diatomic molecule – Torque – Rotational energy state of a rigid diatomic molecule – Torsional pendulum – double pendulum.

UNIT-II

PROPERTIES OF MATTER

10

Elasticity- Hooke's law – stress – strain diagram – Poisson's ratio – Factors affecting elasticity – bending of beams - Bending moment equation – Depression of a cantilever – Young's modulus by uniform bending – I-shaped girders.

UNIT-III

LASER

9

Lasers: Stimulated absorption – Spontaneous emission – Stimulated emission – Population inversion-Einstein's coefficients derivation and their relations – Pumping methods – Types of lasers – CO₂ laser, Semiconductor lasers (Homojunction & Heterojunction) – Holography - Industrial and Medical Applications of lasers.

UNIT-IV

FIBER OPTICS

8

Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle – Types of optical fibres (Material, Refractive Index, Mode) – Attenuation, Dispersion, Bending – Fiber optics communication system (qualitative) – Temperature and Displacement sensors – Fiber optic endoscope.

UNIT-V

QUANTUM PHYSICS

8

Photons and light waves – Electrons and matter waves – The Schrodinger equation (Time dependent and time independent forms) – Particle in a one-dimensional rigid box for Eigen value and Eigen function – tunneling (qualitative) – Electron microscope - Scanning Tunneling microscope.

TOTAL: 45 PERIODS

LIST OF EXERCISE/EXPERIMENTS

1. Determination of rigidity modulus of wire and moment of inertia of regular objects – Torsion pendulum.
2. Determination of Young's modulus by Uniform bending method.
3. Determination of Simple harmonic oscillations of cantilever.
4. Determination of the wavelength of the laser using grating
5. Determination of width of the groove of CD using laser.
6. Determination of numerical aperture and acceptance angle in an optical fiber.
7. Determination particle size of Lycopodium powder using semiconductor laser.
8. Determination of thickness of a material by Air-wedge method.

TOTAL: 30 PERIODS

TOTAL: 45 + 30 = 75 PERIODS

COURSE OUTCOME

At the end of the course the students will be able to

- C01:** Demonstrate the foundational knowledge in Mechanics
- C02:** Interpret the elastic properties of solid materials and their applications
- C03:** Apply the comprehended knowledge about laser and its applications
- C04:** Apply the comprehended knowledge about fibre optic communication system in various engineering applications.
- C05:** Understand the fundamental principles of quantum mechanics.

TEXT BOOKS:

1. D.Kleppner and R.Kolenkow, "An Introduction to Mechanics," McGraw Hill Education (Indian Edition), 2021.
2. Arthur Beiser, Shobhit Mahajan, S.Rai Choudhury, "Concepts of Modern Physics," McGraw-Hill (Indian Edition), 2024.

REFERENCE BOOKS:

1. K.Thyagarajan and A.Ghatak, "Lasers: Fundamentals and Applications," Laxmi Publications, (Indian Edition), 2023
2. D.Halliday, R.Resnick and J.Walker, "Principles of Physics," Wiley (Indian Edition), 2021

3. N.Garcia, A.Damask and S.Schwarz, "Physics for Computer Science Students," Springer-Verlag, 2012

PRACTICAL REFERENCES:

1. A.K. Katiyar (Author), C.K. Pandey, Engineering Physics: Theory and Practical Paperback, 2015.

Learning Resources:

1. <https://archive.nptel.ac.in/courses/113/106/113106039/>
2. <https://vlab.amrita.edu/?sub=1>

CO's- PO's MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C01	3	3	2	1	1	-	-	-	-	-	-
C02	3	3	2	1	1	-	-	-	-	-	-
C03	3	2	2	1	2	-	-	-	-	-	-
C04	3	2	2	1	2	-	-	-	-	-	-
C05	3	3	1	1	2	-	-	-	-	-	-
AVG	3	3	2	1	2	-	-	-	-	-	-

1- Low, 2- Medium , 3-High, "-" No Correlation

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25CYI11

ENGINEERING CHEMISTRY
(B.E./B.Tech-Common to all branches)

L T P C
3 0 2 4

COURSE OBJECTIVES:

- To provide foundational knowledge on water quality and water treatment processes.
- To introduce the principles of nanochemistry, methods of synthesizing nanomaterials, and their applications.
- To familiarize students with polymer chemistry, polymerization techniques, and the manufacturing methods of plastics.
- To impart knowledge on fuels and combustion, including manufacturing of fuels, fuel analysis, and alternative energy sources.
- To develop an understanding of electrochemistry and its applications in energy storage devices and electric vehicles.

UNIT-I

WATER AND ITS TREATMENT

9

Water quality parameters – Estimation of hardness by EDTA method - Boiler troubles - Internal treatment and External treatment of boiler feed water – Ion exchange method and zeolite process – Desalination method: Reverse Osmosis.

UNIT-II

NANOCHEMISTRY

9

Basics of Nanochemistry - Size-dependent properties - Types of nanomaterials: nanoparticle, nanowire, nanorod and nanotube - Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, electrochemical deposition - Applications of nanomaterials.

UNIT-III

POLYMER CHEMISTRY

9

Basics of polymer chemistry - Mechanism of polymerization: Addition (Free Radical); condensation and copolymerization - Thermoplastics & thermosetting plastics - Preparation, properties and uses of Nylon 6, 6 and Epoxy resin - Fabrication of plastics - (Compression, Injection & Extrusion moulding).

UNIT-IV

FUELS AND COMBUSTION

9

Classification of fuels - Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method) - Manufacture of synthetic petrol (Bergius process) - Knocking - octane number, cetane number - Power alcohol and biodiesel - Flue gas analysis - ORSAT Method.

UNIT-V

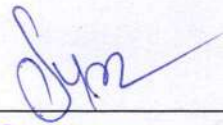
ELECTROCHEMISTRY AND STORAGE DEVICES

9

Types of cells – types of electrodes: calomel electrode, glass electrode – Nernst equation – EMF series - Batteries: Primary battery - Dry cell, Secondary battery - lead acid battery and lithium-ion-battery; H₂-O₂ fuel cell; Supercapacitors - Electric vehicles.

TOTAL: 45 HOURS

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LIST OF EXPERIEMENTS

1. Determination of types and amount of alkalinity in a water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of strength of given hydrochloric acid using pH meter.
5. Determination of strength of acids in a mixture of acids using conductivity meter.
6. Conductometric titration of barium chloride against sodium sulphate (precipitation titration).
7. Estimation of iron content of the given solution using potentiometer.
8. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.

TOTAL: 30 HOURS

GRAND TOTAL: 45 + 30 = 75 HOURS

COURSE OUTCOMES:

At the end of the course the students will be able

- C01:** Assess the quality of water from water quality parameter and propose suitable treatment methodologies to treat water.
- C02:** Summarize the basic concepts of nanochemistry in designing the synthesis of nanomaterials for engineering and technology applications.
- C03:** Understand the basic knowledge of polymers to apply the futuristic material needs.
- C04:** Familiar with the concepts of fuels for engineering processes and applications.
- C05:** Apply the concept of electrochemistry in the fabrication of energy storage devices.

TEXT BOOKS:

1. Dr. A. Ravikrishnan, "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Limited, 23rd Edition, 2023.
2. S. S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

REFERENCE BOOKS:

1. Shashi Chawla, "A Text Book of Engineering Chemistry", Dhanpat Rai & Co (Pvt.) Ltd, New Delhi, 2011.

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2. O.G. Palanna, "Engineering Chemistry", McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.

ONLINE SOURCES:

Unit1:

https://www.youtube.com/watch?v=4SRMmqH2s4&list=PLLy_2iUCG87AZvtaiuD3r4HATrBKhb90P (IIT ROORKEE NPTEL) & <https://www.youtube.com/watch?v=o6iurO2Cwd0> (NPTEL-NOC IITM)

Unit 2:

<https://www.youtube.com/watch?v=0EWCqCIsFOA&list=PLyqSpQzTE6M8682dGkNTN8936vSY4CbqZ> (NPTEL-NOC IITM)

Unit 3:

<https://www.youtube.com/watch?v=jSNlmOwpYg&list=PLbMVogVj5nJT0slH3tuas5Blp1DG8ZpMj> (NPTELHRD)

Unit 4:

<https://www.youtube.com/watch?v=1-EliKQ0erA> (AKTU DIGITAL EDUCATION)

Unit 5:

<https://www.youtube.com/watch?v=nh2xbyOaERw> &

<https://www.youtube.com/watch?v=iFVVv23ZzGE> (IIT ROORKEE NPTEL)

CO's- PO's MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C01	3	3	3	3	1	3	-	-	-	-	-
C02	3	2	2	1	3	3	-	-	-	-	2
C03	3	2	2	2	2	2	-	-	-	-	-
C04	3	2	3	2	2	2	-	-	-	-	-
C05	3	2	2	2	2	2	-	-	-	-	-
AVG	3	2	2	2	2	2	-	-	-	-	2

1- Low, 2- Medium , 3-High, "-" No Correlation

25CSI11	PROBLEM SOLVING USING C PROGRAMMING	L	T	P	C
SDG No: 4, 8, 9, 10,17	(Common to: B.E. / B.Tech. all Branches)	3	0	2	4

COURSE OBJECTIVES:

- To learn how to think algorithmically to solve a problem.
- To gain knowledge of fundamental programming concepts in C programming.
- To explore the basic concept of arrays and pointers.
- To learn concept of functions and structures.
- To gain proficiency in file handling techniques.

UNIT-I**COMPUTATIONAL THINKING****9**

Overview of Computational Thinking and Key Techniques – Overview of Software Development Life Cycle – Introduction to Algorithmic Thinking – Elements: Sequence, Selection and Repetition – Representation of Flow Chart – Overview of Flow algorithm Tool – Pseudo- code– Introduction to programming languages

UNIT-II**BASICS OF C PROGRAMMING****9**

Introduction to C - Structure of C Programming - Compiling - Executing and Debugging - Character Set - Tokens - Identifiers - Data Types - Variable - Constants - Evaluating Expression - Type Conversion - Input and Output - Decision control and looping statements

UNIT-III**ARRAYS AND POINTERS****9**

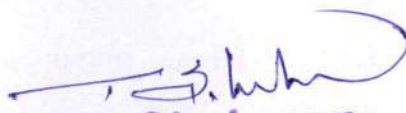
Introduction to Arrays - Declaration and Initialization of Single Dimensional Arrays - Array Operations - Declaration and Initialization of Two-Dimensional Arrays - Multidimensional Arrays - Declaring and Initializing Strings - Reading and Writing Strings - String Operations - Array of Strings. Introduction to Pointers - Pointer operators - Pointer arithmetic - Arrays and pointers - Array of pointers.

UNIT-IV**FUNCTIONS AND STRUCTURES****9**

Function - Types of Function – Elements - Pass by value - Pass by reference – Recursion - Storage Classes. Introduction to structures - Declaring and Defining Structure Variables - Accessing Structure Members - Structure Initialization - Nested structures - Array of structure – typedef - Union

UNIT-V**FILE PROCESSING****9**

Files: Introduction – Using files in C – Read data from files – Writing data to files – Error handling during File operation – Command line arguments.


