KCG
COLLEGE OF TECHNOLOGY
Affiliated to Anna University
AUTONOMOUS

CURRICULUM AND SYLLABUS

UG

(REGULATIONS 2023)

ACADEMIC YEAR 2023-2024

INDEX

B.E. CIVIL ENGINEERING

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23AD101	Programming in Python	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23AD121	Python Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**12**	**28**	**21**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA203	Statistics and Numerical Methods	BSC	3	1	0	4	4
3	23PH201	Physics for Civil Engineering	BSC	3	0	0	3	3
4	23CE201	Building Materials	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE282	Basic Electrical, Electronics and Instrumentation Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23CE221	Materials Testing Laboratory	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

***The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA**

B.E. MECHANICAL ENGINEERING

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23AD101	Programming in Python	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23AD121	Python Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**12**	**28**	**21**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA203	Statistics and Numerical Methods	BSC	3	1	0	4	4
3	23PH206	Material Science	BSC	3	0	0	3	3
4	23ME201	Applied Mechanics	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE281	Basic Electrical and Electronics Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23ME222	Applied Mechanics Laboratory	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

B.E. AERONAUTICAL ENGINEERING

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23AD101	Programming in Python	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23AD121	Python Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**12**	**28**	**21**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA201	Vector Calculus and Complex Functions	BSC	3	1	0	4	4
3	23PH207	Applied Physics	BSC	3	0	0	3	3
4	23AE201	Elements of Aeronautical Engineering	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE281	Basic Electrical and Electronics Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23AE221	Aeromodelling Lab	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

B.E. AEROSPACE ENGINEERING

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23AD101	Programming in Python	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23AD121	Python Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**12**	**28**	**21**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA201	Vector Calculus and Complex Functions	BSC	3	1	0	4	4
3	23PH207	Applied Physics	BSC	3	0	0	3	3
4	23AS201	Elements of Aerospace Engineering	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE281	Basic Electrical and Electronics Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23AS221	Aerospace Modelling Lab	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

B.E. AUTOMOBILE ENGINEERING

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23AD101	Programming in Python	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23AD121	Python Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**12**	**28**	**21**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA203	Statistics and Numerical Methods	BSC	3	1	0	4	4
3	23PH206	Material Science	BSC	3	0	0	3	3
4	23ME201	Applied Mechanics	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE281	Basic Electrical and Electronics Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23ME222	Applied Mechanics Laboratory	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

B.E. MECHATRONICS ENGINEERING

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23AD101	Programming in Python	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23AD121	Python Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**12**	**28**	**21**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA203	Statistics and Numerical Methods	BSC	3	1	0	4	4
3	23PH202	Applied Material Science	BSC	3	0	0	3	3
4	23ME201	Applied Mechanics	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE283	Basic Electrical, Electronics Engineering and Measurements	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**10**	**29**	**23**

B.E. -ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23CS101	Programming in C	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23CS121	C Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**12**	**28**	**21**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA203	Statistics and Numerical Methods	BSC	3	1	0	4	4
3	23PH203	Physics for Electronics Engineering	BSC	3	0	0	3	3
4	23EC201	Circuit Analysis	PCC	3	1	0	4	4
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE284	Basic Electrical and Instrumentation Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23EC221	Circuits Analysis Laboratory	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**2**	**14**	**34**	**26**

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23AD101	Programming in Python	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23AD121	Python Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**12**	**28**	**21**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201	Professional English	HSMC	3	0	0	3	3
2	23MA201	Vector Calculus and Complex Functions	BSC	3	1	0	4	4
3	23PH204	Physics for Electrical Engineering	BSC	3	0	0	3	3
4	23EE201	Electric Circuit Analysis	PCC	3	1	0	4	4
5	23ME271	Basic Mechanical and Building Sciences	ESC	3	0	0	3	3
6	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23EE221	Electric Circuits Laboratory	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**19**	**2**	**12**	**33**	**26**

B.E. COMPUTER SCIENCE AND ENGINEERING

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23CS101	Programming in C	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23CS121	C Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23CS122	Computational Thinking	EEC	0	0	2	2	1
10	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**14**	**30**	**22**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA204	Probability and Statistics	BSC	3	1	0	4	4
3	23PH205	Physics for Information Science	BSC	3	0	0	3	3
4	23CS201	Data Structures using C	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE281	Basic Electrical and Electronics Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23CS221	Data Structures Using C Laboratory	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

B.E. COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23CS101	Programming in C	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23CS121	C Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23CS122	Computational Thinking	EEC	0	0	2	2	1
10	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**14**	**30**	**22**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA204	Probability and Statistics	BSC	3	1	0	4	4
3	23PH205	Physics for Information Science	BSC	3	0	0	3	3
4	23CS201	Data Structures using C	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE281	Basic Electrical and Electronics Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23CS221	Data Structures Using C Laboratory	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

B.TECH. INFORMATION TECHNOLOGY

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23CS101	Programming in C	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23CS121	C Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23IT121	Information Technology Essentials	ESC	0	0	2	2	1
10	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**14**	**30**	**22**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA204	Probability and Statistics	BSC	3	1	0	4	4
3	23PH205	Physics for Information Science	BSC	3	0	0	3	3
4	23IT201	Data Structures and Algorithms	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE281	Basic Electrical and Electronics Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23IT221	Data Structures and Algorithms Laboratory	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

B. Tech ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23AD101	Programming in Python	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23AD121	Python Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**12**	**28**	**21**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA202	Discrete Mathematics	BSC	3	1	0	4	4
3	23PH205	Physics for Information Science	BSC	3	0	0	3	3
4	23AD201	C and Data Structures	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE281	Basics Electrical and Electronics Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23AD221	C and Data Structures Lab	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

B. Tech FASHION TECHNOLOGY

SEMESTER – I

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
	23IP101	Induction Programme		-	-	-	-	-
THEORY								
1	23HS101	Essential Communication	HSMC	3	0	0	3	3
2	23MA101	Matrices and Calculus	BSC	3	0	0	3	3
3	23AD101	Programming in Python	ESC	3	0	0	3	3
4	23HS102	Heritage of Tamils	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
5	23PH111	Engineering Physics	BSC	3	0	2	5	4
6	23CY111	Engineering Chemistry	BSC	3	0	2	5	4
PRACTICALS								
7	23AD121	Python Programming Laboratory	ESC	0	0	4	4	2
8	23HS121	Communication Skills Laboratory	HSMC	0	0	2	2	1
9	23HS122	General Clubs / Technical Clubs / NCC / NSS / Extension Activities	HSMC	0	0	2	2	1*
TOTAL				**16**	**0**	**12**	**28**	**21**

SEMESTER – II

SL. NO	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	23HS201/ 23HS202	Professional English / Foreign Language	HSMC	3	0	0	3	3
2	23MA203	Statistics and Numerical Methods	BSC	3	1	0	4	4
3	23PH206	Material Science	BSC	3	0	0	3	3
4	23FT201	Introduction to global fashion industry and fashion design	PCC	3	0	0	3	3
5	23HS203	Tamils and Technology	HSMC	1	0	0	1	1
THEORY AND PRACTICALS								
6	23EE282	Basic Electrical, Electronics and Instrumentation Engineering	ESC	2	0	2	4	3
7	23ME211	Engineering Graphics	ESC	3	0	2	5	4
PRACTICALS								
8	23ME221	Engineering Practices Laboratory	ESC	0	0	4	4	2
9	23FT221	Fashion Designing Laboratory	PCC	0	0	4	4	2
10	23HS221	Soft Skills	EEC	0	0	2	2	1*
TOTAL				**18**	**1**	**14**	**33**	**25**

SEMESTER – I

23IP101 INDUCTION PROGRAMME

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) Physical Activity

This would involve a daily routine of physical activity with games and sports, yoga, gardening, etc.

(ii) Life Skills

Every student would choose one skill related to daily needs such as stitching, accounting, finance management, 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 dont'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) Club Activity

Students will be introduced to more than 20 Clubs available in the college- both technical and non technical. The student can choose as to which club the student will enrol in .

(v) Value Based Communication

This module will focus on improving the communication skills of students

(vi) Lectures by Alumni

Lectures by alumni are arranged to bring in a sense of belonging to the student towards the institution and also to inspire them to perform better.

(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) Address by different heads

Heads of Placement, Training, Student affairs, counsellor, etc would be interacting with the students to introduce them to various measures taken in the institution for the betterment of students.

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

References:

Guide to Induction program from AICTE

23HS101 ESSENTIAL COMMUNICATION L T P C
3 0 0 3

COURSE OBJECTIVES:

- To help learners extract information from short and simple correspondence
- To familiarize learners with different text structures by engaging them in reading, writing and grammar learning activities
- To help learners write coherent, short paragraphs and essays
- To enable learners to use language efficiently while expressing their opinions via various media.

UNIT-I FORMATION OF SENTENCES 9

Reading- Read pictures-notices- short comprehension passages and recognize main ideas and specific details. **Writing**- framing simple and compound sentences, completing sentences, developing hints, writing text messages. **Language development**- Parts of Speech, Wh- Questions, yes or no questions, direct and indirect questions. **Vocabulary development**– prefixes- suffixes- articles – countable and uncountable nouns

UNIT-II NARRATION AND DESCRIPTION 9

Reading – Read short narratives and descriptions from newspapers, dialogues and conversations. Reading strategies and practices. **Language development** – Tenses- simple present, present continuous, present perfect, simple past, past continuous, past perfect, simple future, future continuous, past participle, pronouns. **Vocabulary development**- guessing meanings of words in context. **Writing** – Write short narrative paragraphs, biographies of friends/relatives - writing- topic sentence- main ideas- free writing, short narrative descriptions using some suggested vocabulary and structures.

UNIT-III COMPARING AND CONTRASTING 9

Reading- short texts and long texts -understanding different types of text structures, -coherence-jumbled sentences. **Language development**- degrees of comparison, concord- **Vocabulary development** – single word substitutes- discourse markers- use of reference words **Writing** - comparative and contrast paragraphs writing- topic sentence- main idea, free writing, compare and contrast using some suggested vocabulary and structures.

UNIT-IV SOCIAL MEDIA COMMUNICATION 9

Reading blogs, social media reviews, posts, comments, process description, **Language development** - relative clause, **Vocabulary development**- social media terms-words, abbreviations and acronyms **Writing**- -e-mail writing-conventions of personal email, descriptions for simple processes, critical online reviews, blog, website posts, commenting to posts

UNIT-V ESSAY WRITING **9**

Reading- Close reading non-technical longer texts **Language development** - modal verbs, phrasal verbs- **Vocabulary development** - collocation. **Writing**- Writing short essays- brainstorming – developing an outline- identifying main and subordinate ideas

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of the course, the students should be able to

- **CO1:** Summarize simple, level-appropriate texts of around 300 words recognizing main ideas and specific details.
- **CO2:** Demonstrate the understanding of more complex grammatical structures and diction while reading and writing
- **CO3:** Use appropriate expressions to describe, compare and contrast people, things, situations etc., in writing
- **CO4:** Establish the ability to communicate effectively through emails
- **CO5:** Determine the language use appropriate for different social media platforms

TEXT BOOKS:

1. Susan Proctor, Jack C. Richards, Jonathan Hull. Interchange Level 2. Cambridge University Press and Assessment
2. Susan Proctor, Jack C. Richards, Jonathan Hull. Interchange Level 3. Cambridge University Press and Assessment

REFERENCES :

1. Dutt P. Kiranmai and Rajeevan Geeta. Basic Communication Skills, Foundation Books: 2013
2. Means,L. Thomas and Elaine Langlois. English & Communication for Colleges. CengageLearning , USA: 2007

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	1	1	-	2	3	-	2	-	-	-
2	-	-	-	-	-	-	-	-	2	3	-	2	-	-	-
3				-	-	1	1	-	2	3	-	2	-	-	-
4	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-
5	-	-	-	-	-	1	1	-	3	3	-	2	-	-	-
Overall correlation						1	1		3	3	-	2	-	-	-

23MA101 MATRICES AND CALCULUS L T P C
3 0 0 3

OBJECTIVES:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.

UNIT-I MATRICES 9

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – Applications: Stretching of an elastic membrane.

UNIT-II DIFFERENTIAL CALCULUS 9

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications : Maxima and Minima of functions of one variable.

UNIT-III FUNCTIONS OF SEVERAL VARIABLES 9

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined 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, Integration of irrational functions - Improper integrals.

UNIT-V MULTIPLE INTEGRALS **9**

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Apply the matrix algebra techniques and applications in Engineering Problems.
- **CO2:** Use both the limit definition and rules of differentiation to differentiate functions.
- **CO3:** Apply differentiation to solve maxima and minima problems.
- **CO4:** Evaluate integrals by using Riemann sums, Fundamental Theorem of Calculus and techniques of integration such as substitution, partial fractions and integration by parts.
- **CO5:** Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.

TEXT BOOKS:

1. Kreyszig. E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.

2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 8th Edition, New Delhi, 2015. [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].

REFERENCES :

1. Dr.P.Sivaramakrishnadas, Dr.C.Vijayakumari., " Matrices and Calculus" Pearson Publications

2. Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2016

3. Bali. N., Goyal. M. and Watkins. C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.

4. Narayanan. S. and Manicavachagom Pillai.T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	-	-	-	-	-	-	-	-	-	2	-	-
2	3	2	1	-	-	-	-	-	-	-	-	-	3	-	-
3	3	2	1	-	-	-	-	-	-	-	-	-	3	-	-
4	3	2	1	-	-	-	-	-	-	-	-	-	3	-	-
5	3	2	1	-	-	-	-	-	-	-	-	-	3	-	-
Overall correlation	3	2	1	-	-	-	-	-	-	-	-	-	3	-	-

23AD101 PROGRAMMING IN PYTHON L T P C
3 0 0 3

Objectives

The main objective is to teach Computational thinking using Python.

- To know the basics of Programming.
- To convert an algorithmin to a Python program.
- To construct Python programs with control structures.
- To structure a Python Program as a set of functions.
- To use Python data structures-lists, tuples, dictionaries and files.

UNIT-I COMPUTATIONAL THINKING 9

Introduction to Computing and Problem Solving: Fundamentals of Computing – Computing Devices – Identification of Computational Problems – Pseudo Code and Flowcharts – Instructions – Algorithms – Building Blocks of Algorithms (statements, state, control flow, functions), notation (pseudo code, flowchart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

UNIT-II INTRODUCTION TO PYTHON 9

Introduction to Python Programming: Python Interpreter and Interactive Mode– Variables and Identifiers – Arithmetic Operators – Values and Types – Statements, Reading Input, Print Output, Type Conversions, type() Function and Is Operator, Dynamic and Strongly Typed Language.
ControlFlowStatements: if, if…else, if…elif…else Decision Control Statements, Nested if Statement, while Loop, for Loop, continue and break Statements.

UNIT-III FUNCTIONS AND STRINGS 9

Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.
Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.

UNIT-IV LISTS, TUPLES, DICTIONARIES AND FILES 9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list Parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension.
Files and Exception: text files, reading and writing files, format operator;

command line arguments, errors and exceptions, handling exceptions, modules, packages.

UNIT-V OBJECT-ORIENTED AND FUNCTIONAL PROGRAMMING 9

Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data Attributes, Encapsulation, Inheritance, Polymorphism.
Functional Programming: Lambda. Iterators, Generators, List Comprehensions.

TOTAL: 45 PERIODS

Course Outcomes:
On completion of the course, students will be able to:

- **CO1:** Develop algorithmic solutions to simple computational problems.
- **CO2:** Develop and execute simple Python programs using Control Statements
- **CO3:** Develop simple Python programs for solving problems using Functions and Strings
- **CO4:** Structure a Python program into lists, tuples, dictionaries and files.
- **CO5:** Construct a code related to Object-Oriented and Functional Programming.

Text books:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2ndedition,UpdatedforPython3,Shroff/O'ReillyPublishers,2016(http://greenteapress.com/wp/think-python/).
2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.

References:

1. LearningToProgramwithPython.RichardL.Halterman.Copyright©2011
2. PythonforEverybody,ExploringDataUsingPython3.Dr.CharlesR.Severance. 2016.
3. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
4. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
5. John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data'', Third Edition, MIT Press , 2021
6. Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.
7. https://www.python.org/

8. Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill, 2018.

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	3	2	-	-	-	-	-	2	2	3	3	-
2	3	3	3	3	2	-	-	-	-	-	2	2	3	-	-
3	3	3	3	3	2	-	-	-	-	-	2	-	3	-	-
4	2	2	-	2	2	-	-	-	-	-	1	-	3	-	-
5	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-
AVG.	**2**	**3**	**3**	**3**	**2**	-	-	-	-	-	**2**	**2**	**3**	**3**	-

23AD121 PYTHON PROGRAMMING LAB L T P C
0 0 4 2

COURSE OBJECTIVE

The main objective of this laboratory is to put into practice computational thinking. The students will be expected to write, compile, run and debug Python programs to demonstrate the usage of:

- Operators and Conditional Statements
- Control Structures and Functions (both recursive and iterative) and Recursion.
- String functions
- Lists, Sets, Dictionaries, Tuples and Files.
- Object-Oriented Programming

EXERCISES

I. Programs to demonstrate the usage of operators and conditional statements.

1. Write a program that takes two integers as command line arguments and prints thesum of two integers.
2. Program to display the information:
   Your name, Full Address, Mobile Number, College Name, Course Subjects
3. Program that reads the URL of a website as input and displays contents of awebpage.

II. Programs to demonstrate usage of control structures.

4. Program to find the sum of all prime numbers between 1 and 1000.
5. Program to find the product of two matrices.
6. Program to find the roots of a quadratic equation.

III. Programs to demonstrate the usage of Functions and Recursion

7. Write both recursive and non-recursive functions for the following:
   a. To find GCD of two integers
   b. To find the factorial of positive integer
   c. To print Fibonacci Sequence up to given number 'n'
   d. To convert decimal number to Binary equivalent
8. Program with a function that accepts two arguments: a list and a number 'n'. It should display all the numbers in the list that are greater than the given number 'n'.
9. Program with a function to find how many numbers are divisible by 2, 3,4,5,6 and 7 between 1 to 1000.

IV. Programs to demonstrate the usage of String functions.

10. Program that accepts two strings S1, S2, and finds whether they are equal

are not.

11. Program to count the number of occurrences of characters in each string.
12. Program to find whether a given string is palindrome or not.

V. Programs to demonstrate the usage of lists, sets, dictionaries, tuples and files.

13. Simple sorting, Histogram, Students marks statement, Retail bill preparation
14. Write a program that combines lists L1 and L2 into a dictionary.
15. Program to display a list of all unique words in a text file and word count, copy file, Voter's age validation, Marks range validation (0-100).

VI. Programs to demonstrate the usage of Object-Oriented Programming

16. Program to implement the inheritance.
17. Program to implement polymorphism.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

On completion of the course, students will be able to:

- **CO1:** Develop algorithmic solutions to simple computational problems.
- **CO2**: Develop and execute simple Python programs.
- **CO3**: Implement programs in Python using conditionals and loops for solving problems..
- **CO4:** Deploy functions to decompose a Python program.
- **CO5**: Process compound data using Python data structures.

CO-PO-PSO MAPPING

CONo.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	3	-	2	-	-	-	-	-	-	2	3	-	-
2	3	3	3	-	2	-	-	-	-	-	-	2	3	-	-
3	3	3	3	-	2	-	-	-	-	-	-	2	3	-	-
4	3	2	2	-	2	-	-	-	-	-	-	2	3	-	-
5	3	3	3	-	3	-	-	-	-	-	-	2	3	-	-
Avg. Mapping	**2.0**	**2.6**	**2.8**	**-**	**2.2**	**-**	**-**	**-**	**-**	**-**	**-**	**2.0**	**3.0**	**-**	**-**

23CS101 PROGRAMMING IN C **L T P C**
3 0 0 3

COURSE OBJECTIVES:

- To understand the constructs of C Language.
- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop modular applications in C using functions
- To develop applications in C using pointers and structures
- To do input/output and file handling in C

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

Introduction to programming paradigms – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements – Decision making statements - Switch statement - Looping statements – Preprocessor directives - Compilation process

UNIT-II ARRAYS AND STRINGS **9**

Introduction to Arrays: Declaration, Initialization – One dimensional array – Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search.