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TOTAL : 45 PERIODS

PRACTICAL EXERCISES:

1. Implementation of algorithm, flowchart and pseudo code to solve electricity billing.
2. Implementation of algorithm, flowchart and pseudo code to solve retail shop billing.
3. Implementation of if, if-else, nested if and switch statements.
4. Implementation of while, do-while and for loops.
5. Implementation of sorting and searching algorithms.
6. Implementation of one-dimensional array, passing array to functions and array operations.
7. Implementation of programs for implementing various string operations like "copy", "finding length", "compare", "concatenate" with and without built-in library functions.
8. Implementation of pointer operators, call by reference, pointers with array.
9. Implementation of function calls, recursion, call by value.
10. Implementation of structure and nested structure.
11. Implementation of array of structures.
12. Implementation of file operations.
13. Implementation of file to read N character using file functions.

TOTAL: 30 PERIODS

TOTAL: 75 (45+30) PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

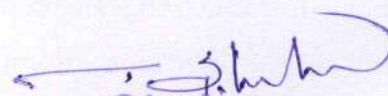
- CO 1 :** Construct algorithmic solutions for a given computational problem.
- CO 2 :** Demonstrate the understanding of fundamental concepts of C programming.
- CO 3 :** Utilize appropriate concepts of arrays and pointers to solve the programming problems effectively.
- CO 4 :** Apply concepts of functions and structures in C programming
- CO 5 :** Implement file I/O operations to store and retrieve data from files.

TEXT BOOKS:

1. GVenkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
2. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2023.
3. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2023.

REFERENCE BOOKS:

1. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2023
2. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C",
SVHEC - R2025


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McGraw-Hill Education, 2024.

3. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2022.

4. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2024.

E-RESOURCES:

1. Tutorial point - <https://www.tutorialspoint.com/c-programming/index.htm>
2. Greek for geeks - <https://www.geeksforgeeks.org/c-programming-language/>

CO's – PO's & PSO's MAPPING

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	1	2	-	3	3	1	2	2
CO2	2	3	2	1	2	1	1	2	-	3	2	2	2	2
CO3	3	2	2	1	3	1	1	2	-	3	3	2	2	2
CO4	2	3	3	1	2	2	1	2	-	3	2	2	3	2
CO5	2	2	3	2	1	-	-	2	1	2	2	2	2	2
AVG	2.2	2.4	2.4	1.2	2	1.3	1	2	1	2.8	2.4	1.8	2.2	2

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


Chairman
BoS/CSE&IT

25STAT11

தமிழர் மரபு

L T P C
1 0 0 1

(B.E./B.Tech- அனைத்து பாடப்பிரிவுகளுக்கும் பொதுவானது)

பாடநெறி நோக்கங்கள்:

- தமிழின் இலக்கியங்கள் மற்றும் நவீன இலக்கியங்களைப் புரிந்துகொள்ளுதல்
- தமிழ் கலாச்சார பாரம்பரியத்தைக் கற்றுக்கொள்ளுதல்
- தமிழர்களின் பல்வேறு கலைவடிவங்களைக் கண்டறிதல்
- தமிழர்களின் திணைக்கோட்பாடுகளை விளக்குதல்
- இந்திய சுதந்திர போராட்ட இயக்கங்களுக்கும் இந்திய கலாச்சாரத்திற்குமான தமிழர்களின் பங்களிப்பை உணர்தல்

அலகு - I

மொழி மற்றும் இலக்கியம்

3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமய சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் ஆறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமணப் பௌத்த மதங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு - II

மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை

3

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப்பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் - மிருதங்கம், பறை வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு - III

நாட்டுப்புறக் கலைகள் மற்றும் வீரவிளையாட்டுகள்

3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு - IV

தமிழர்களின் திணைக் கோட்பாடுகள்

3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவு, கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.



அலகு - V

இந்திய தேசிய இயக்கம் மற்றும்

3

இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிற்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிக்கள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

பாடநெறி முடிவுகள்:

இப்பாடத்தைப் படிப்பதின் முடிவில் மாணவர்கள்

- C01: தமிழின் பல்வேறு இலக்கியங்களைப் பற்றிய அறிவைப் பெறுவார்கள்
- C02: தமிழ் கலாச்சார பாரம்பரியத்தின் தனித்தன்மையைக் கற்றுக்கொள்வார்கள்
- C03: தமிழகத்தின் பல்வேறு கலைவடிவங்களைக் கண்டறிவார்கள்
- C04: தமிழர்களின் திணைக்கோட்பாடுகளை அறிந்துகொள்வார்கள்
- C05: தமிழ் சுதந்திரப்போராட்ட வீரர்கள் மற்றும் தமிழ் கலாச்சாரத்தை இந்தியாவின் மற்ற பகுதியுடன் ஒப்பிடும் திறனைப் பெறுவார்கள்

மின் -ஆதாரங்கள்:

1. <https://www.tamilvu.org/>

CO's -PO's விவரணையாக்கம்::

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C01	-	-	-	-	-	1	1	-	1	-	-
C02	-	-	-	-	-	1	1	-	1	-	-
C03	-	-	-	-	-	1	1	-	1	-	-
C04	-	-	-	-	-	1	1	-	1	-	-
C05	-	-	-	-	-	1	1	-	1	-	-
AVG	-	-	-	-	-	1	1	-	1	-	-

Shree Venkateshwara Hi-Tech Engineering College

25TAT11

HERITAGE OF TAMILS
(B.E./B.Tech-Common to all branches)

L T P C
1 0 0 1

COURSE OBJECTIVES:

- To understand the Sangam and modern literature of Tamil
- To learn the heritage of Tamil culture
- To recognize the various art forms of Tamils
- To explain the Thinaï concept of Tamils
- To realize the contribution of Tamils to Indian national movement and Indian culture

UNIT-I

LANGUAGE AND LITERATURE

3

Language Families in India - Dravidian Languages - Tamil as a Classical Language - Classical Literature in Tamil - Secular Nature of Sangam Literature - Distributive Justice in Sangam Literature- Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land- Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT-II

HERITAGE - ROCK ART PAINTINGS

3

TO MODERN ART - SCULPTURE

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT-III

FOLK AND MARTIAL ARTS

3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT-IV

THINAI CONCEPTS OF TAMILS

3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT-V

**CONTRIBUTION OF TAMILS TO INDIAN
NATIONAL MOVEMENT AND INDIAN CULTURE**

3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India - Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine - Inscriptions & Manuscripts - Print History of Tamil Books.

Shree Venkateshwara Hi-Tech Engineering College

COURSE OUTCOMES:

At the end of the course the student will be able to

- C01:** Gain knowledge about various literatures of Tamil
- C02:** Learn the uniqueness of Tamil cultural heritage
- C03:** Find various art forms of Tamil Nadu
- C04:** Understand the Thinaï concepts in Tamil
- C05:** Distinguish the contribution of Tamils to Indian national movement and Indian culture

E- RESOURCES:

1. <https://www.tamilvu.org/>

CO's -PO's MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C01	-	-	-	-	-	1	1	-	1	-	-
C02	-	-	-	-	-	1	1	-	1	-	-
C03	-	-	-	-	-	1	1	-	1	-	-
C04	-	-	-	-	-	1	1	-	1	-	-
C05	-	-	-	-	-	1	1	-	1	-	-
AVG	-	-	-	-	-	1	1	-	1	-	-

25MEL11
SDG No.
4, 8, 9, 11, 12

IDEA LAB
(Common to B.E./B.Tech all branches)

L	T	P	C
0	0	4	2

Course Objectives:

The main learning objective of this course is to prepare the students to:

- Develop hands-on skills in schematic design and PCB layout for custom electronic circuits.
- Enable students to fabricate, assemble, and test PCBs using standard manufacturing practices.
- Impart practical knowledge in embedded system programming using Arduino and Raspberry Pi platforms.
- Provide exposure to workshop tools including welding, lathes, and plumping equipment for physical prototyping.
- Facilitate the design and fabrication of complete working prototypes through integration of embedded hardware and 3D-printed or machined enclosures.

LIST OF EXPERIMENTS:

1. Schematic and PCB layout design of a suitable circuit.
2. Fabrication and testing of the Printed Circuit Board (PCB).
3. Embedded programming using Arduino and/or Raspberry Pi.
4. Familiarity and use of welding equipment.
5. Familiarity and use of lathe operations.
6. Familiarity and use of plumping equipment.
7. 3D Printing practice using Fusion Deposit Modeling (FDM).
8. Design and implementation of a capstone project involving embedded hardware, software and machined or 3D printed enclosure.

TOTAL : 60 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- | | |
|-------------|---|
| CO1: | Design and simulate electronic circuits and translate them into PCB layouts using industry-standard tools. |
| CO2: | Fabricate and test printed circuit boards ensuring reliability and functionality of electronic components. |
| CO3: | Write and debug embedded programs using Arduino/Raspberry Pi for real-world applications |
| CO4: | Operate welding, lathe, and plumping tools to build enclosures and mechanical fixtures for prototypes. |
| CO5: | Integrate embedded systems with 3D-printed/machined parts to develop and present a functional capstone project. |

REFERENCE BOOKS:

1. AICTE's Prescribed Textbook: Workshop / Manufacturing Practices (with Lab Manual), ISBN: 978-9391505332
2. Make Your Own PCBs with EAGLE: From Schematic Designs to Finished Boards. Simon Monk and Duncan Amos. McGraw Hill Education. ISBN-13 : 978-1260019193.

3. 3D Printing & Design, Dr. Sabrie Soloman, ISBN: 978-9386173768, Khanna Book Publishing Company, New Delhi.
4. Programming Arduino: Getting Started with Sketches. 2nd edition. Simon Monk. McGraw Hill. ISBN-13: 978-1259641633
5. The Big Book of Maker Skills: Tools & Techniques for Building Great Tech Projects. Chris Hackett. Weldon Owen; 2018. ISBN-13: 978-1681884325.

E-RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc25_ee163/preview
2. https://onlinecourses-archive.nptel.ac.in/noc18_cs05/course
3. <https://www.autodesk.com/learn/ondemand/collection/fusion-360>

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C01	3	2	3	-	2	-	-	-	-	1	-
C02	3	2	3	2	2	-	-	-	-	1	-
C03	3	3	3	2	3	-	-	-	-	2	-
C04	2	1	2	-	2	-	-	-	-	1	-
C05	3	3	3	2	3	-	-	-	2	3	2
Avg	3	2	3	2	2	-	-	-	2	2	2

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

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BoS / Mech

25MDC11
SDG No. 3,4,5,10,16

YOGA FOR HUMAN EXCELLENCE
(Common to B.E./B.Tech. all Branches)

L	T	P	C
0	0	1	0

UNIT-I	SIMPLIFIED PHYSICAL EXERCISES	3
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Physical exercises: Hand exercises – Leg exercises. Breathing exercises: Eye exercises – Kapalabathi. Makarasana. Body massages: Acupressure – Relaxation.

UNIT-II	KAYA KALPA	3
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Kaya Kalpa Exercise – Aswini Mudra – Moola Bandha – Ojas Breath (Kayakalpa Exercise should be learnt directly from the World Community Service Centre.)

UNIT-III	MEDITATION	3
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Agna. Santhi : Clearence. Thuriya. Thuriyatheetham meditation

UNIT-IV	HUMAN RESOURCES DEVELOPMENT	3
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Roles and responsibilities of a human being (Due the Duty, 4 Ashramas) - Desire Alignment (Aasai seeramaithal) - Discipline (olukkam formula) - Diet/Food control (Organ Clock) - Five duties, Five limitations (Ivaghai kadamaighal, Indhil Alavu murai) - Bene its of Blessings (comparing to Law of attraction)- Individual peace leads to world peace.