UNIT-III FUNCTIONS AND POINTERS **9**

Modular programming - Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion, Binary Search using recursive functions – Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.

UNIT-IV STRUCTURES AND UNION **9**

Structure - Nested structures – Pointer and Structures – Array of structures – Self referential structures – Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes and Visibility.

UNIT -V FILE PROCESSING **9**

Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments.

COURSE OUTCOMES:

Upon completion of the course, the students will be able to

- **CO1**: Develop simple applications in C using basic constructs (K3)
- **CO2**: Design and implement applications using arrays and strings (K3)
- **CO3**: Develop and implement modular applications in C using functions. (K3)
- **CO4:** Develop applications in C using structures and pointers. (K3)
- **CO5**: Design applications using sequential and random access file processing. (K3)

TOTAL : 45 PERIODS

TEXT BOOKS:

1. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2015.

REFERENCES:

1. Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.
2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
3. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.
4. PradipDey, ManasGhosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
5. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	3	2	2	1	-	1	-	2	-	1	3	2	2
2	3	2	3	2	2	1	-	1	-	2	-	1	3	2	2
3	3	2	3	2	2	1	-	1	-	2	-	1	3	2	2
4	3	2	3	2	2	1	-	1	-	2	--	1	3	2	2
5	3	2	3	2	2	1	-	1	-	2		1	3	2	2
AVG	3	2	3	2	2	1	-	1	-	2	-	1	3	2	2

23CS121 C PROGRAMMING LABORATORY L T P C
0 0 4 2

OBJECTIVES:

- To familiarise with C programming constructs.
- To develop programs in C using basic constructs.
- To develop programs in C using arrays.
- To develop applications in C using strings, pointers, functions.
- To develop applications in C using structures.
- To develop applications in C using file processing.

LIST OF EXPERIMENTS:

1. I/O statements, operators, expressions
2. Decision-making constructs: if-else, goto, switch-case, break-continue
3. Loops: for, while, do-while
4. Arrays: 1D and 2D, Multi-dimensional arrays, traversal
5. Strings: operations
6. Functions: call, return, passing parameters by (value, reference), passing arrays to function.
7. Recursion
8. Pointers: Pointers to functions, Arrays, Strings, Pointers to Pointers, Array of Pointers
9. Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions.
10. Files: reading and writing, File pointers, file operations, random access, processor directives.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

- **CO1**: Develop programs in C using basic constructs. (K3)
- **CO2**: Develop programs in C using arrays. (K3)
- **CO3**: Develop applications in C using strings, pointers, functions. (K3)
- **CO4**: Develop applications in C using structures. (K3)
- **CO5**: Develop applications in C using file processing. (K3)

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	3	2	3	1	-	1	-	2	-	1	3	3	2
2	3	2	3	2	3	1	-	1	-	2	-	1	3	3	2
3	3	2	3	2	3	1	-	1	-	2	-	1	3	3	2
4	3	2	3	2	3	1	-	1	-	2	-	1	3	3	2
5	3	2	3	2	3	1	-	1	-	2	-	1	3	3	2
AVG*	3	2	3	2	3	1	-	1	-	2	-	1	3	3	2

23HS102 HERITAGE OF TAMILS L T P C
1 0 0 1

COURSE OBJECTIVES:

- To explain to students the classical literature of Tamil language and define the contribution of Tamil poets and the development of modern literature
- To Summarize the making of musical instruments related to Tamil heritage
- To Illustrate to students the sports and games of Tamils
- To make students Recall the education and literacy during sangam age
- To make students realize the importance and contribution of Tamils to Indian Freedom Struggle

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 TO MODERN ART – SCULPTURE 3

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, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT-IV THINAI CONCEPT 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.

TOTAL: 15 PERIODS

COURSE OUTCOMES:

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

- **CO1** explain the classical literature of Tamil language and define the contribution of Tamil poets and the development of modern literature
- **CO2** Summarize the making of musical instruments related to Tamil heritage
- **CO3** Illustrate the sports and games of Tamils
- **CO4** Recall the education and literacy during Sangam age
- **CO5** Realize the importance and contribution of Tamils to Indian Freedom Struggle

TEXT BOOKS:

1. தமிழக வரலாறு–மக்களும் பண்பாடும்–கே.கேபிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித்தமிழ் – முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்).

REFERENCE BOOKS

1. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
2. பொருனை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

CO	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
2	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
3	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
4	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
5	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
Overall correlation	-	-	-	-	-	1	1	**1**	-	-	-	-	-	-	-

23PH111	ENGINEERING PHYSICS	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES

- To make the students effectively to achieve an understanding of mechanics.
- To enable the students to gain knowledge of electromagnetic waves and its applications.
- To introduce the basics of optics and lasers.
- Equipping the students to be successfully understand the importance of quantum physics.
- To motivate the students towards the applications of quantum mechanics.

UNIT-I MECHANICS **9**

Types of Stress, Stress-strain diagram and its uses — factors affecting elastic modulus and tensile strength. — Bending of beams, bending moment - Uniform and non-uniform bending: theory and experiment. Center of mass (CM) – CM of continuous bodies - rod – motion of the CM. Rotation of rigid bodies: Rotational kinematics – rotational kinetic energy and moment of inertia - theorems of MI– moment of inertia of a rod, disc, and solid sphere– M.I of a diatomic molecule – torque-rotational energy state of a rigid diatomic molecule – M.I of disc by torsional pendulum.

UNIT-II ELECTROMAGNETIC WAVES **9**

Concept of field- Introduction to Gradient, divergence and Curl of Field- Stokes Theorem (no proof)-Gauss Divergence Theorem(no Proof)-The Maxwell's equations in Integral form and Differential form - wave equation; Plane electromagnetic waves in vacuum - properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - Energy and momentum in EM waves – Poyntings vector – cellphone reception.

UNIT-III OPTICS AND LASERS **9**

Reflection and refraction of light waves - total internal reflection – types of optical fibers – numerical aperture and acceptance angle - interference –Theory of air wedge and experiment. Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients (qualitative)- population inversion - CO2 laser, semiconductor laser (homojunction) –Basic applications of lasers in industry.

UNIT-IV BASIC QUANTUM MECHANICS **9**

Photons and light waves - Electrons and matter waves –Compton effect - The Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization –Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes- Normalization, probabilities and the correspondence principle.

UNIT-V APPLIED QUANTUM MECHANICS **9**

The harmonic oscillator(qualitative)- Barrier penetration and quantum tunneling(qualitative)- Tunneling microscope - Resonant diode - Finite potential wells (qualitative)- Bloch's theorem for particles in a periodic potential –Basics of Kronig-Penney model and origin of energy bands.

TOTAL : 45 PERIODS

PRACTICAL EXERCISES: (Any Seven Experiments)

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects.
2. Simple harmonic oscillations of cantilever.
3. Non-uniform bending- Determination of Young's modulus
4. Uniform bending–Determination of Young's modulus
5. Laser-Determination of the wavelength of the laser using grating
6. Airwedge- Determination of thickness of a thinsheet /wire
7. a) Optical fibre-Determination of Numerical Aperture and acceptance angle
   b) Compact disc-Determination of width of the groove using laser.
8. Acoustic grating-Determination of velocity of ultrasonic waves in liquids.
9. Ultrasonic interferometer–determination of the velocity of sound and compressibility of liquids
10. Post office box-Determination of Band gap of a semiconductor.
11. Photoelectric effect
12. Michelson Interferometer.
13. Melde's string experiment
14. Experiment with lattice dynamics kit.

TOTAL: 30 PERIODS

Course Outcomes

After completion of this course, the students should be able to

- **CO1:** Identify the elastic and plastic behavior of the material and behavior of the material and build the importance of mechanics.
- **CO2:** Develop the knowledge in electromagnetic waves.
- **CO3**: Make use of the optical properties to determine the thickness of thin wire and to determine the characteristics of optical fiber.

- **CO4**: Apply the quantum mechanical properties of particles and waves.
- **CO5:** Apply quantum mechanical principles towards the formation of energy bands.

TEXT BOOKS:

1. D.Kleppner and R.Kolenkow. An Introduction to Mechanics. McGraw Hill Education (Indian Edition), 2017.
2. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, McGraw-Hill (Indian Edition), 2017.

REFERENCES:

1. R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian Edition), 2009.
2. D.Halliday, R.Resnick and J.Walker. Principles of Physics, Wiley (Indian Edition), 2015.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	-	-	-	2	-	-	-	-	1	-	-	-
2	3	3	2	-	-	-	2	-	-	-	-	1	-	-	-
3	3	3	1	-	-	-	1	-	-	-	-	1	-	-	-
4	3	2	1	-	-	-	1	-	-	-	-	1	-	-	-
5	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall correlation	3	3	2	-	-	-	1	-	-	-	-	1	-	-	-

23CY111	ENGINEERING CHEMISTRY	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To inculcate sound understanding of water quality parameters and water treatment techniques.
- To impart knowledge on the basic principles and preparatory methods of nanomaterials.
- To introduce the basic concepts and applications of phase rule and composites.
- To facilitate the understanding of different types of fuels, their preparation, properties and Combustion characteristics.
- To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.

UNIT-I WATER AND ITS TREATMENT **9**

Water: Sources and impurities, Water quality parameters: Definition and significance of-color, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, flouride and arsenic. Sewage treatment primary treatment and disinfection (UV, Ozonation, break-point chlorination). Hardness-Estimation of Hardness of water by EDTA-numerical Problems-Desalination of brackish water: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming &foaming. Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment – Ion exchange demineralization and zeolite process.

UNIT- II NANO CHEMISTRY **9**

Basics: Distinction between molecules, nanomaterials and bulk materials; Size-dependent properties (optical, lectrical, mechanical and magnetic); Types of nanomaterials (Metal oxide and Metal) Synthesis and Characterization of nanomaterials: sol-gel, solvothermal, laser ablation, chemical vapour deposition, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, energy, sensor , electronics and catalysis**.**

UNIT-III PHASE RULE AND COMPOSITES **9**

Phase rule: Introduction, definition of terms with examples. One component system – water system; CO2 system; Reduced phase rule; Two component system: lead-silver system – Pattinson process.

Composites: Definition & Need for composites; Constitution: Matrix materials (Polymer matrix, metal matrix and ceramic matrix) and Reinforcement (fiber, particulates, flakes and whiskers). Properties and applications of: Metal matrix composites (MMC), Ceramic matrix composites and Polymer matrix composites. Hybrid composites – definition and examples.

UNIT-IV FUELS AND COMBUSTION **9**

Fuels: Fossil Fuels, Classification of fuels; Coal and coke: Analysis of coal

(proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Knocking – octane number, diesel oil – cetane number; Power alcohol and biodiesel.
Combustion of fuels: Introduction: Calorific value – higher and lower calorific values, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis – ORSAT Method. CO2 emission and carbon sequestration, Green Hydrogen.

UNIT-V ENERGY SOURCES AND STORAGE DEVICES 9

Nuclear fission and fusion- light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials. Wind energy; Geothermal energy; Batteries: Types of batteries, Primary battery – dry cell, Secondary battery – lead acid battery and lithium-ion battery; Electric vehicles – working principles; Fuel cells: H2-O2 fuel cell, microbial fuel cell and its advanced technology, supercapacitor

TOTAL: 45 PERIODS

PRACTICAL EXERCISES: 30 PERIODS

1. Determination of hardness causing salts in water sample by EDTA method.
2. Determination of alkalinity in water sample
3. Determination of chloride content of water sample by argentometric method
4. Determination of strength of given Barium chloride using conductivity meter
5. Determination of strength of Acid using pH meter
6. Determination of strength of FAS by potentiometer
7. Determination of strength of acids in a mixture using conductivity meter.
8. Preparation of nanoparticles (TiO2/ZnO/CuO) by Sol-Gel method.
9. Estimation of Nickel in steel

COURSE OUTCOMES:

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

- **CO1**: To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water
- **CO2**: To identify the apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications
- **CO3**: To apply the knowledge of phase rule and composites for material selection requirements
- **CO4**: To recommend suitable fuels for engineering processes and applications
- **CO5:** To recognize different forms of energy resources and apply them for suitable applications in energy sectors

TEXTBOOKS:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

REFERENCES:

1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
4. ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
5. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	-	-	1	1	-	-	-	-	1	-	-	-
2	2	1	1	-	-	1	1	-	-	-	-	1	-	-	-
3	2	1	1	-	-	1	1	-	-	-	-	1	-	-	-
4	2	1	1	-	-	1	1	-	-	-	-	1	-	-	-
5	2	1	1	-	-	1	1	-	-	-	-	1	-	-	-
Overall correlation	2	1	1	-	-	1	1	-	-	-	-	1	-	-	-

23IT121 INFORMATION TECHNOLOGY ESSENTIALS L T P C
0 0 2 1

OBJECTIVES:

- To design and develop web pages using HTML and CSS.
- To understand the general concepts of PHP scripting language and MySQL functionalities for the development of simple data-centric applications.
- To provide a basic knowledge of computer software.
- To understand various types of information systems and their complexities.
- To Simplify and transfer this problem solving process to wide variety of problems

UNIT-I WEB AND SCRIPTING ESSENTIALS 10

Internet Basics – Browser Fundamentals – Authoring Tools – Introduction to HTML5 –HTML5 Tags–HTML5 Forms–Cascading Style Sheets (CSS3) Fundamentals–Need for Scripting Languages–Introduction to JavaScript.

SuggestedActivities:

- Browse the internet on special topics given by instructor.
- Learn HTML basic tags for web page design.
- Identify different types of form validations in the websites that are commonly used.
- Practical - Design of a small simple website, interlinking set of web pages created using the HTML tags and CSS.

Suggested Evaluation Methods:

- Quizzes on all the topics of the unit.
- Discussion on form validation.
- Peer evaluation of the simple web-sites created.

UNIT-II SERVER-SIDE ESSENTIALS (PHP) 10

Introduction to PHP – PHP Variables – Constants – Operators – Flow Control and Looping –Arrays – Strings – Functions – PHP and HTML– Database Management–Introduction to My SQL – MySQL Commands – MySQL Database Creation –Connecting MySQL and PHP – Querying MySQL Database with PHP.

Suggested Activities:

- Practical -Simpleprograms using PHP.
- Design ofadynamicwebpages using PHP.
- Database creation usingMySQL andPHP scripts.
- Practical - Creation ofsessionandcookies.

Suggested Evaluation Methods:

- Quizzes ondifferent topicsoftheunit.
- Demonstrationof theimplementations.
- Groupdiscussionsdesignofweb page.

UNIT-III APPLICATION ESSENTIALS 10

Creation of Simple Interactive Applications – Simple Database Applications – Introduction to Information Systems – Personal Information System – Information Retrieval System – Social Networking Applications.

Suggested Activities:

- Flipped classroom on social networking applications.
- Explore the web to know more about the concepts and technologies used for the design of Information Systems. Students may present their findings orally or by a written report.
- Design a simple web or mobile application.
- Explore and analyze some of the visual analytics software.

Suggested Evaluation Methods:

- Quizzes on features of social networking applications.
- Presentations on various information systems.
- Demonstration of application.
- Discussions through forums.

TOTAL: 30 PERIODS

OUTCOMES:

On completion of the course, the student will be able to:

- **CO1:** Create dynamic website / web based applications using HTML, PHP, and MYSQL database.
- **CO2:** Design websites that meet specified needs and interests using basic elements to control at you and style.
- **CO3:** Debug the programs by applying concepts and error handling techniques of HTML, Java Script, PHP and MYSQL.
- **CO4:** Identify the fundamental concepts and key issues in the design of commonly used applications.
- **CO5**: Simplify and transfer this problem solving process to wide variety of problems.

TEXTBOOKS:

1. RobinNixon,"LearningPHP,MySQL,JavaScript,CSS&HTML5:A Step-by-Step Guide to Creating Dynamic Websites",O'ReillyMedia,Inc,2014.

REFERENCES:

1. Steven Holzner, "PHP: The Complete Reference", Fifth Edition, Mc Graw Hill, 2017.

2. NiederstRobbins,Jennifer,"LearningWebDesign:ABeginner'sGuidetoHTML,CSS,Javascript,andWeb Graphics",FifthEdition,O'ReillyMedia,2018.
3. LauraLemay,RafeColburn,JenniferKyrnin,"MasteringHTML,CSS&JavaScriptWebPublishing",BPBPublications,2016.
4. R.KellyRainer,Casey G.Cegielski,BradPrince,"IntroductiontoInformationSystems",FifthEdition,Wiley Publication,2014.

COPO Mapping

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	3	3	3	1	3	1	-	1	1	1	2	1	3	-
2	2	3	2	3	1	3	1	-	1	1	1	2	1	3	-
3	2	3	3	3	1	3	2	-	1	1	1	2	1	3	-
4	2	3	3	3	1	3	3	-	1	1	1	2	1	3	-
5	2	1	1	1	3	1	1	-	1	3	-	2	1	3	-

23HS121 COMMUNICATION SKILLS LABORATORY L T P C
0 0 0 2

COURSE OBJECTIVES:

- To enable the students to comprehend the main idea and specific information of the listening passage
- To help students express themselves clearly, and communicate effectively with others.
- To introduce authentic language use and context-specific vocabulary that might not be encountered in textbooks.

Exercise: 1 Listening to conversations set in everyday social context and complete gap-filling exercise

Exercise: 2 Listening to a monologue in everyday social context. Diagram labelling and MCQ

Exercise: 3 Listening to a group conversation in academic setting and answer MCQ

Exercise: 4 Listening to a lecture and answer MCQ or gap filling

Exercise: 5 Listening to Ted Talks, podcasts, documentaries - discussion

Exercise 6 Listening to a lecture and reading a text on same subject- compare and contrast

Exercise: 7 Speaking introducing oneself

Exercise: 8 Answering questions based on the introduction

Exercise: 9 Speaking on a given prompt for 2 mins.

Exercise: 10 Answering questions based on the topic spoken

Exercise: 11 Role play- Engaging in conversation

Exercise: 12 Engaging in Podcast Discussion

TOTAL PERIODS: 25

COURSE OUTCOMES

- **CO1:** Demonstrate fluency in speaking in variety of situations
- **CO2:** Express their knowledge by talking continuously for more than two minutes on a topic
- **CO3**: Use a full range of structures naturally and appropriately
- **CO4:** Use a full range of structures naturally and appropriately
- **CO5:** Identify the specific information in conversations, interviews, talks and lectures

LEARNING SOFTWARE LINK

M/s. Orell Techno Systems (India) Pvt Ltd.

CO Nos.	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	1	1	-	2	3	-	2	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
3	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
5	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-
Overall correlation	-	-	-	-	-	1	1	-	3	3	-	2	-	-	-

SEMESTER – II

23HS201 PROFESSIONAL ENGLISH **L T P C**
3 0 0 3

COURSE OBJECTIVES:

- To help learners extract information from longer, technical and scientific texts
- To familiarize learners with different text structures by engaging them in reading, writing and grammar learning activities
- To help learners write coherent, extensive reports and essays.
- To enable learners to use language efficiently while expressing their opinions in professional and business situations

UNIT-I WORKPLACE COMMUNICATION **9**

Reading – Reading brochures (technical context), advertisements, telephone messages, gadget reviews social media messages, digital communication relevant to technical contexts and business. **Writing –** Writing emails -emails on professional contexts including introducing oneself, writing checklist, writing single sentence definition, product description- advertising or marketing slogans, **Language Development**– Tenses, Concord, Question types: Wh/ Yes or No/ and Tags, imperative sentences, omplex sentences**. Vocabulary** One-word substitutes; Abbreviations & Acronyms as used in technical contexts and social media.