UNIT-V	YOGASANAS	3
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Suriya Namaskar, Padmasana, Vajrasana, Sukasana, Trikonasana , Saral matsyasana, Gomugasana, Mandukasana, Arthamatsyendrasana, Ushtrasana, Siddhasana, Shavasana

TOTAL : 15 PERIODS

TEXT BOOKS:

1. Yoga Practices – I: VISION, Vethathiri Publications.
2. Yogasana – Vethathiri Publications

REFERENCE BOOKS:

1. Simpli ied Physical Exercises – Vethathiri Publications.
2. Sound Health Through Yoga – Dr. K. Chandrasekaran.

25EN121

COMMUNICATIVE ENGLISH – II
(Common to B.E./B.Tech. All Branches)

L T P C
2 0 2 3

COURSE OBJECTIVES:

- To develop the learners' fundamental communication skills by introducing basic grammar, everyday conversations, and descriptive writing.
- To enable learners to understand and apply advanced grammar structures, enhance their listening skills for process comprehension, improve presentation abilities, read technical documents, and write formal complaint and editorial letters.
- To equip learners with essential communication skills for interviews, group discussions, debates, and professional correspondence.
- To develop learners' skills in reported speech, descriptive speaking, review listening, fluent reading, and formal correspondence.
- To prepare learners for job interviews, professional speaking, resume writing, and job-related communication.

UNIT-I INTRODUCTION TO EFFECTIVE COMMUNICATION 6+3

- Grammar** : Prefix/ Suffix- Active and Passive Voice- Model Passive
- Listening** : Listening to Short literary Texts - Listening to a Presentation and Completing Gap Filling Exercise
- Speaking** : Talking about Daily Routine, Hobbies, Favorites, Family, etc.
- Reading** : Describing a Product through Comparing & Contrasting it with other Products
- Writing** : Writing a short biography on Achievers based on given hints.

UNIT-II PROCESS COMMUNICATION AND TECHNICAL WRITING 6+3

- Grammar** : Subject - Verb Agreement -Infinitives - Gerunds
- Listening** : Listening to Process Description and Drawing a Flow Chart
- Speaking** : General and Technical Presentation.
- Reading** : Reading Technical Manuals.
- Writing** : Writing Complaint Letter to Companies - Letter to the Editor.

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UNIT-III	ADVANCED COMMUNICATION FOR PROFESSIONAL SUCCESS	6+3
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- Grammar** : If Clause -One Word Substitution
- Listening** : Listening to Interview Techniques and Etiquettes
- Speaking** : Participating in Group Discussion - Developing Persuasive Skills and Argument Construction (Debate)
- Reading** : Reading of Articles (Editorials)
- Writing** : Compose Emails for Internship Request, Placement Enquires and Industrial Visits

UNIT-IV	DESCRIPTIVE AND INTERACTIVE COMMUNICATION	6+3
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- Grammar** : Reported Speech - Compound Words
- Listening** : Listening to Book and Movie Review
- Speaking** : Describing Working Mechanism
- Reading** : Reading for Improving Fluency and Intonation.
- Writing** : Writing letter of Invitation, Acceptance and Declination

UNIT-V	CAREER-ORIENTED COMMUNICATION SKILLS	6+3
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- Grammar** : Content vs. Function Words – Fixed & Semi Fixed Expression - Relative Phrase
- Listening** : Listening to job Interviews and Answering to the Exercise
- Speaking** : Offline and Online Interviews.
- Reading** : Matching the Heading to the Paragraph.
- Writing** : Job Application & Internship Application with Resume.

TOTAL : 45 PERIODS

COURSE OUTCOMES:

At the end of the Course the students will able to

- CO 1:** Apply basic grammar, communicate daily situations, comprehend listening tasks, compare products and write short biographies.
- CO 2:** Correct grammar, present processes effectively, interpret technical texts and draft form:

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letters.

CO 3: Use conditional sentences, participate confidently in debates and discussions, follow interview protocols, analyze editorials and compose professional emails.

CO 4: Use reported speech, describe processes, listen and respond to reviews, read with fluency and draft formal invitation letters.

CO 5: Apply grammar structures, face interviews confidently, match texts with headings, and draft job applications with resumes.

TEXT BOOKS:

1. Department of English, Anna University, "English for Engineers & Technologists" Orient Blackswan Private Ltd, 2020.
2. Dr.Veena Selvam, Dr.Sujatha Priyadarshini, & CO, Department of English, Anna University, "English for Science & Technology" Cambridge University Press, 2021.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeeta Sharma, "Technical Communication–Principles and Practices", Oxford Univ. Press, New Delhi, 2016.
2. Lakshminarayanan, "A Course Book on Technical English", Scitech Publications (India) Pvt.Ltd. 2012.
3. Aysha Viswamohan, "English For Technical Communication (With CD)", McGraw Hill Education, ISBN : 0070264244, 2008.
4. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna Publishing House, 2016.

E. RESOURCES:

- <https://learnenglish.britishcouncil.org/>

CO's-PO's MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	-	-	-	-	-	3	3	-	3
CO2	-	-	-	-	-	-	-	3	3	-	3
CO3	-	-	-	-	-	-	-	3	3	-	2
CO4	-	-	-	-	-	-	-	3	3	-	2
CO5	-	-	-	-	-	-	-	3	3	-	2
AVR	-	-	-	-	-	-	-	3.00	3.00	-	2.40

1- Low, 2- Medium, 3-High, "-" No Correlation

25MAT21 NUMERICAL METHODS AND DIFFERENTIAL EQUATIONS L T P C
(Common to B.E./B.Tech. all Branches) 3 0 0 3

COURSE OBJECTIVES:

- To introduce the basic concepts of solving algebraic and transcendental equations
- To introduce the numerical techniques of interpolation in various intervals and differentiation and integration in engineering and technology
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations
- To familiarize students how to solve the higher-order linear differential equations.
- To enable students to understand the definition and properties of the Laplace transform apply it to solve differential and integral equations and analyze the behavior of systems in the frequency domain .

UNIT-I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9

Newton Raphson method- Solution of linear system of equations - Gauss elimination method - Pivoting-Gauss Jordan method - Iterative methods of Gauss Jacobi and Gauss Seidel - Eigen values of a matrix by Power method.

UNIT-II INTERPOLATION, NUMERICAL DIFFERENTIATION AND 9
NUMERICAL INTEGRATION

Lagrange's and Newton's divided difference interpolations - Newton's forward and backward difference interpolation - Numerical single integrations using Trapezoidal and Simpson's 1/3 rules

UNIT-III NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL 9
EQUATIONS

Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differential equations - Multi step methods: Milne's predictor corrector methods for solving first order differential equations.

UNIT-IV ORDINARY DIFFERENTIAL EQUATIONS 9

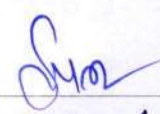
Linear higher order differential equations with constant coefficients - Method of variation of parameters - Cauchy's and Legendre's linear differential equations

UNIT-V LAPLACE TRANSFORMS 9

Laplace transform: Sufficient conditions - Transform of elementary functions - Basic Properties - Transform of periodic functions. Inverse Laplace transform: Standard results - statement of Convolution theorem and its applications - Solution of linear second order ODE with constant coefficients using Laplace transformation techniques.

TOTAL : 45 PERIODS

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BOS / SAN

COURSE OUTCOMES:

At the end of the Course the students will be able to

- CO1 :** Apply the numerical techniques of interpolation in various intervals and differentiation and integration for engineering problems
- CO2 :** Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations
- CO3 :** Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications
- CO4 :** Apply various techniques in solving differential equations..
- CO5 :** Understand Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

TEXT BOOKS:

- Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2019
- Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016

REFERENCE BOOKS:

- Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2015.
- Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016
- T.K.V Iyengar, B.krishna Gandhi, S.Ranganatham, M.V.S.S.N Prasad, " Laplace Transforms, Numerical Methods and complex variables", S.Chand, 10th march 2025.

CO's – PO's MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	1	1	-	-	2	-	2	3
CO2	3	3	2	1	1	-	-	2	-	2	2
CO3	3	3	2	1	1	-	-	2	-	2	3
CO4	3	3	2	1	1	-	-	2	-	2	3
CO5	3	2	2	1	1	-	-	2	-	3	3
AVG	3.00	2.80	2.00	1.00	1.00	-	-	2.00	-	2.20	2.80

1. Low, 2- Medium , 3-High, "-" No Correlation

SVHEC-R2025


Chairman
BOS / S&H

25PHT24

MEDICAL PHYSICS
(B.E. Bio Medical Engineering)

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To provide understanding of the application of the radiation concepts and methods of Physics in Medical science
- To accentuate the principle, effects and clinical applications of ionizing, non-ionizing electromagnetic radiation
- To enunciate the fundamentals of acoustic waves and their interaction with human tissues
- To explore the effects of radiation in matter and how isotopes are produced
- To study effects of sound and light in human body

UNIT-I LOW ENERGY ELECTROMAGNETIC SPECTRUM AND ITS MEDICAL APPLICATION 9

Physics of radiation, Intensity of radiation-Ionizing and Non-ionizing Electromagnetic spectrum: Overview of non-ionizing radiation effects - Low Frequency Effects - Higher frequency effects., Radiation exposure control- Application

UNIT-II PRINCIPLES OF RADIOACTIVE NUCLIDES 9

Radioactive Decay – Isometric Transition – Gamma ray emission, alpha, beta, Positron decay, electron capture, Sources of Radioisotopes Natural and Artificial radioactivity, Radionuclide used in Medicine and Technology, Production of radionuclides – Cyclotron produced Radionuclide- Reactor produced Radionuclide-fission and neutron capture reaction

UNIT-III INTERACTION OF RADIATION WITH MATTER LIPIDS 9

Interaction of charged particles with matter – Linear energy transfer range, Bremsstrahlung, Interaction of X and Gamma radiation with matter- Photoelectric effect, Compton Scattering , Pair production, Attenuation of Gamma Radiation, Interaction of neutron with matter and their clinical significance

UNIT-IV RADIATION DOSE AND ITS EFFECTS 9

Dose and Exposure measurements – Units (SI), Inverse square law, Maximum permissible exposure, relationship between the dosimetric quantities, Radiation biology – effects of radiation, concept of LD 50, Stochastic and Non-stochastic effects, Radiation Syndrome.