UNIT- II EXPRESSING CAUSE AND EFFECT **9**

Reading - Reading longer technical texts– Cause and Effect Essays, and emails of complaint. **Writing** - writing complaint emails (raising tickets) and responses to complaints, writing Cause and effect paragraphs and essays. **Language Development**– Active, Passive and Impersonal Passive Voice transformations, Infinitive and Gerunds **Vocabulary** – Synonyms- contextual meaning of words, Same word acting as different parts of speech, causal expressions

UNIT-III PROVIDING SOLUTIONS TO PROBLEMS **9**

Reading - Case Studies, editorials, news reports etc. Writing – Letter to the Editor, Writing instructions and recommendations, Problem solution essay / Argumentative Essay, **Language Development** – Error correction; If conditional sentences **Vocabulary** - Compound Words, discourse markers

UNIT-IV INTERPRETATION OF GRAPHICS **9**

Reading newspaper articles, nonverbal communication (charts and graphs,) **Writing** –Transferring information from nonverbal (chart, graph etc, to verbal mode) Process

description. **Language development**–Possessive & Relative pronouns, numerical adjectives **Vocabulary** Homonyms and Homophones, sequence words

UNIT-V REPORT WRITING AND RESUME WRITING 9

Reading – Company profiles, journal reports. **Language Development**– Reported Speech **Vocabulary**-reporting words and phrases.**Writing** accident report, survey report and progress report, project proposal, minutes of the meeting, writing statement of purpose, internship application and resume.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of the course, the students should be able to

- **CO1:** Summarize long technical and scientific text of not less than 500 words recognizing main ideas and specific details.
- **CO2:** Demonstrate the understanding of more complex grammatical structures and diction while reading and writing
- **CO3:** Use appropriate expressions to describe process and product, compare and contrast data, analyze problems, provide solutions and prove an argument in writing
- **CO4:** Establish the ability to communicate effectively in professional environment through emails and reports
- **CO5:** Determine the language use appropriate for different social media platforms used for digital marketing

Text Book:

1. V. Chellammal, Deepa Mary Francis, K N Shoba, P R Sujatha Priyadharshini, Veena Selvam, English for Science & Technology I, Cambridge University Press and Assessment

2. V. Chellammal, Deepa Mary Francis, K N Shoba, P R Sujatha Priyadharshini, Veena Selvam, English for Science & Technology II, Cambridge University Press and Assessment

References:

1. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
2. Developing Communication Skills by Krishna Mohan, Meera Bannerji-Macmillan India Ltd. 1990, Delhi.

CO Nos.	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	1	1	-	2	3	-	2	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
3	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
5	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-
Overall correlation	-	-	-	-	-	1	1	-	3	3	-	2	-	-	-

23HS221 SOFT SKILLS **L T P C**
0 0 2 1*

COURSE OBJECTIVES:

- To help learners improve their interpersonal skills and critical thinking
- To familiarize learners with the attributes of a leader to enhance team performance
- To prepare students to face job interviews
- To help learners to know the importance of ethics in work place

UNIT-I INTERPERSONAL COMMUNICATION

Basic communication- verbal and non-verbal communication; passive, assertive and aggressive communication; presentation skills; giving feedback and responding to feedback.

UNIT- II TEAM WORK AND LEADERSHIP

Vision- setting realistic goals and objectives, collaboration, cooperation, dependability, empathy, sympathy, motivation, delegation of responsibilities, open mindedness, creativity, flexibility, adaptability, cross cultural communication and group dynamics

UNIT-III TIME MANAGEMENT AND STRESS MANAGEMENT

Effective Planning, Planning activities at macro and micro levels, setting practical deadlines and realistic limits/targets, punctuality, prioritizing activities, spending the right time on the right activity, positive attitude, emotional intelligence, self-awareness and regulation

UNIT-IV CRITICAL THINKING AND WORK ETHICS

Questioning, analysing, inferencing, interpreting, evaluating, solving problems, explaining, self-regulation, open-mindedness, conflict management- ethical dilemmas, appearance, attendance, attitude, character, organizational skills, productivity, respect.

UNIT-V INTERVIEW SKILLS AND RESUME BUILDING TECHNIQUES

Telephonic interview, online interviews, f2f interviews, FAQ soft skills interview questions, drafting error-free CVs/ Resumes and Cover Letters, selecting the ideal format for resume, content drafting along with sequencing, art of representing one's qualifications and most relevant work history, video resume, website resume.

TOTAL: 25 PERIODS

COURSE OUTCOMES:

After completion of the course, the students should be able to

- **CO1:** Express their thoughts, opinions and ideas confidently to one or more people in spoken form
- **CO2:** Demonstrate knowledge and skills in a group as team player and leader
- **CO3:** Compose a comprehensive resume reflecting qualifications, exposure and achievements
- **CO4:** Exhibit knowledge and skills confidently during job interviews
- **CO5:** Demonstrate ethical and professional behaviour at workplace in all situations

Text Book

1. Soft Skills: Key to Success in Workplace and Life by Meenakshi Raman & Shalini Upadhyay. Cengage

References

2. English for Job Seekers (Language and Soft Skills for the Aspiring) by Geetha Rajeevan, C.L.N. Prakash) Cambridge University Press pvt,Ltd.
3. Business Benchmark by Norman Whitby. Cambridge University Press pvt,Ltd

CO Nos.	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-
2	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-
3	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-
4	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-
5	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-
Overall correlation	-	-	-	-	-	-	-	3	3	3	-	-	-	-	-

23MA201 VECTOR CALCULUS AND COMPLEX FUNCTIONS L T P C

3 1 0 4

OBJECTIVES:

- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex functions theory so as to enable the student to apply them with confidence, in application areas.
- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT-I VECTOR CALCULUS 9+3

Gradient and directional derivative – Divergence and curl - Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral - Area of a curved surface - Volume integral - Green's, Gauss divergence and Stoke's theorems (excluding proofs)–Verification and simple application involving cubes and rectangular parallelopipeds.

UNIT-II ANALYTIC FUNCTION 9+3

Functions of complex variable -Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates - Properties– Harmonic conjugates–Construction of analytic function- Conformal mapping– $w=z+c$, cz, $1/z$, z^2 , Bilinear Transformation

UNIT-III COMPLEX INTEGRATION 9+3

Line integral-Cauchy's integral theorem (exclude proof)–Cauchy's integral formula– Taylor's and Laurent's series - Singularities – Residues – Residue theorem (exclude proof) – Application of residue theorem for evaluation of real definite integrals as contour integrals around contour and semi circular contour (with poles NOT on real axis)

UNIT-IV ORDINARY DIFFERENTIAL EQUATIONS 9+3

Higher order linear differential equations with constant coefficients-Method of variation of parameters – Linear Differential equations with variable coefficients - Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients.

UNIT-V LAPLACE TRANSFORMS **9+3**

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems- Transforms of derivatives and integrals-Initial and final value theorems – Inverse transforms – Convolution theorem (exclude proof) – Transform of periodic functions – Application to solution of linear second order ordinary differential equations with constant coefficients.

TOTAL: 60 PERIODS

COURSE OUTCOMES

On completion of the course, students will be able to:

- **CO1:** Develop skills to calculate grad, div and curl in Cartesian and other simple coordinate systems and Use Gauss, Stokes and Greens theorems to simplify calculations of integrals and prove simple results.
- **CO2:** Use the concept of Analytic functions, conformal mapping for solving engineering problems
- **CO3:** Evaluate real and complex integrals using the Cauchy integral formula and the residue theorem.
- **CO 4:** Apply various techniques in solving ordinary differential equations.
- **CO5:** Apply Laplace transform and inverse transform techniques in solving differential equations

TEXTBOOKS:

1. Erwin Kreyszig," Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, NewDelhi, 2016.
2. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.

REFERENCES:

1. Dr.P. Sivaramakrishna Das, C. Vijayakumari, "Engineering Mathematics - II" Pearson Publications
2. Sastry, S.S, "Engineering Mathematics", Vol.I &II, PHI Learning Pvt. Ltd, 4th Edition, NewDelhi, 2014.
3. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, NewDelhi, 3rd Edition, 2007.
4. BaliN., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt.,Ltd.,), NewDelhi, 7th Edition,2009.
5. Veerarajan T, Engineering Mathematics for First Year, II Edition, Tata McGraw Hill Publishers, 2008

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-
2	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-
3	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-
4	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-
5	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-
Overall correlation	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-

23MA202 DISCRETE MATHEMATICS

L	T	P	C
3	1	0	4

COURSE OBJECTIVES:

- To develop student's logical and mathematical maturity and ability to deal with abstraction.
- To introduce most of the basic terminologies used in computer science related courses and application of ideas to solve practical problems.
- To understand the basic concepts of combinatorics and graph theory.
- To familiarize the applications of algebraic structures.
- To understand the concepts and significance of Lattices and Boolean algebra which are widely used in computer science and engineering.

UNIT-I LOGIC AND PROOFS **9+3**

Propositional logic – Propositional equivalences - Predicates and quantifiers – Nested quantifiers – Rules of inference - Introduction to proofs – Proof methods and strategy

UNIT-II COMBINATORICS **9+3**

Mathematical induction - The basics of counting - Well ordering -Strong induction – The pigeonhole principle – Permutations and Combinations – Recurrence relations - Solving linear recurrence relations – Generating functions – Inclusion and exclusion principle and its applications.

UNIT-III GRAPHS **9+3**

Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT-IV ALGEBRAIC STRUCTURES **9+3**

Algebraic systems – Semi groups and monoids - Groups – Subgroups – Homomorphism's – Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields.

UNIT-V LATTICES AND BOOLEAN ALGEBRA **9+3**

Partial ordering – Posets – Lattices as posets – Properties of lattices - Lattices as algebraic systems – Sub lattices – Direct product and homomorphism – Some special lattices – Boolean algebra – Boolean Homomorphism.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Apply the concepts of propositional and predicate calculus to the given logical statements needed for computing skill
- **CO2:** Apply the idea of mathematical induction, pigeon-hole principle, inclusion and exclusion principle, permutation and combinations, recurrence relations and generating functions in combinatorial problems
- **CO3:** Analyze the solutions for various engineering problems using graphs
- **CO4:** Apply the concepts and properties of algebraic structures such as semi groups, monoids and groups needed in areas like formal languages and design fast adders, error-detecting codes and error-correcting codes
- **CO5:** Identify the lattice structure using its properties and build Boolean expressions in areas like computational theory.

TEXT BOOKS:

1. Rosen. K.H., "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2017.
2. Tremblay. J.P. and Manohar. R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.

REFERENCES:

1. Dr.P.Sivaramakrishnadas, Dr.C.Vijayakumari," Discrete Mathematics" Pearson Publications
2. Grimaldi. R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 5thEdition, Pearson Education Asia, Delhi, 2013.
3. Koshy. T. "Discrete Mathematics with Applications", Elsevier Publications, 2006.
4. Lipschutz. S. and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.

CO Nos.	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-
2	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-
3	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-
4	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-
5	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-
Overall correlation	3	2	1	-	-	-	-	-	-	-	-	1	3	-	-

23MA203 STATISTICS AND NUMERICAL METHODS L T P C
3 1 0 4

COURSE OBJECTIVES:

- This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems
- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

UNIT-I TESTING OF HYPOTHESIS 9+3

Sampling distributions – Standard error - Large sample test for single mean, proportion, difference of means – Small sample Tests– t Test for single mean and difference of means - F test for equality of variance – Chi square test for single variance- Independence of attribute-Goodness of fit (Binomial Distribution, Poisson Distribution).

UNIT-II DESIGN OF EXPERIMENTS 9 +3

One way and two way classifications - Completely randomized design – Randomized block design – Latin square design

UNIT-III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9 +3

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a square matrix by Power method .

UNIT-IV INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION 9+3

Interpolation - Newton's forward and backward difference interpolation -Lagrange's and Newton's divided difference interpolations –- Approximation of derivative using interpolation polynomials – Numerical single integration and double integrations using Trapezoidal and Simpson's 1/3rules.

UNIT-V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS **9+ 3**

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 and Adam's Bashforth method.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Analyze the given data for large and small samples.
- **CO2:** Analyze the problems involving design of experiments.
- **CO3:** Determine numerical solutions for nonlinear (algebraic or transcendental) equations, large system of linear equations and Eigen value problem of a matrix, when analytical methods fail to give solution.
- **CO4:** Distinguish the Newton's forward, backward, divided difference, Lagrange's in finding the intermediate values of the experimental data and solving the problems using numerical differentiation and integration.
- **CO5:** Solve numerically, ordinary differential equations which is used to solve different kinds of problems occurring in engineering and technology.

TEXTBOOKS:

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition,2015.

REFERENCES:

1. Dr.P.Sivaramakrishnadas, Dr. C.Vijayakumari, "Statistics and Numerical Methods" Pearson Publications.
2. Burden, R.L and Faires,J.D,"Numerical Analysis", 9th Edition, Cengage Learning,2016.
3. Devore.J.L."Probability and Statistics for Engineering and the Sciences", Cengage Learning, NewDelhi, 8th Edition,2014.
4. Gerald.C.F. and Wheatley.P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
2	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
3	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
4	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
5	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
Overall correlation	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-

23MA204	PROBABILITY AND STATISTICS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

This course aims

- To introduce the basic concepts of probability and random variables.
- To introduce the basic concepts of two dimensional random variables.
- To acquaint the knowledge of Estimation Theory for small and large samples this plays an important role in real life problems.
- To provide required advanced statistical tools in solving engineering problems.
- To introduce the basic concepts of classifications of statistical quality control this plays very important roles in the field of agricultural engineering.

UNIT-I PROBABILITY AND RANDOM VARIABLES 12 + 4

Axioms of probability – Conditional probability – Baye's theorem - Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions.

UNIT-II TWO- DIMENSIONAL RANDOM VARIABLES 9 + 3

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Curve Fitting-Method of Least Squares-Central limit theorem (for independent and identically distributed random variables,without proof)- Simple problems.

UNIT-III ESTIMATION THEORY 9 + 3

Unbiased estimators - Efficiency - Consistency - Sufficiency - Robustness - Method of moments - Method of maximum Likelihood - Interval estimation of Means - Differences between means.

UNIT-IV NON- PARAMETRIC TESTS 9 + 3

Introduction - The Sign test - The Signed - Rank test - Rank - sum tests - The U test - The H test- Tests based on Runs - Test of randomness - The Kolmogorov Tests .

UNIT-V STATISTICAL QUALITY CONTROL 6 + 2

Control charts for measurements ($\overline{X}$ and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Apply the fundamental knowledge of the concepts of probability and one dimensional random variables and standard probability distributions

which can describe real life phenomenon.

- **CO2:** Apply the basic concepts of two dimensional random variables in engineering applications.
- **CO3:** Apply the concept of estimation theory for small and large samples in real life problems.
- **CO4:** Apply the notion of sampling distributions and statistical techniques used in engineering and management problems.
- **CO5:** Apply the basic concepts of classifications of statistical quality control in the field of engineering.

TEXT BOOKS

1. Johnson. R.A., Miller. I.R and Freund . J.E, " Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 9th Edition, 2016.
2. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata Mc Graw Hill, 4th Edition, 2007.

REFERENCES:

1. Dr.P. Sivaramakrishna Das, C. Vijayakumari, "A text book of probability and statistics", Pearson Publications.
2. Gupta. S.C. and Kapoor. V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020.
3. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
4. Ross. S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 5thEdition, Elsevier, 2014.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
2	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
3	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
4	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
5	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-
Overall correlation	3	2	1	1	-	-	-	-	-	-	-	1	3	-	-

23PH201 PHYSICS FOR CIVIL ENGINEERING L T P C
3 0 0 3

COURSE OBJECTIVES:

- To introduce the basics of heat transfer through different materials, thermal performance of building and various thermal applications
- To impart knowledge on the ventilation and air conditioning of buildings
- To introduce the concepts of sound insulation and lighting designs
- To give an introduction to the processing and applications of new engineering materials
- To create an awareness on natural disasters and safety measures.

UNIT-I THERMAL APPLICATIONS 9

Principles of heat transfer, steady state of heat flow, conduction through compound media-series and parallel-conductivity of rubber tube and powder materials - heat transfer through fenestrations, thermal insulation and its benefits - heat gain and heat loss estimation - factors affecting the thermal performance of buildings, thermal measurements, thermal comfort, indices of thermal comfort, climate and design of solar radiation, shading devices - central heating.

UNIT-II VENTILATION AND REFRIGERATION 9

Requirements, principles of natural ventilation - ventilation measurements, design for natural ventilation - Window types and packaged air conditioners - chilled water plant - fan coil systems - water piping - cooling load - Air conditioning systems for different types of buildings - Protection against fire to be caused by A.C.Systems.

UNIT- III ACOUSTICS AND LIGHTING DESIGNS 9

Methods of sound absorptions - absorbing materials - noise and its measurements, sound insulation and its measurements, impact of noise in multistoried buildings. Visual field glare, colour - day light calculations - day light design of windows, measurement of day-light and use of models and artificial skies, principles of artificial lighting, supplementary artificial lighting.

UNIT- IV NEW ENGINEERING MATERIALS 9

Composites - Definition and Classification - Fibre reinforced plastics (FRP) and fiber reinforced metals (FRM) - Metallic glasses - Shape memory alloys - Ceramics - Classification - Crystalline - Non Crystalline - Bonded ceramics, Manufacturing methods - Slip casting - Isostatic pressing - Gas pressure bonding - Properties - thermal, mechanical, electrical and chemical ceramic fibres - ferroelectric and ferromagnetic ceramics - High Aluminium ceramics.

UNIT- V NATURAL DISASTERS **9**

Seismology and Seismic waves - Earth quake ground motion - Basic concepts and estimation techniques - site effects - Probabilistic and deterministic Seismic hazard analysis - Cyclone and flood hazards - Fire hazards and fire protection, fire-proofing of materials, fire safety regulations and firefighting equipment - Prevention and safety measures.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of the course, the students should be able to

- **CO1:** Explain the heat transfer through different materials, thermal performance of building and thermal insulation
- **CO2:** Outline the ventilation and air conditioning of buildings
- **CO3:** Explain the concepts of sound absorption, noise insulation, daylight harvesting and lighting designs in building
- **CO4:** Summarize the processing and applications of composites, metallic glasses, shape memory alloys and ceramics
- **CO5:** Describe the safety measures in a building towards natural disasters such as earth quake, cyclone, fire and safety.

TEXT BOOKS:

1. Marko Pinteric, Building Physics, Springer 2017.
2. D.S.Mathur. Elements of Properties of Matter. S Chand & Company, 2010.
3. Hugo Hens, Building Physics: Heat, Air and Moisture, Wiley, 2017

REFERENCES:

1. W.R.Stevens. Building Physics: Lighting. Pergamon Press, 2013..
2. Hugo Hens, Applied Building Physics, Wiley, 2016
3. K.G.Budinski and M.K.Budinski. Engineering Materials: Properties and Selection. Pearson Education, 2016.
4. Peter A. Claisse, Civil Engineering Materials, Elsevier, 2016.
5. Patrick L. Abbott, Natural Disasters, McGraw-Hill, 2017.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-
2	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-
3	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-
4	3	2	1	-	-	2	-	-	-	-	-	-	-	-	-
5	2	2	1	-	-	1	-	-	-	-	-	-	-	-	-
Overall correlation	3	2	1	-	-	1	-	-	-	-	-	-	-	-	-

23PH202 APPLIED MATERIALS SCIENCE L T P C
3 0 0 3

COURSE OBJECTIVES:

- To make the students understand the basics of crystallography and its importance in studying materials properties.
- To inculcate the knowledge of phase relationships for the understanding of material properties.
- To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
- To instill knowledge on physics of semiconductors, determination of charge carriers and device applications
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications

UNIT-I CRYSTALLOGRAPHY 9

Crystal structures: BCC, FCC and HCP – directions and planes - linear and planar densities – crystal imperfections- edge and screw dislocations – grain and twin boundaries - Burgers vector and elastic strain energy- Slip systems, plastic deformation of materials – Polymorphism.