UNIT-V

PRINCIPLES AND APPLICATIONS OF SOUND IN MEDICINE

9

Physics of sound, Normal sound levels, ultrasound fundamentals, Generation of ultrasound (Ultrasound Transducer), Interaction of Ultrasound with matter- Reflection, Transmission, Scanning methods, Artifacts, Ultrasound- Doppler effect, Clinical Applications

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- C01:** Interpret the properties of electromagnetic radiations and its effect on human
- C02:** Apply the principles and understand the production of radioactive nuclides
- C03:** Explain the interaction of radiation with matter
- C04:** Identify and Analyse the radiation quantities and its effects
- C05:** Demonstrate the knowledge on the properties of sound and its application in medicine

TEXT BOOKS:

1. B.H. Brown, R.H. Smallwood, D.C. Barber, P.V. Lawford, D.R. Hose, "Medical Physics and Biomedical Engineering", Institute of physics publishing, Bristol and Philadelphia, 2017
2. Gopal B. Saha, "Physics and Radiobiology of Nuclear Medicine", Fourth edition Springer, 2013

REFERENCE BOOKS:

1. W.J. Meredith and J.B. Massey, "Fundamental Physics of Radiology", Varghese Publishing house, Third Edition, 2013
2. Steve Webb, "The Physics of Medical Imaging", Taylor & Francis, Newyork, Second Edition, 2012
3. R.S. Khandpur, "Handbook of Biomedical Instrumentation", Tata McGraw-Hill, New Delhi, 2010

Shree Venkateshwara Hi-Tech Engineering College (Autonomous)

CO's – PO's MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C01	3	3	1	1	1	-	-	-	-	-	-
C02	3	3	1	1	1	1	-	-	-	-	-
C03	3	3	1	1	1	-	-	-	-	-	-
C04	3	3	-	1	1	-	-	-	-	-	-
C05	3	3	-	1	1	1	-	-	-	-	-
AVG	3	3	1	1	1	1	-	-	-	-	-

1- Low, 2- Medium , 3-High, "-" No Correlation

25EEI22 SDG NO:4,7,8,9	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (For B.E./B.Tech- CIVIL, CSE, MECH, AI&DS, AI&ML, IT, Cyber Security, Pharm.Tech branches)	L	T	P	C
		2	0	2	3
COURSE OBJECTIVES:					
➤ To learn the basic concepts of electric circuits and analysis. ➤ To analyze the magnetic circuits and domestic wiring. ➤ To understand the basics of working principles and application of electrical machines. ➤ To impart knowledge about analog devices and their characteristics. ➤ To educate on the fundamental concepts of digital electronics.					
UNIT-I	ELECTRIC CIRCUITS				10
Basic components of electric circuits, Charge, Current, Voltage and Power, Voltage and current sources, Ohm's law, Kirchhoff's laws, Series and parallel connected independent sources, Resistors in series and parallel, Voltage division and current division rule, Mesh current and node voltage methods of analysis-DC Circuits.					
UNIT-II	MAGNETIC CIRCUITS AND ELECTRICAL INSTALLATIONS				10
Magnetic circuits-definitions-MMF, flux, reluctance, Magnetic field intensity, Flux density, Fringing, Self and Mutual inductances-simple problems. Domestic wiring, Wires and Cables - types, Earthing, Protective devices, Switch fuse unit, Safety precautions and First Aid.					
UNIT-III	ELECTRICAL MACHINES				9
Construction and working principle- DC generators, EMF equation, Types and applications. Working principle of DC motors, Types and applications. Construction, Working principle and applications of 1 ϕ Transformer, Three phase alternator, Three phase induction motor.					
UNIT-IV	ANALOG ELECTRONICS				9
Resistor, Inductor and Capacitor in electronic circuits, PN Junction diodes, Rectifier, Zener diode-Characteristics-Applications, Construction and characteristics of bipolar junction transistor (CC,CE & CB)-Applications.					
UNIT-V	DIGITAL ELECTRONICS				7
Review of number systems, Binary codes, Error detection and correction codes, Combinational logic Circuits, Representation of logic functions-SOP and POS forms, K-map representations, Minimization using K maps - Simple Problems.					
TOTAL: 45 PERIODS					

LAB COMPONENT:

15 PERIODS

1. Verification of ohms and Kirchhoff's Laws.
2. Load test on Single phase Transformer.
3. Load Test on 1Ø Induction Motor.
4. Characteristics of PN and Zener Diodes.
5. Characteristics of BJT.
6. Study of Logic Gates.

COURSE OUTCOMES

At the end of this course the students will be able to:

- C01** Explain circuit's behavior using circuit laws and analyze the mesh analysis and nodal analysis.
- C02** Analyze the Magnetic circuits, earthing and wiring.
- C03** Understand the working principle and applications of electrical machines.
- C04** Analyze the characteristics of analog electronic devices.
- C05** Explain the basic concepts of digital electronics.

TEXT BOOKS:

1. D P Kothari and I.J Nagarath, "Basic Electrical and Electronics Engineering", McGraw Hill Education (India) Private Limited, Second Edition, 2020.
2. S.K. Bhattacharya, Basic Electrical Engineering, Pearson Education, 2019.
3. James A Svoboda, Richard C. Dorf, Dorf's Introduction to Electric Circuits, Wiley, 2018.
4. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.

REFERENCE BOOKS:

1. Muhammad H.Rashid, "Spice for Circuits and electronics", 4th Edition., Cengage India, 2019.
2. Thomas L. Floyd, 'Electronic Devices', 10th Edition, Pearson Education, 2018.
3. John Bird, "Electrical Circuit theory and technology", Routledge; 2017.
4. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
5. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010.

E-RESOURCES:

1. NPTEL-Online Courses and Video lectures: <https://nptel.ac.in/>

CO's - PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
C01	3	2	1	1	-	-	-	-	-	1	-	3	2	1
C02	3	3	2	2	-	-	-	-	-	1	-	3	3	2
C03	3	3	3	3	-	-	-	-	-	1	-	3	3	3
C04	3	3	3	3	-	-	-	-	-	1	-	3	3	3
C05	3	3	3	2	-	-	-	-	-	1	-	3	3	3
AVG	3	2.8	2.4	2.2	-	-	-	-	-	1	-	3	2.8	2.4

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


Chairman
BoS / EEE

25CSI21
SDG No: 4, 8, 9, 10,17

PYTHON PROGRAMMING
 (Common to: B.E. / B.Tech. all Branches)

L	T	P	C
3	0	2	4

COURSE OBJECTIVES:

- To understand the basics of python data types and operators
- To learn to solve problems using Python conditionals and loops.
- To define Python , lists, tuples, dictionaries to represent complex data .
- To define python function and use function calls to solve problems.
- To develop python program using modules and files.

UNIT-I

PYTHON FUNDAMENTALS

9

Python Interpreter and Interactive Mode --Variables - Immutable variables - Data types - Tokens - Keywords - Operators - Python Reserved Words Statements - Indentation - Understanding error messages

UNIT-II

STRING AND CONTROL FLOW

9

Strings - Single-quote, double quote and multi-line strings - String Operations (Concatenation, Repetition, Indexing, Slicing, Splitting and Joining) Control Flow - If/Else Statements - for, while statements - Range () function - break and continue statement.

UNIT-III

LIST, TUPLES, DICTIONARIES

9

Lists - list operations - list slices - list methods - list loop - Tuples - assignment - tuple operations - Dictionaries - Operations and Methods in Dictionary - Looping and Dictionaries.

UNIT-IV

FUNCTIONS

9

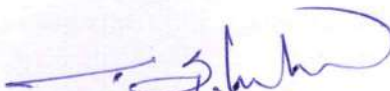
Functions- Elements of User Defined Functions - Fruitful Functions - Parameters and Arguments - Lambda Functions or Anonymous Functions - Scope - Function Composition

UNIT-V

MODULES AND FILES

9

Modules: Standard Modules - OS and SYS modules - User defined Modules - Importing modules - Writing into a File - Reading from a File - File Methods


Chairman
BoS/CSE&IT

TOTAL : 45 PERIODS

PRACTICAL EXERCISES:

List of Experiments

1. Python programming using simple Input/Output statements and data types.
2. Implement a python program using Operators.
3. Implementing programs using Strings.
4. Develop a python program using String operations.
5. Scientific problems using Decision making statements.
6. Develop a python program using Looping statements.
7. Create real-time applications using Lists
8. Applications using Tuples.
9. Develop real-time applications using Dictionaries.
10. Program using user defined functions.
11. Develop a python program using Lambda function.
12. Computations using NumPy functions.
13. Develop applications using File handling techniques.
14. Implement programs using written modules and Python Standard Libraries.

TOTAL : 30 PERIODS

TOTAL : 75(45+30) PERIODS

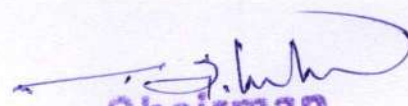
COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 :** Understand and use the Python interpreter and IDE for writing, running, and debugging code using data types and operators.
- CO2 :** Write simple Python programs using conditionals and loops for solving problems.
- CO3 :** Decompose a Python program using Python lists, tuples, dictionaries etc.
- CO4 :** Decompose a Python program into functions.
- CO5 :** Read and write data from/to files in Python programs and perform mathematical and scientific calculations using the math modules.

TEXT BOOKS:

- 1.R. G. Dromey "How to Solve it by Computer", Pearson Education., 2024.
- 2.Robert Sedgewick "Introduction to Programming in Python", Pearson Education., 2024.


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REFERENCE BOOKS:

1. John V. Guttag "Introduction to Computation and Programming using Python", The MIT press., 2016.
2. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.

E-RESOURCES:

1. <https://www.python.org/>

CO's - PO's & PSO's MAPPING

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	3	3	3	2	2	2	2	2	2	2	3	3	3
CO2	2	3	3	3	2	2	2	2	2	2	2	3	3	3
CO3	2	2	3	2	2	2	2	2	2	1	2	3	3	3
CO4	1	2	3	3	1	2	2	2	2	1	2	2	3	3
CO5	2	2	3	3	2	2	2	2	2	1	2	2	3	3
AVG	1.8	2.4	3	2.8	1.8	2	2	2	2	1.4	2	2.6	3	3

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


Chairman
BoS/CSE&IT

25MEI21

SDG No.

4, 8, 9, 11

ENGINEERING GRAPHICS

(Common to B.E. - Civil, CSE, Mech, BME, CSE(CS),

CSE(AIML) & B.Tech. - BT, IT, PT, AIDS)

L T P C

3 0 2 4

Course Objectives:

The main learning objective of this course is to prepare the students to:

- Construct standard plane curves and geometrical shapes used in engineering applications
- Draw and interpret projections of points, lines, and plane surfaces using first angle projection method
- Visualize and draw projections of basic solids and model them using CAD software
- Perform sectioning of solids and development of lateral surfaces for practical engineering applications using manual and CAD method
- Convert pictorial and isometric views into orthographic projections through freehand sketching and CAD practice

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications — Size, layout and folding of drawing sheets — Lettering and dimensioning.

UNIT-I PLANE CURVES

9

Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method

Construction of cycloid — Construction of involutes of square and circle.

UNIT-II PROJECTION OF POINTS, LINES AND PLANE SURFACE

9

Principal Planes - First angle projection - Projection of points - Projection of straight lines inclined to both the principal planes by rotating line method.

Projection of planes inclined to both the principal planes by rotating object method.

UNIT-III PROJECTION OF SOLIDS

9+10

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes and parallel to the other by rotating object method.

Practical: Projection of prisms, pyramids, cylinder and cone using CAD software.

UNIT-IV PROJECTION OF SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

9+10

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other.

Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones.

Practical: Projection of sectioning of above solids and Development of lateral surfaces of simple and sectioned solids using CAD software.

UNIT-V ORTHOGRAPHIC PROJECTION

9+10

Orthographic projection- Freehand sketching of multiple views from pictorial views of objects.

Practical: Orthographic projections from given isometric and pictorial views of simple objects using CAD software.