UNIT-II PHASE DIAGRAMS 9

Phase equilibrium – solubility limit – solid solution (interstitial and substitution) – intermediate phases – intermetallics – electron compound – Gibbs phase rule – Unary phase diagram (iron) – Binary phase diagrams: Isomorphous systems (Cu-Ni) – determination of phase composition and phase amounts – tie line and lever rule – binary eutectic diagram with no solid solution and limited solid solution (Pb-Sn) – eutectoid and peritectic reactions – other invariant reactions – microstructural development during the slow cooling: eutectic, hypereutectic and hypoeutectic compositions.

UNIT- III ELECTRICAL AND MAGNETIC PROPERTIES OF MATERIALS 9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Quantum free electron theory :Tunneling – degenerate states – Fermi- Dirac statistics – Density of energy states. Magnetic materials: Dia, para and ferromagnetic effects -Domain theory of ferromagnetism and hysteresis– exchange interaction and ferromagnetism – quantum interference devices – GMR devices.

UNIT- IV SEMICONDUCTORS AND TRANSPORT PHYSICS 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors– Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors –

Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion (qualitative) – Hall effect and devices – Ohmic contacts – Schottky diode – introduction to solid state drive (SSD)

UNIT- V OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption, loss and gain. Optical processes in quantum wells – Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode - optical processes in organic semiconductor devices –excitonic state.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- **CO1** Apply the basics of crystallography and it's importance in studying materials properties
- **CO2** Develop the knowledge of phase relationship for the understanding of material properties
- **CO3** Illustrate the electrical properties of materials using classical and quantum free electron theory and apply properties of magnetic materials in devices
- **CO4** Develop the knowledge on physics of semiconductors, determination of charges carrier and device application
- **CO5** Build a sound grasp of knowledge and different optical properties of materials, optical displays and applications

TEXT BOOKS:

1. V.Raghavan. Materials Science and Engineering: A First Course, Prentice Hall India Learning Private Limited, 2015.
2. Safa Kasap, Principles of Electronic Materials and Devices, Mc-Graw Hill, 2018.
3. Jasprit Singh, Semiconductor Devices: Basic Principles, Wiley (India), 2007.
4. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, Mc-Graw Hill India (2019)
5. Safa kasap, Optoelectronics & Photonics: Principles and Practices, Pearson, 2013.

REFERENCES:

1. R.Balasubramaniam, Callister's Materials Science and Engineering. Wiley (Indian Edition), 2014.

2. Wendelin Wright and Donald Askeland, Essentials of Materials Science and Engineering, CL Engineering, 2013.
3. Robert F.Pierret, Semiconductor Device Fundamentals, Pearson, 2006.
4. Simon Sze and Ming-kwei Lee, Semiconductor Devices: Physics and Technology, Wiley, 2015.
5. Pallab Bhattacharya, Semiconductor Optoelectronic Devices, Pearson, 2017.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	-	-	-	2	-	-	-	-	1	-	-	-
2	3	3	2	-	-	-	2	-	-	-	-	1	-	-	-
3	3	3	1	-	-	-	1	-	-	-	-	1	-	-	-
4	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
5	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall correlation**	3	3	2	-	-	-	1	-	-	-	-	1	-	-	-

23PH203 PHYSICS FOR ELECTRONICS ENGINEERING L T P C
3 0 0 3

COURSE OBJECTIVES:

- To make the students understand the basics of crystallography and its importance in studying materials properties.
- To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
- To instil knowledge on physics of semiconductors, determination of charge carriers and device applications
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.

UNIT-I CRYSTALLOGRAPHY 9

Crystal structures: Crystal lattice – basis - unit cell and lattice parameters – crystal systems and Bravais lattices – Structure and packing fractions of SC, BCC, FCC, diamond cubic, NaCl, ZnS structures – crystal planes, directions and Miller indices – distance between successive planes – linear and planar densities – crystalline and noncrystalline materials - imperfections in crystals.

UNIT- II ELECTRICAL AND MAGNETIC PROPERTIES OF MATERIALS 9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Quantum free electron theory: Tunnelling – degenerate states – Fermi- Dirac statistics– Density of energy states – Electron in periodic potential. Magnetic materials: Dia, para and ferromagnetic effects – exchange interaction and ferromagnetism -Domain theory of ferromagnetism and hysteresis– quantum interference devices – GMR devices.

UNIT-III SEMICONDUCTORS AND TRANSPORT PHYSICS 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion (qualitative) – Hall effect and devices – Ohmic contacts – Schottky diode – introduction to solid state drive (SSD)

UNIT-IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption,

loss and gain. Optical processes in quantum wells – Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode - optical processes in organic semiconductor devices –excitonic state.

UNIT- V NANO DEVICES **9**

Density of states for solids - Significance between Fermi energy and volume of the material – Quantum confinement – Quantum structures – Density of states for quantum wells, wires and dots – Band gap of nanomaterials –Tunneling – Single electron phenomena – Single electron Transistor. Carbon nanotubes: Properties and applications - Spintronic devices and applications – Optics in quantum structures – quantum well laser.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Apply the basics of Crystallography and its importance for varied material properties
- **CO2:** Illustrate the electrical properties of materials using classical and quantum free electron theory and apply properties of magnetic materials in devices
- **CO3:** Relate the knowledge in physics of semiconductor, determination of charge carriers and device application
- **CO4:** Establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- **CO5:** Develop an idea of significance of nano structure, quantum confinement and ensuing nano device applications

TEXT BOOKS:

1. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw Hill Education (Indian Edition), 2020.
2. R.F.Pierret. Semiconductor Device Fundamentals. Pearson (Indian Edition), 2006.
3. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.

REFERENCES:

1. Laszlo Solymar, Walsh, Donald, Syms and Richard R.A., Electrical Properties of Materials, Oxford Univ. Press (Indian Edition) 2015.

2. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Education (Indian Edition), 2019.
3. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.
4. Mark Fox, Optical Properties of Solids, Oxford Univ.Press, 2001.
5. N.Gershenfeld. The Physics of Information Technology. Cambridge University Press, 2011.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	-	-	-	2	-	-	-	-	1	-	-	-
2	3	3	2	-	-	-	2	-	-	-	-	1	-	-	-
3	3	3	1	-	-	-	1	-	-	-	-	1	-	-	-
4	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
5	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall correlation**	3	3	2	-	-	-	1	-	-	-	-	1	-	-	-

23PH204 PHYSICS FOR ELECTRICAL ENGINEERING L T P C
3 0 0 3

COURSE OBJECTIVES:

- To make the students to understand the basics of dielectric materials and insulation.
- To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
- To instil knowledge on physics of semiconductors, determination of charge carriers and device applications
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.

UNIT- I DIELECTRIC MATERIALS AND INSULATION 9

Matter polarization and relative permittivity: definition – dipole moment and polarization vector P- polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization – frequency dependence – local field and Clausius-Mosotti equation – dielectric constant and dielectric loss – dielectric strength, introduction to insulation breakdown in gases, liquids and solids – capacitor materials – typical capacitor constructions – piezoelectricity, ferroelectricity and pyroelectricity.

UNIT-II ELECTRICAL AND MAGNETIC PROPERTIES OF MATERIALS 9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Quantum free electron theory : Tunnelling – degenerate states – Fermi- Dirac statistics – Density of energy states - Magnetic materials: Dia, para and ferromagnetic effects – exchange interaction and domain theory of ferromagnetism and hysteresis – quantum interference devices – GMR devices.

UNIT-III SEMICONDUCTORS AND TRANSPORT PHYSICS 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion (qualitative) – Hall effect and devices – Ohmic contacts – Schottky diode – introduction to solid state drive (SSD)

UNIT-IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption, loss and gain. Optical processes in quantum wells – Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode - optical processes in organic semiconductor devices –excitonic state.

UNIT- V NANO DEVICES 9

Density of states for solids - Significance between Fermi energy and volume of the material – Quantum confinement – Quantum structures – Density of states for quantum wells, wires and dots – Band gap of nanomaterials –Tunnelling – Single electron phenomena – Single electron Transistor. Carbon nanotubes: Properties and applications - Spintronic devices and applications – Optics in quantum structures – quantum well laser.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- **CO1:** comprehend the basics of dielectric materials and insulation and apply the knowledge to basic concepts
- **CO2:** explain the electrical and magnetic properties of materials and apply to devices
- **CO3**: Comprehend the physics of semiconductors and use it to determining charge carriers and device applications
- **CO4:** apply knowledge of different optical properties of materials to optical displays and applications
- **CO5:** Explain the significance of nano structures, quantum confinement and apply to quantum devices

TEXT BOOKS:

1. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw Hill Education (Indian Edition), 2020.
2. R.F.Pierret. Semiconductor Device Fundamentals. Pearson (Indian Edition), 2006.
3. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.

REFERENCES:

1. Laszlo Solymar, Walsh, Donald, Syms and Richard R.A., Electrical Properties of Materials, Oxford Univ. Press (Indian Edition) 2015.
2. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw- Hill Education (Indian Edition), 2019.
3. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.
4. Mark Fox, Optical Properties of Solids, Oxford Univ.Press, 2001.
5. Parag K. Lala, Quantum Computing: A Beginner's Introduction, McGraw-Hill Education (Indian Edition), 2020.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	-	-	-	2	-	-	-	-	1	-	-	-
2	3	3	2				2	-	-	-	-	1	-	-	-
3	3	3	1	-	-	-	1	-	-	-	-	1	-	-	-
4	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
5	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall correlation**	3	3	2	-	-	-	1	-	-	-	-	1	-	-	-

23PH205 PHYSICS FOR INFORMATION SCIENCE L T P C
3 0 0 3

COURSE OBJECTIVES:

- To make the students understand the importance in studying electrical properties of materials.
- To enable the students to gain knowledge in semiconductor physics
- To instill knowledge on magnetic properties of materials.
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- To inculcate an idea of significance of nano structures, quantum confinement, ensuing nano device applications and quantum computing.

UNIT-I ELECTRICAL PROPERTIES OF MATERIALS 9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Wiedemann-Franz law – Success and failures - electrons in metals – Particle in a three dimensional box – degenerate states – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids – tight binding approximation - Electron effective mass – concept of hole.