TOTAL : 75 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1:** Create standard plane curves and geometrical shapes used in engineering applications
- CO2:** Produce and interpret projections of points, lines, and plane surfaces using the first angle projection method
- CO3:** Generate projections and CAD models of basic engineering solids
- CO4:** Execute sectional views and surface developments of solids using appropriate manual and CAD techniques
- CO5:** Analyze pictorial and isometric views to generate complete and accurate orthographic projections

TEXT BOOKS:

1. K Venugopal, Engineering Drawing and Graphics, Sixth edition, New Age International, 2013.
2. Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.

REFERENCE BOOKS:

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edit ion, 2019.
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27th Edition, 2017.
3. Luzzader, Warren.J. and Duff, John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4. Parthasarathy N. S. and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
5. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition, 2009.

E-RESOURCES:

1. <https://archive.nptel.ac.in/courses/112/102/112102304/>
2. https://onlinecourses.nptel.ac.in/noc20_me79/preview
3. <https://www.youtube.com/watch?v=ANEvQyt3PnU>

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO2	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO3	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO4	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO5	3	1	2	-	2	-	-	-	3	-	2	2	2	-
Avg	3	1	2	-	2	-	-	-	3	-	2	2	2	-

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

25TAT21

தமிழரும் தொழில்நுட்பமும்

L T P C
1 0 0 1

(B.E./B.Tech- அனைத்து பாடப்பிரிவுகளுக்கும் பொதுவானது)

பாடநெறி நோக்கங்கள்:

- நெசவு மற்றும் பானைத்தொழில்நுட்பத்தைப் புரிந்து கொள்ளுதல்
- சேர, சோழ, பல்லவ மற்றும் நாயக்கர்களின் வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பத்தை ஒப்பிடுதல்
- தமிழர்களின் பல்வேறு உற்பத்தி தொழில்நுட்பத்தைப் பற்றிய அறிவைப் பெறுதல்
- தமிழர்களின் வேளாண்மை மற்றும் கடல்சார் அறிவைப் பெற்றுக்கொள்ளுதல்
- அறிவியல் தமிழையும் அதன் இணையப்பயன்பாட்டையும் கற்றல்

அலகு - I

நெசவு மற்றும் பானைத் தொழில்நுட்பம்

3

சங்க காலத்தில் நெசவுத்தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு - II

வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்

3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமானப்பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரம் சிற்பங்களும் கோவில்களும் - சோழர் காலத்து பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக் கட்டிடக் கலை

அலகு - III

உற்பத்தித் தொழில்நுட்பம்

3

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்

அலகு - IV

வேளாண்மை மற்றும் நீர்பாசனத் தொழில்நுட்பம்

3

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குழுழித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும்

வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மின்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்

அலகு - V

அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்

3

அறிவியல் தமிழின் வளர்ச்சி - கணினித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல்
- தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம்
- இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்

மொத்தம்: 15 பாடவேளைகள்

பாடநெறி முடிவுகள்:

இப்பாடத்தைப் படிப்பதின் முடிவில் மாணவர்கள்

- C01: நெசவு மற்றும் பானைத்தொழில்நுட்பத்தை பற்றிப் புரிந்துகொள்வார்கள்
C02: வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பத்தில் தமிழர்களின் அறிவைப் பெறுவார்கள்
C03: தமிழர்களின் உற்பத்தி தொழில்நுட்பத்தை கண்டறிவார்கள்
C04: தமிழர்களின் வேளாண்மை மற்றும் கடல்சார் அறிவைக் குறித்து விவாதிப்பார்கள்.
C05: பல்வேறு இணையப் பயன்பாடுகளில் அறிவியல் தமிழைப் பயன்படுத்திப்பார்ப்பார்கள்

மின் -ஆதாரங்கள்:

1. <https://www.tamilvu.org/>
2. <https://sorkuvai.com/>

CO's -PO's விவரணையாக்கம்:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C01	1	-	-	-	-	1	1	1	1	-	1
C02	2	-	-	-	-	2	2	2	2	-	2
C03	2	-	-	-	-	2	2	2	2	-	2
C04	1	-	-	-	-	1	1	1	1	-	1
C05	2	-	-	-	-	2	2	2	2	-	2
AVG	2	-	-	-	-	2	2	2	2	-	2

25STAT21

TAMILS AND TECHNOLOGY
(Common to B.E./B. Tech. all branches)

L	T	P	C
1	0	0	1

COURSE OBJECTIVES:

- To understand about weaving and ceramic technology of Tamils
- To compare the design and constructive technology of Cheras, Cholas, Pallavas and Nayakkars
- To gain knowledge in various manufacturing technology of Tamils
- To analyse the agriculture and fishery knowledge of Tamils
- To learn about scientific Tamil and its usage in online platforms

UNIT-I	WEAVING AND CERAMIC TECHNOLOGY	3
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Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT-II	DESIGN AND CONSTRUCTION TECHNOLOGY	3
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Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT-III	MANUFACTURING TECHNOLOGY	3
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Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads - Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT-IV	AGRICULTURE AND IRRIGATION TECHNOLOGY	3
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Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society

UNIT-V	SCIENTIFIC TAMIL & TAMIL COMPUTING	3
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Development of Scientific Tamil - Tamil computing - Digitalization of Tamil Books - Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

TOTAL: 15 PERIODS

COURSE OUTCOMES:

At the end of the course the student will be able to

- CO1:** Relate the weaving ceramic technology of Tamils
- CO2:** Understand the knowledge of Tamils in design and construction technology
- CO3:** Recognize the manufacturing technology knowledge of Tamils
- CO4:** Criticize the agriculture and fishery knowledge of Tamils
- CO5:** Apply scientific Tamil in Various online platforms

E- RESOURCES:

1. <https://www.tamilvu.org/>
2. <https://sorkuvai.com/>

CO's -PO's MAPPING:

CO/PO	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011
C01	1	-	-	-	-	1	1	1	1	-	1
C02	2	-	-	-	-	2	2	2	2	-	2
C03	2	-	-	-	-	2	2	2	2	-	2
C04	1	-	-	-	-	1	1	1	1	-	1
C05	2	-	-	-	-	2	2	2	2	-	2
AVG	2	-	-	-	-	2	2	2	2	-	2

25BTL21

VISIONARY SOLUTION LABORATORY

L T P C

SDG No.4,8,9,10,12,13,17

0 0 4 2

(Common to B.Tech - BT and PT)

COURSE OBJECTIVES:

- Identify the problem statement of the customers.
- Understand the need of the customers.
- Draw upon, interpret, and weigh all the findings.
- Generate as many different ideas as possible and visualize them.
- Develop a prototype of ideas and test them.

LIST OF ACTIVITIES

Visionary solution is human-centered problem-solving tool which emphasize on empathy, collaboration, co-creation and stakeholder feedback to unlock creativity and innovation, to devices feasible and viable, idea/solutions.

Note: Each activity must use one or two design thinking tools from each phases for assessment.

S.No	Activities	Suggestion tools	Name of the tools
1	Introduction Overview of design thinking, Design thinking phases and tools. (6 hours)	Text book	1. Problem statements 2. Design Principles 3. Question 5x Why 4. Stakeholder Map
2	Understanding phase Learning about the users, their needs, problems, and experiences. (10 hours)	Dt 1 - 08	5. 5Wh questions 6. Interview for Empathy 7. Extreme & Lead User 8. Emotional Response Cards
3	Observe phase Observe the behavior, problems, and needs without interference (10 hours)	Dt 09 - 14	9. Empathy Map 10. Persona & User Profile 11. Persona & User Profile 12. Customer Journey Map
4	Define phase Involves analyzing user research data and organize research findings. (10 hours)	Dt 15 - 19	13. AEIOU 14. Peers Observing Peers 15. HMW-question 16. Storytelling 17. Context Mapping
5	Ideate phase Generate ideas through the phase and review the idea. (10 hours)	Dt 20 - 23	18. Define Success 19. Critical Items Diagram 20. Brainstorming 21. 2x2 Matrix
6	Prototype & Test Phase Importance of prototype and testing in design thinking - create simple and scale down version of prototype (10 hours)	Dt 24 - 30	22. 6-3-5-Method 23. Analogies & Benchmarking 24. Exploration Map 25. Prototype to Test 26. Service Blueprint 27. MVP
7	Report Submission (4 hours)		28. Testing Sheet 29. Feedback-Capture-Grid 30. Experience Testing

Case studies:

Students are required to acquire knowledge of Design Thinking tools and apply these concepts using case studies such as

Environmental Biotechnology (wastewater treatment, bioremediation), Drug Delivery Systems and Therapeutic Design, Tissue Engineering and Regenerative Medicine Solutions, Bioprocess Design and Optimization (fermentation, downstream processing), Pharmaceutical Manufacturing and Quality Management, Agricultural Biotechnology (crop improvement, biofertilizers, pest management), Bioinformatics, Digital Health Solutions, Healthcare and Clinical Workflow Optimization and Biomedical Device Design (diagnostic kits, biosensors, point-of-care devices).

TOTAL : 60 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

CO1 : Getting customer insights and appropriate problem statement.

CO2 : Observe the customer pains and gainstohavebetterunderstanding.

CO3 : Develop a point of view from the various insights gathered and write a problem Statement.

CO4 : Ideate and develop innovative solution to the customer problem.

CO5 : Create a prototype as a solution base and test the same.

TEXT BOOKS:

1. The Design Thinking Playbook, Michael Lewrick, Patrick Link, Larry Leifer, Wiley, 2018.

2. Thinking: A Comprehensive Textbook, Shalini Rahul

Tiwari (Author), Rohit Rajendra Swarup (Author), First Edition, Wiley, 2024.

REFERENCE BOOKS:

1. Design Thinking for dummies, Chrisian Muller- Roterberg, Willey, 2020.

2. Design Thinking: A Hands-on Approach, Chandramouli Subramanian, Thiyagarajan Paramasivan, Sankaran Venkataramani, Atlantic, 2025.

E-RESOURCES

1. DT-Tools- <https://en.dt-toolbook.com/tools-eng>

2. https://onlinecourses.swaya m2.ac.in/aic23_ge17/unit?unit=9&lesson=13

3. <https://archive.nptel.ac.in/courses/110/106/110106124/>

CO's - PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	3	1	1	2	1	2	2	1	3	2	2
CO2	3	2	2	3	3	2	2	2	1	3	2	1	3	2	2
CO3	3	3	2	3	3	2	2	2	3	3	2	1	3	2	2
CO4	3	3	3	3	3	2	3	3	3	2	2	2	3	2	2
CO5	3	3	3	3	3	2	2	2	3	2	2	1	3	2	2
AVG	3	2.6	2.4	3	3	2	2	2.2	2.2	2.4	2	1.2	3	2	2

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

COURSE OUTCOMES:

Upon successful completion of the course, students should be able to:

- C01:** Understand how to solve the given standard partial differential equations.
- C02:** Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
- C03:** Appreciate the physical significance of Fourier series techniques in solving one dimensional heat flow problems and one-dimensional wave equations
- C04:** Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering
- C05:** Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, New Delhi, 2023.
2. Kreyszig E, "Advanced Engineering Mathematics ", 10th Edition, John Wiley, New Delhi, India, 2023.

REFERENCE BOOKS:

1. Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 10th Edition, Laxmi Publications Pvt. Ltd, 2021.
2. James. Glyn., "Advanced Modern Engineering Mathematics", 5th Edition, Pearson Education, New Delhi, 2018.
3. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2018.
4. Wylie. R.C. and Barrett. L.C., "Advanced Engineering Mathematics "Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012

E-RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc24_ma37/preview
2. https://onlinecourses.nptel.ac.in/noc24_ma20/preview

CO's - PO's MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C01	3	3	1	1	-	-	-	2	-	-	3
C02	3	3	1	1	-	-	-	2	-	-	3
C03	3	3	1	1	-	-	-	2	-	-	3
C04	3	3	1	1	-	-	-	2	-	-	3
C05	3	3	1	1	-	-	-	2	-	-	3
Avg	3	3	1	1	-	-	-	2	-	-	3

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

25PTT31	BASIC PRINCIPLES AND CALCULATIONS IN	L	T	P	C
SDG No : 2, 3, 4, 6,	CHEMICAL ENGINEERING	3	0	0	3
12, 15					

COURSE OBJECTIVES:

The main learning objective of this course is to prepare the students to:

- To apply basic chemical engineering calculations and reaction stoichiometry.
- To apply gas laws and equations of state in engineering calculations.
- To apply psychrometric principles in humidification calculations.
- To analyze material balance problems in process systems.
- To analyze energy balance problems in chemical processes.

UNIT-I INTRODUCTION AND UNITS AND DIMENSIONS 9

Introduction to chemical engineering; unit operations and unit processes; applications in biotechnology and pharmaceutical technology. Systems of units (SI, MKS, CGS, FPS); fundamental and derived units; conversion of units; equations with/without dimensional homogeneity; dimensionless groups; conversion of equations. Basic chemical calculations: concept of atoms, moles, and mole fraction; composition of mixtures; equivalent weight; concentration units (normality, molarity, molality, ppm); chemical reactions involving excess and limiting reactants; conversion, yield, selectivity, and extent of reaction.

UNIT-II IDEAL GASES AND VAPOUR PRESSURE 9

Ideal gas—Boyle's law, Charles's law, and Avogadro's principle; calculations of ideal gases; mixtures of ideal gases; Dalton's and Amagat's laws; average molecular weight; density and specific gravity. Vapour pressure and temperature; Clausius-Clapeyron and Antoine equations. Ideal solutions and Raoult's law; vapour-liquid equilibrium calculations for binary systems; partial pressure-composition, boiling point-composition, and equilibrium diagrams. Introduction to non-ideal solutions; Henry's law; immiscible systems and non-volatile solutes.

UNIT-III HUMIDITY AND SOLUBILITY 9

Humidity, molal humidity, absolute humidity, saturation, dew point, and percentage humidity; humidity chart; humid heat; wet-bulb and dry-bulb temperatures; adiabatic saturation temperature; humid volume; and enthalpy.

UNIT-IV MATERIAL BALANCE WITH AND WITHOUT CHEMICAL REACTIONS 9

The concept of a material balance; Material balances for a single component, Characteristics of Systems; steady- and unsteady-state processes; batch and continuous processes. Material balances with more than one component; A general strategy for solving material balance problems; Material balances without reaction; distillation and drying. Material balances involving reactions. Introduction to multi-unit Systems; bypass, purge, and recycle streams.

UNIT-V ENERGY BALANCE AND THERMOCHEMISTRY 9

Types of energy to be included in energy balances; Energy balances without reaction; unsteady state; steady state, open and closed system. General energy balance for open systems; Energy balances to account for chemical reaction; Enthalpy of formation, enthalpy of reaction; Integration of heat of formation and sensible heat; enthalpy of combustion

TOTAL : 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

- CO1:** Apply the principles of chemical engineering, unit conversions, and basic chemical calculations (composition, dimensionless number, dimensional consistency of equations) to process problems.
- CO2:** Apply ideal gas laws, ideal gas mixture relationships and vapour pressures to solve engineering problems involving ideal gas and solutions
- CO3:** Understand and apply humidity and saturation principles in humidification calculations.
- CO4:** Develop and solve material balance models for steady-state and unsteady-state chemical, biotechnology, and pharmaceutical process systems
- CO5:** Analyze energy requirements of open and closed systems under steady and unsteady state conditions, including the effects of chemical reactions and phase changes.

TEXT BOOKS:

1. Himmelblau, D. M. and Riggs, B. J. "Basic Principles and Calculations in Chemical Engineering", 9th Edition, Prentice Hall International series, 2022.
2. Narayanan, K.V. and Lakshmikutty, B. "Stoichiometry and Process Calculations", 2nd Edition. PHI Learning Pvt. Ltd., 2017

REFERENCE BOOKS:

1. Stoichiometry, B.I. Bhatt and S.B. Thakore, 6th Edition, McGraw Hill Education (India) Pvt. Ltd., New Delhi, 2021.
2. Introduction to Process Calculations (Stoichiometry), K.A. Gavhane, Revised Edition, NiraliPrakashan, Pune, 2016.
3. Chemical Process Calculations, D.C. Sikdar, PHI Learning Pvt. Ltd., New Delhi, 2013.
4. Process Calculations, V. Venkataramani, N. Anantharaman, K. M. Meera Sheriffa Begum, PHI Learning Pvt. Ltd., New Delhi, 2011.

E-RESOURCES:

1. <https://nptel.ac.in/courses/103103165>
2. <https://nptel.ac.in/courses/103105209>

CO's – PO's & PSO's MAPPING

CO/ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	2	1	1	2	2	3	3	3	2
CO2	3	3	3	3	3	2	1	1	2	2	3	3	3	2
CO3	3	3	3	3	3	2	1	1	2	2	3	3	3	2
CO4	3	3	3	3	3	2	1	1	2	2	3	3	3	2
CO5	3	3	3	3	3	2	1	1	2	2	3	3	3	2
AVG	3	3	3	3	3	2	1	1	2	2	3	3	3	2

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

25PTT32

SDG No: 2, 3, 4, 6, 12, 15

MICROBIOLOGY

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

The main learning objective of this course is

- To introduce students to the principles of microbiology and to understand the concept of different microscopy.
- To impart knowledge on microbial structure, characteristics, identification and taxonomy
- To help students solve the problems in microbial infection and their control.
- To teach students to isolate and cultivate pure bacterial culture.
- To emphasise the importance of microbiology in production of industrially valuable products.

UNIT-I

INTRODUCTION TO MICROBIOLOGY

9

Basics of microbial existence, Prokaryotes and Eukaryotes, Whittaker's five-kingdom concept, Group of microorganisms – Basic characteristics and significance, Light microscopy – Bright field, Dark field, phase contrast and fluorescence microscopy, Electron microscopy – Scanning and Transmission electron microscopy.

UNIT-II

MICROBIAL STRUCTURE AND ORGANISATION, REPRODUCTION AND IDENTIFICATION

9

Bacteria, Fungus – Yeast and Mold, Algae and Virus - Bacteriophage – Structural organization and Reproduction. Different staining techniques – Simple, Gram's, Acid fast, Capsular, Endospore and Flagellar staining.

UNIT-III

STERILISATION AND ANTIMICROBIAL AGENTS

9

Sterilisation: Physical and Chemical modes - Heat sterilisation (Moist heat, Autoclave and Dry heat), Radiation and Filtration; Disinfection: Phenol, Alcohol and Detergents; Antimicrobial agents: Antibiotics, Anti-fungal and Anti-viral agents – Types and mode of actions

UNIT-IV

BACTERIA - GROWTH AND CULTURE TECHNIQUES

9

Nutritional requirements of bacteria; Different media used for bacterial culture; Batch and Continuous culture of microorganisms; Growth curve and Different methods to quantify bacterial growth; Factors affecting growth; Screening, isolation of and cultivation of microorganisms; Pure culture techniques; Maintenance and Preservation methods.

UNIT-V

APPLICATIONS OF MICROBIOLOGY

9

Microbes as a food, Microbes in production and preservation of food; Production of primary metabolites – Organic acids, Amino acids and Alcohol, Production of secondary metabolites - Antibiotics, Doxorubicin and Carotenoids.

TOTAL PERIODS : 45

COURSE OUTCOMES:

At the end of the course, the students will be able to

CO1: Understand the principle behind different types of microscopy

CO2: Identify and differentiate microbes

CO3: Solve the problems in microbial infection and their control

CO4: Isolate and cultivate pure bacterial culture

CO5: Apply microbes for the production of industrially valuable products

TEXT BOOKS:

1. Willey, J. M., Sherwood, L. M., & Woolverton, C. J., *Prescott's Microbiology*, 11th Edition, McGraw-Hill
2. Tortora, G. J., Funke, B. R., & Case, C. L., *Microbiology: An Introduction*, 13th Edition, Pearson

REFERENCE BOOKS:

1. Pelczar, M. J., Chan, E. C. S., & Krieg, N. R., *Microbiology*, 5th Edition, Tata McGraw-Hill.
2. Madigan, M. T., Bender, K. S., Buckley, D. H., Sattley, W. M., & Stahl, D. A., *Brock Biology of Microorganisms*, 15th Edition, Pearson.
3. Dubey, R. C., & Maheshwari, D. K., *A Textbook of Microbiology*, 2nd Edition, S. Chand.
4. Ananthanarayan, R., & Paniker, C. K. J., *Textbook of Microbiology*, Latest Edition, Universities Press.

E-RESOURCES:

1. <https://archive.nptel.ac.in/courses/102/103/102103015/>
2. <https://dth.ac.in/medical/courses/Microbiology/block-1/1/index.php>

CO's – PO's & PSO's MAPPING

CO/PO /PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	2	-	-	-	-	-	-	-	3	2	-
CO2	3	3	1	2	-	-	-	-	-	-	-	3	2	-
CO3	3	3	2	3	1	-	-	-	-	-	-	3	3	1
CO4	3	3	1	2	-	1	-	-	-	-	-	2	2	1
CO5	3	3	2	2	1	2	-	1	-	-	-	3	2	2
AVG	3.0	2.8	1.4	2.2	0.4	0.6	-	0.2	-	-	-	2.8	2.2	0.8

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

Sawa
Chairman
BoS/Pharma.Tech

25PTT33

PHARMACEUTICAL CHEMISTRY.

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To understand the fundamental concepts, properties, structures, nomenclature, and reactions of organic and inorganic pharmaceutical compounds.
- To explain the synthesis, properties, and chemical reactions of heterocyclic and pharmaceutical compounds.
- To apply named organic reactions, molecular rearrangements, and synthetic methods in the preparation and transformation of pharmaceutical compounds.
- To analyze the quality, purity, impurities, and limit-test requirements of pharmaceutical substances and inorganic pharmaceuticals.
- To evaluate the principles, measurement, applications, storage, and safety aspects of radiopharmaceuticals and coordination compounds in pharmacy.

UNIT-I

CHEMISTRY OF ALIPHATIC, AROMATIC COMPOUNDS

9

Characteristics of organic compounds, structure, nomenclature, preparation and reaction mechanism of alkyl and aryl halides, Nucleophilic aliphatic substitution reaction, Elimination reactions, electrophilic addition reactions, Markownikoff's orientation, Anti-Markownikoff's orientation - Huckel's rule - Electrophilic aromatic substitution reaction - Green chemistry approaches in organic synthesis.

UNIT-II

HETEROCYCLIC COMPOUNDS

9

Introduction to methods of synthesis - Pharmaceutical compounds - Physical, chemical, biological & AI structures, synthesis, properties and chemical reactions of benzenoid and nonbenzenoid compounds, General principles of heterocyclic synthesis - Methods of preparation and reactions of Pyridines - Pyrroles - Thiophenes - Furans - Quinolines - Isoquinolines.

UNIT-III

STUDY OF ORGANIC REACTIONS AND MOLECULAR
REARRANGEMENTS

9

Alder Reaction, Formylation reactions, Gattermann Reaction, Gattermann-Koch reaction, Vilsmeier reaction, Azide-Alkyne Cycloaddition, Catalytic hydrogenation, Meerwein-Ponndorf-Verley, Birch reduction, Clemmenson, Sandmeyer, Haloform reactions, Azo coupling, Beckmann Rearrangement, Benzidine rearrangement.

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UNIT-IV

QUALITY CONTROL OF DRUGS AND PHARMACEUTICALS

9

Importance of quality control, significant errors, methods used for quality control, History of Pharmacopoeia, Identification and characterization of impurities in Pharmaceutical substances, Limit tests: Definition, importance, general procedure for limit test for chlorides, sulphates, iron, arsenic, heavy metals and lead with suitable examples. Identification test for Magnesium hydroxide, Ferrous sulphate, Copper sulphate. Test for purity: Swelling power of Bentonite, Neutralizing capacity of aluminum hydroxide gel, Preparation of inorganic pharmaceuticals: Boric acid, Potash alum.

UNIT-V

RADIOPHARMACEUTICALS AND CO-ORDINATION COMPOUNDS

9

Radio activity, Measurement of radioactivity, Properties of α , β , γ radiations, Half-life, radio isotopes and study of radio isotopes - Sodium iodide I131, Storage conditions, precautions & pharmaceutical application of radioactive substances. Theory of co-ordination compounds with special reference to application in Pharmacy: EDTA, Dimercaprol, Penicillamine, 1, 10-Phenanthroline.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1:** Comprehend the fundamental concepts, structures, nomenclature and reactions of organic compounds, alkyl/aryl halides and aromatic compounds.
- CO2:** Explain the synthesis, properties and reactions of heterocyclic and pharmaceutical compounds
- CO3:** Apply named organic reactions and synthetic methods for the preparation and transformation of pharmaceutical compounds
- CO4:** Analyze the quality, purity, impurities and limit test requirements of pharmaceutical inorganic substances.
- CO5:** Evaluate the principles, measurement, applications and safety aspects of radioisotopes and coordination compounds in pharmacy.

TEXT BOOKS:

1. V. Algarsamy, Pharmaceutical Organic Chemistry, Kindle edition, 2020.
2. V.N. Rajasekaran, Textbook of Pharmaceutical Inorganic Chemistry Theory and Practical, CBS Publishers, 2019
3. R.K. Sharma, Text Book of Coordination Chemistry, 1st Edition, Discovery Publishing House Pvt. Ltd. 2011.

REFERENCE BOOKS:

1. Jr. Leroy G. Wade, Jan William Simek, Maya Shankar Singh, Organic Chemistry, 9 Edition, Pearson Publisher, 2019.

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2. L.M. Atherden, Bentley and Driver's Textbook of Pharmaceutical Chemistry, 8th Edition, Oxford Publisher, 2020
3. P. L. Soni, VandnaSoni, The Chemistry of Coordination Complexes and Transition Metals, 1st Edition, CRC Press, 2021.
4. Jie Jack Li, Name Reactions A Collection of Detailed Mechanisms and Synthetic Applications, 6th Edition, Springer Publisher, 2021.

E-RESOURCES:

1. <https://archive.nptel.ac.in/courses/104/106/104106106/>
2. <https://fdspharmacy.in/pharmaceutical-chemistry/>

CO's – PO's & PSO's MAPPING

Course outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	1	1	1	2	1	3	2	2
CO2	3	2	1	1	2	1	1	1	1	2	1	3	2	2
CO3	3	3	2	2	3	1	1	1	1	2	1	3	3	3
CO4	3	3	2	3	3	2	2	2	1	2	1	3	3	2
CO5	3	2	2	2	3	2	3	2	1	2	1	3	3	3
Avg	3	2.40	1.60	1.80	2.40	1.40	1.60	1.40	1	2	1	3	2.60	2.40

1 - Low, 2 - Medium, 3 - high, '-' - no correlation



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25PTT34
SDG 3,4,9

HUMAN ANATOMY AND PHYSIOLOGY

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- Understand the structure, composition, and physiological functions of blood and the process of hematopoiesis.
- Explain the anatomy and physiology of the cardiovascular system and understand the mechanisms involved in circulation and blood pressure regulation.
- Describe the structure and functions of the respiratory system and analyze the physiological mechanisms involved in respiration and gas transport.
- Acquire knowledge of the organization and functions of the nervous system, including the brain, spinal cord, and neural reflexes.
- Understand the endocrine system, mechanisms of hormone action, and the clinical significance of hormonal biomarkers in disease diagnosis.

UNIT-I

HEMOPOIETIC SYSTEM

9

Composition and functions of blood, Hemopoiesis, blood components, blood groups, clotting factors and mechanism of coagulation, platelets, Role of stem cells in blood cell regeneration and therapy.

UNIT-II

CARDIOVASCULAR SYSTEM

9

Anatomy and function of the heart, circulation: pulmonary, coronary, and systematic circulation; electrocardiogram (ECG), cardiac cycle and heart sounds, blood pressure - its maintenance and regulation.

UNIT-III

RESPIRATORY SYSTEM

9

Anatomy of respiratory organs and functions, mechanism/physiology of respiration and regulation of respiration, transport of respiratory gases, respiratory volumes and capacities

UNIT-IV

NERVOUS SYSTEM

9

Classification of the nervous system, anatomy, physiology, and functional areas of the cerebrum, cerebellum, midbrain, thalamus, hypothalamus and basal ganglia, spinal cord: structure and reflexes

UNIT-V

ENDOCRINE SYSTEM

9

Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal glands, pancreas, pineal gland, thymus, Hormonal biomarkers in disease diagnosis.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

CO1: Explain the composition and functions of blood and apply the knowledge to understand blood groups, coagulation, and hematological disorders.

CO2: Describe the structure and functions of the heart and blood vessels and apply the

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concepts to interpret circulation, ECG, cardiac cycle, and blood pressure regulation.

- CO3 :** Explain the anatomy and physiology of the respiratory system and apply the concepts to understand respiration, gas transport, and respiratory disorders.
- CO4 :** Describe the organization and functions of the nervous system and apply the knowledge to explain neural control and reflex actions.
- CO5 :** Explain the functions of endocrine glands and mechanisms of hormone action and apply the knowledge to interpret hormonal imbalance and disease conditions using biomarkers.

TEXT BOOKS:

1. K. Sembulingam and P. Sembulingam., Essentials of Medical Physiology., 9th edition, 2024., Jaypee brothers medical publishers, New Delhi.
2. Dr. C.C. Chatterjee, Human Physiology (vol 1 and 2), 13th edition., 2019., Academic Publishers Kolkata.

REFERENCE BOOKS:

1. Kathleen J.W. Wilson & Anne Waugh, Ross & Wilson Anatomy and Physiology in Health and Illness, 14th Edition, 2021, Elsevier / Churchill Livingstone.
2. David N. Shier, Jackie L. Butler & Ricki Lewis, Hole's Human Anatomy & Physiology, 17th Edition, 2023, McGraw-Hill Education.
3. W.J. Germann & Cindy L. Stanfield, Principles of Human Physiology, 6th Edition, 2022, Pearson Education.
4. J. Gordon Betts, Kelly A. Young, James A. Wise et al., Anatomy and Physiology 2e, 2nd Edition, 2022, OpenStax, Rice University.

E-RESOURCES:

1. <https://dth.ac.in/medical/course.php>
2. <https://www.skillmd.com/course/anatomy-nptel-video-lessons/>

CO's - PO's & PSO's MAPPING

CO/ PO	PO1	PO2	PO 3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	3	2	—	—	—	—	—	—	—	—	3	—	3	2
CO2	3	3	—	—	—	—	—	—	—	—	3	—	3	3
CO3	3	3	—	—	—	—	—	—	—	—	3	—	3	3
CO4	3	2	—	—	—	—	—	—	—	—	3	—	3	2
CO5	3	3	—	—	—	—	—	—	—	—	3	—	3	3
AVG	3.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	2.6

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

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SDG

2,3,4,9

BIOCHEMISTRY OF INTERMEDIARY METABOLISM

L	T	P	C
3	0	2	4

COURSE OBJECTIVES:

The main learning objective of this course is to prepare the students to:

- To understand the structure, classification, and metabolism of carbohydrates.
- To learn the types of lipids and their major metabolic pathways.
- To study amino acids, protein structure, and key protein metabolic reactions.
- To understand the structure of nucleic acids and the basics of nucleotide metabolism.
- To identify common metabolic disorders and understand their biochemical basis.

UNIT-I

CARBOHYDRATES METABOLISM

9

Structure of Monosaccharides; Disaccharides, Oligosaccharides and Polysaccharides - Starch, Glycogen, Heparin; Mutarotation, Carbohydrate Metabolism - Glycolysis, TCA Cycle, Electron Transport Cycle, ATP Cycle.

UNIT-II

LIPID METABOLISM

9

Saponification, Iodination, Hydrogenation, Fatty Acids, Triacylglycerol, Phospholipids, Cholesterol, Steroids, Prostaglandin, Fatty Acid Synthesis and β -Oxidation.

UNIT-III

PROTEIN METABOLISM

9

Structure and Functions of Essential and Non-Essential amino acids; Peptides and Anti-peptides; Protein -Structural Organization- Primary, Secondary, Tertiary, Quaternary Structure; Protein Folding and Chaperones; Lipoproteins, Metabolism - Decarboxylation; Oxidative deamination; Transamination; Urea cycle.

UNIT-IV

NUCLEIC ACID METABOLISM

9

Structure of Purines, Pyrimidines and Nucleotides; DNA- Nucleic Acid Measurement - Types of DNA - Watson and Crick model; Types of RNA- tRNA, mRNA, rRNA; Salvage Pathway.

UNIT-V

DISORDERS OF METABOLISM

9

Carbohydrate metabolism - Diabetes mellitus, Lactose Intolerance; Lipid Metabolism - Hypercholesterolemia, Fatty Liver; Protein Metabolism - Phenylketonuria, Alkaptonuria; Nucleic acid metabolism - Gout, Xanthinuria.

TOTAL PERIODS: 45

PRACTICAL

1. Qualitative tests for carbohydrates:
(i) Aldose Vs Ketose, (ii) Reducing Vs Non-reducing and (iii) Hexose Vs Pentose.
2. Quantitative Estimation of Carbohydrates by DNSA.
3. Separation and Identification of Lipids/ Sugars by TLC.
5. Quantitative determination of DNA using UV spectroscopy.
5. Quantification of Amino Acids using the Ninhydrin method.
6. Estimation of Protein Levels using Lowry's method.
7. Determination of Blood Glucose Levels using the GOD-POD assay.
8. Estimation of Total Carbohydrate by Anthrone / Phenol- Sulfuric Acid Method.

Curriculum & Syllabus

SVHEC-R-2025B. Tech-PT

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COURSE OUTCOMES:

At the end of the course, the students will be able to

- CO1** Students will be able to explain the structure, classification, and fundamental metabolic pathways of carbohydrates.
- CO2** Students will understand the types of lipids and interpret their major metabolic processes.
- CO3** Students will be able to describe amino acids, protein structure, and essential protein metabolic reactions.
- CO4** Students will understand the structure and function of nucleic acids and outline nucleotide synthesis pathways.
- CO5** Students will be able to identify common metabolic disorders and relate them to their biochemical defects.

TEXT BOOKS:

- U. Satyanarayana & U. Chakrapani Biochemistry, 6th Edition, Elsevier, 2017.
- Lehninger Principles of Biochemistry 8th Edition by David L. Nelson, Michael M. Cox W.H. Freeman and Company, 2021.
- Schaum's Outline of Biochemistry, 3rd Edition (Schaum's Outline Series) Philip Kuchel, 3rd Edition, 2009.

REFERENCE BOOKS:

- Textbook of Biochemistry with clinical correlations. Ed. Thomas M. Devlin. Wiley Liss Publishers, 6th edition, 2006.
- Introduction of Practical Biochemistry by David T. Phummer. (2nd Edition), 1978.
- Schaum's Outline of Biochemistry, 3rd Edition (Schaum's Outline Series) Philip Kuchel, 3rd Edition, 2009.

CO's – PO's & PSO's MAPPING

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	2	3	2	2	2	3	3	3	3
CO2	2	2	3	2	2	2	2	2	-	3	3	2	2	2
CO3	3	3	3	2	3	-	2	1	-	2	1	3	3	2
CO4	2	3	3	3	2	-	3	-	1	2	1	3	3	2
CO5	2	3	3	2	3	2	3	2	2	1	2	2	2	3
AVG	2.4	2.8	2.8	2.2	2.4	2	2.6	1.75	1.67	2	2	2.6	2.6	2.4

1 -Low, 2-Medium, 3-High, '-' – No Correlation.

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DISASTER RISK REDUCTION AND MANAGEMENT

L	T	P	C
3	0	0	0

COURSE OBJECTIVES:

- To impart knowledge on concepts related to disaster, disaster risk reduction, disaster management
- To acquaint with the skills for planning and organizing disaster response
- To develop disaster response skills by adopting relevant tools and technology
- To Enhance awareness of institutional processes for Disaster response in the country
- To Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

UNIT-I

HAZRADS, VULNERABILITY AND DISASTER RISKS

9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Types of Disasters: Natural, Human induced, Climate change induced –Earthquake, Landslide, Flood, Drought, Fire etc – Technological disasters- Structural collapse, Industrial accidents, oil spills -Causes, Impacts including social, Economic, political, environmental, health, psychosocial, etc.- Disaster vulnerability profile of India and Tamil Nadu - Global trends in disasters: urban disasters, pandemics, Complex emergencies, - Inter relations between Disasters and Sustainable development Goals

UNIT-II

DISASTER RISK REDUCTION (DRR)

9

Sendai Framework for Disaster Risk Reduction, Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community Based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions / Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Early Warning System – Advisories from Appropriate Agencies.- Relevance of indigenous Knowledge, appropriate technology and Local resources.

UNIT-III

DISASTER MANAGEMENT

9

Components of Disaster Management – Preparedness of rescue and relief, mitigation, rehabilitation and reconstruction- Disaster Risk Management and post disaster management – Compensation and Insurance- Disaster Management Act (2005) and Policy - Other related policies, plans, programmes and legislation - Institutional Processes and Framework at State and Central Level- (NDMA –SDMA-DDMA-NRDF- Civic Volunteers)

UNIT-IV

TOOLS AND TECHNOLOGY FOR DISASTER MANAGEMENT

9

Early warning systems -Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment. - Elements of Climate Resilient Development –Standard operation Procedure for disaster response – Financial planning for disaster Management

UNIT-V

DISASTER MANAGEMENT: CASE STUDIES

9

Discussion on selected case studies to analyse the potential impacts and actions in the contest of disasters-Landslide Hazard Zonation: Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.- Field work-Mock drill -

TOTAL : 45 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 :** To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)
- CO2 :** To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction
- CO3 :** To develop disaster response skills by adopting relevant tools and technology
- CO4 :** Enhance awareness of institutional processes for Disaster response in the country and
- CO5 :** Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

TEXT BOOKS:

1. Taimpo (2016), Disaster Management and Preparedness, CRC Publications
2. Singh R (2017), Disaster Management Guidelines for earthquakes, Landslides, Avalanches and tsunami, Horizon Press Publications
3. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
4. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]

REFERENCE BOOKS:

1. Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005.
2. Government of India, National Disaster Management Policy, 2009.
3. Shaw R (2016), Community based Disaster risk reduction, Oxford University Press

E-RESOURCES:

1. <https://archive.nptel.ac.in/courses/124/107/124107010/>
2. <https://nptel.ac.in/courses/124107010>

CO's - PO's & PSO's MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
C01	3	3	2	3	-	-	2	2	-	-	2	2	-	1
C02	3	3	3	3	-	-	2	1	-	-	2	2		1
C03	3	3	3	3	-	-	2	2	-	-	-	2		1
C04	3	3	2	3	-	-	2	1	-	-	2	2		1
C05	3	3	2	3	-	-	2	2	-	-	2	3		1

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


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25PTL31	MICROBIOLOGY LABORATORY	L	T	P	C
SDC No: 2, 3, 4, 6, 12, 15		0	0	3	1.5

COURSE OBJECTIVES:

The main learning objective of this course is to prepare the students to:

- Develop skills in preparing various culture media, and to isolate, cultivate, and preserve microbial cultures.
- Identify various micro-organisms using staining techniques microscopy
- Analyse the growth kinetics of *E.coli*
- Observe the effects of various environmental conditions, antibiotic and disinfectant on the growth of *E.coli*.
- Identify unknown microbes using biochemical characterisation.

LIST OF EXPERIMENTS

1. Demonstration of efficiency of sterilisation techniques.
2. Preparation of various culture media: Nutrient Broth, Nutrient Agar, and Selective Media.
3. Isolation, cultivation, and preservation of microbial cultures.
4. Microscopic observation of microbes using simple staining technique
5. Microscopic observation of microbes using Gram's staining technique
6. Microscopic observation of microbes using Flagellar staining technique
7. Quantification of microbes by serial dilution, total count, and viable plate count.
8. Antibiotic sensitivity testing by disc diffusion method and determination of Minimum Inhibitory Concentration (MIC).
9. Determination of phenol coefficient to evaluate disinfectant efficacy.
10. Inoculation, incubation, and growth kinetics analysis of *Escherichia coli*.
11. Effect of pH, temperature, and UV radiation on the growth of *Escherichia coli*.
12. Biochemical characterisation and identification of unknown microorganisms.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to

CO1: Develop skills in preparing various culture media, and to isolate, cultivate, and preserve microbial cultures.

- C02:** Identify various micro-organisms using staining techniques microscopy
- C03:** Analyse the growth kinetics of *E.coli*.
- C04:** Observe the effects of various environmental conditions, antibiotic and disinfectant on the growth of *E.coli*.
- C05:** Identify unknown microbes using biochemical characterisation.

TEXT BOOKS:

1. Prescott L.M., Harley J.P., Klein D.A., Microbiology, 3rd Edition, Wm.C.Brown Publishers, 1999.

E-RESOURCES:

1. <https://mvi-au.vlabs.ac.in/>

CO's – PO's & PSO's MAPPING

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
C01	3	1	1	2	3	-	-	-	-	-	-	3	2	-
C02	3	2	2	2	2	-	-	-	1	-	-	3	2	1
C03	3	3	2	3	2	-	-	-	-	-	-	3	3	1
C04	3	3	2	3	2	-	-	-	-	-	-	3	3	2
C05	2	3	3	2	2	-	-	-	1	-	-	3	3	3
Avg	2.8	2.4	2.0	2.4	2.2	-	-	-	0.4	-	-	3.0	2.6	1.4

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

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SDG
3,4,9,12,13

PHARMACEUTICAL CHEMISTRY LABORATORY

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- To develop practical skills in the preparation, standardization, and safe handling of pharmaceutical chemicals.
- To understand the methods used for the identification of pharmaceutical compounds.
- To develop skills in quality control testing of pharmaceutical compounds.
- To understand the principles of organic synthesis of pharmaceutical compounds.
- To apply chemical synthesis techniques for the preparation of drug molecules using conventional and green chemistry methods.

LIST OF EXPERIMENTS

1. Determination of the strength of a given unknown solution of HCl by titrating it against with the help of a known solution of NaOH using phenolphthalein indicator.
2. Determination of the strength of a given unknown solution of NaOH by titrating it against with the help of a known solution of HCl using methyl orange indicator.
3. Preparation and standardization of 200 ml of 0.1 M silver nitrate solution.
4. Determination of physical constants: melting point, boiling point.
5. Determination of partition coefficient of any medicinal compound by shake flask method.
6. Identification tests of the following official (IP) compounds: Magnesium sulphate, Calcium Carbonate, Ferrous sulphate, Boric acid.
7. Determination of impurities by limit test.
8. Synthesis of compounds by hydrolysis reaction: Salicylic acid from alkyl benzoate.
9. Synthesis of compounds by oxidation reaction: Benzoic acid from benzyl chloride.
10. Synthesis of major industrial compounds: Paracetamol from p-aminophenol, Benzocaine from p-nitrobenzoic acid.
11. Green chemistry approach in organic synthesis using eco-friendly solvents.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

- CO1 :** Apply knowledge of laboratory safety in the preparation and standardization of pharmaceutical reagents.
- CO2 :** Determine the physicochemical properties of pharmaceutical compounds using standard laboratory techniques.
- CO3 :** Perform quality control tests for pharmaceutical compounds using standard analytical methods.
- CO4 :** Apply knowledge of organic synthesis in the preparation of pharmaceutical compounds.
- CO5 :** Demonstrate the synthesis of pharmaceutical compounds using conventional and green chemistry methods.

REFERENCE BOOK:

1. K.Yogananda Reddy, Dr.K.N.Jayaveera & Dr.S.Subramanyam, Practical Medicinal Chemistry, S.Chan Publishing, 2013
2. N.M. Raghavendra & Sayan Dutta Gupta, Laboratory manual of Pharmaceutical Organic Chemistry- I, Vallabh Prakashan, 1st edition, 2013.
3. Chatwal G.R, "Pharmaceutical chemistry inorganic" Himalaya publishing house, Ed5th, 2010, pp 127-128.
4. Mann & Saunders, Practical Organic Chemistry, 4th edition, Pearson Publisher, 2009.

CO's - PO's & PSO's MAPPING

CO/PO/ PSO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	3	2	-	3	3	-	2	2	2	-	1	3	2	1
CO2	3	3	-	3	3	-	2	2	2	-	1	3	3	1
CO3	3	2	-	3	2	-	2	2	2	-	1	3	2	2
CO4	3	3	2	3	3	2	2	2	2	-	2	3	3	3
CO5	2	2	2	2	2	3	3	2	2	-	3	2	3	3
Avg	2.8	2.4	0.8	2.8	2.6	1	2.2	2	2	-	1.6	2.8	2.6	2

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

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