UNIT-II SEMICONDUCTOR PHYSICS 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – variation of Fermi level with temperature and impurity concentration – Carrier transport in Semiconductor: random motion, drift, mobility and diffusion (qualitative) – Hall effect and devices – Ohmic contacts – Schottky diode – introduction to solid state drive (SSD)

UNIT-III MAGNETIC PROPERTIES OF MATERIALS 9

Magnetic dipole moment – atomic magnetic moments- magnetic permeability and susceptibility - Magnetic material classification: diamagnetism – paramagnetism – ferromagnetism – antiferromagnetism – ferrimagnetism – Ferromagnetism: origin and exchange interaction- saturation magnetization and Curie temperature – Domain Theory- M versus H behaviour – Hard and soft magnetic materials – examples and uses-– Magnetic principle in computer data storage – Magnetic hard disc (GMR sensor).

UNIT-IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – carrier generation and recombination processes - Absorption emission and scattering of light in metals, insulators and semiconductors (concepts only) - photo current in a P-N diode – solar cell - LED – Organic LED – Laser diodes – Optical data storage techniques.

UNIT-V NANODEVICES AND QUANTUM COMPUTING 9

Introduction - quantum confinement – quantum structures: quantum wells, wires and dots –– band gap of nanomaterials. Tunneling – Single electron phenomena: Coulomb blockade - resonant- tunneling diode – single electron transistor – quantum cellular automata - Quantum system for information processing - quantum states – classical bits – quantum bits or qubits –CNOT gate - multiple qubits – Bloch sphere – quantum gates – advantage of quantum computing over classical computing.

TOTAL : 45 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Apply the knowledge of classical and quantum electron theories toenergy band structures.
- **CO2:** Utilize the basics of intrinsic and extrinsic semiconductor physicsand its application in various devices.
- **CO3:** Apply the magnetic properties of materials apply to explain data storage devices.
- **CO4:** Utilize electro optical properties to model optoelectronic devices.
- **CO5:** Utilize the quantum structures and quantum confinement to model nano devices and apply qubits to quantum computing and quantum logic gates

TEXT BOOKS:

1. Jasprit Singh, “Semiconductor Devices: Basic Principles”, Wiley (Indian Edition), 2007.
2. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw-Hill Education (Indian Edition), 2020.

3. Parag K. Lala, Quantum Computing: A Beginner's Introduction, McGraw-Hill Education (Indian Edition), 2020.

REFERENCES:

1. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.
2. Y.B.Band and Y.Avishai, Quantum Mechanics with Applications to Nanotechnology and Information Science, Academic Press, 2013.
3. V.V.Mitin, V.A. Kochelap and M.A.Stroscio, Introduction to Nanoelectronics, Cambridge Univ.Press, 2008.
4. G.W. Hanson, Fundamentals of Nanoelectronics, Pearson Education (Indian Edition) 2009.
5. B.Rogers, J.Adams and S.Pennathur, Nanotechnology: Understanding Small Systems, CRC Press, 2014.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
4	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-
5	3	2	1	-	-	3	-	-	-	-	-	-	-	-	-
Overall correlation	3	2	1	-	-	1	-	-	-	-	-	-	1	-	-

23PH206 MATERIALS SCIENCE L T P C
3 0 0 3

COURSE OBJECTIVES:

- To make the students to understand the basics of crystallography and its importance in studying materials properties.
- To understand the electrical properties of materials including free electron theory, applications of quantum mechanics and magnetic materials.
- To instil knowledge on physics of semiconductors, determination of charge carriers and device applications
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.

UNIT-I CRYSTALLOGRAPHY 9

Crystal structures: BCC, FCC and HCP – directions and planes - linear and planar densities – crystal imperfections- edge and screw dislocations – grain and twin boundaries - Burgers vector and elastic strain energy- Slip systems, plastic deformation of materials - Polymorphism

UNIT-II ELECTRICAL AND MAGNETIC PROPERTIES OF MATERIALS 9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Quantum free electron theory: Tunneling – degenerate states – Fermi- Dirac statistics – Density of energy states. Magnetic materials: Dia, para and ferromagnetic effects –Domain theory and hysteresis of ferromagnets – exchange interaction and ferromagnetism – quantum interference devices – GMR devices.

UNIT-III SEMICONDUCTORS AND TRANSPORT PHYSICS 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion (qualitative) – Hall effect and devices – Ohmic contacts – Schottky diode – introduction to solid state drive (SSD)

UNIT-IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption,

loss and gain. Optical processes in quantum wells – Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode - optical processes in organic semiconductor devices –excitonic state.

UNIT-V NANOELECTRONIC DEVICES 9

Quantum confinement – Quantum structures – quantum wells, wires and dots – Zener-Bloch oscillations – Resonant tunnelling – quantum interference effects - mesoscopic structures - Single electron phenomena – Single electron Transistor. Active and passive optoelectronic devices – photo processes – spintronics – carbon nanotubes: Properties and applications.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Apply the basics of crystallography and it's importance in studying materials properties
- **CO2:** Illustrate the electrical properties of materials and apply the knowledge of magnetic properties of materials in data storage
- **CO3:** Relate the knowledge on physics of semiconductors, determination of charges carriers and device applications
- **CO4:** Build a sound grasp of knowledge in different optical properties of materials, optical displays and applications
- **CO5:** Develop an idea of significance of nano structures, quantum confinement and ensuring nano device applications

TEXT BOOKS:

1. V.Raghavan. Materials Science and Engineering: A First Course, Prentice Hall India Learning Private Limited, 2015.
2. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, Mc-Graw Hill India (2019)
3. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.

REFERENCES:

1. R.Balasubramaniam, Callister's Materials Science and Engineering. Wiley (Indian Edition), 2014.
2. Wendelin Wright and Donald Askeland, Essentials of Materials Science and Engineering, CL Engineering, 2013.

3. Robert F.Pierret, Semiconductor Device Fundamentals, Pearson, 2006
4. Pallab Bhattacharya, Semiconductor Optoelectronic Devices, Pearson, 2017
5. Ben Rogers, Jesse Adams and Sumita Pennathur, Nanotechnology: Understanding Small Systems, CRC Press, 2017.

CO Nos.	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	-	-	-	2	-	-	-	-	1	-	-	-
2	3	3	2	-	-	-	2	-	-	-	-	1	-	-	-
3	3	3	1	-	-	-	1	-	-	-	-	1	-	-	-
4	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
5	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall correlation**	3	3	2			-	1	-	-	-	-	1	-	-	-

23PH207 APPLIED PHYSICS **L T P C**
3 0 0 3

COURSE OBJECTIVES:

- To make the students to understand the basics mechanics and using vectors to analyse them
- To make the students use Newton's laws of motion for simple systems
- To make the students calculate orbital velocity and variation of g
- To help students gain a thorough knowledge in biomaterials
- To make students comprehend the various types of magnetic materials and superconductors
- To help the students gain a knowledge in metallic glasses, shape memory alloys and nanomaterials.

UNIT-I STATICS OF PARTICLES **9**

Introduction – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces – Vectorial representation of forces – Vector operations of forces - addition, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle - rigid bodies in 2D - Free body diagram – Action and reaction forces –stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis

UNIT-II NEWTON'S LAWS OF MOTION **9**

Centroid and centre of mass – Centroid of lines and areas - Rectangular, circular, triangular areas by integration – Area moments of inertia of plane areas – Newton's laws of motion- Impulse and Momentum-impact of elastic bodies- law of conservation of momentum- frictional forces-motion in an inclined plane.

UNIT-III GRAVITATION **9**

Newton's law of gravitation – Mass and density of Earth – Deduction of Newton's law of gravitation from Kepler's laws – Boy's method of determination of G – Gravitation potential and field due to Spherical shell and Solid sphere – Variation of 'g' with altitude, depth and rotation of Earth – Orbital velocity – Escape velocity

UNIT-IV MAGNETISM AND SUPERCONDUCTIVITY **9**

Classification of magnetic materials: diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism and ferrimagnetism - Domain theory of ferro magnetism - Energies involved in the process of domain growth – M versus H behavior – soft and hard magnetic materials

Superconductivity – Zero resistance and the Meissner effect – critical current density - Type I and Type II superconductors – BCS theory of superconductivity - High temperature superconductor (YBa2Cu3 O7), magnetic levitation

UNIT-V NEW ENGINEERING MATERIALS 9

Metallic glasses: types, glass forming ability of alloys, melt spinning process, applications — shape memory alloys: phases, shape memory effect, pseudoelastic effect, NiTi alloy, applications — nanomaterials: preparation— ball milling method, pulsed laser deposition, properties and applications — carbon nanotubes: types.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, the students should be able to

- **CO1:** Apply the laws of mechanics to equilibrium of particles.
- **CO2:** Apply the laws of motion and solve problems related to the motion of objects.
- **CO3:** Apply the law of gravitation to calculate escape velocity.
- **CO4:** Analyze and interpret the magnetization versus magnetic field behavior of different magnetic materials and analyze various types of superconductors and their applications.
- **CO5:** Illustrate various methods of preparing new engineering materials.

TEXT BOOKS:

1. D.Halliday, R.Resnick and J.Walker. Principles of Physics, Wiley (Indian Edition), 2015.
2. R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian edition)
3. Beer, F.P and Johnston Jr. E.R., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", 8th Edition, Tata McGraw-Hill Publishing company, New Delhi (2004)

REFERENCES:

1. Introduction to Physical Metallurgy, Sidney Avner, McGraw Hill 2017
2. Wendelin Wright and Donald Askeland, Essentials of Materials Science and Engineering, CL Engineering, 2013.

3. Ben Rogers, Jesse Adams and Sumita Pennathur, Nanotechnology: Understanding Small Systems, CRC Press, 2017.

CO Nos.	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
4	3	2	1	-	-	2	-	-	-	-	-	-	1	-	-
5	3	2	1	-	-	3	-	-	-	-	-	-	-	-	-
Overall correlation**	3	2	1	-	-	1	-	-	-	-	-	-	1	-	-

23HS203 TAMILS AND TECHNOLOGY L T P C
1 0 0 1

COURSE OBJECTIVES:

- To summarize the weaving industry and ceramic technology during Sangam Age
- To explain the design and construction of houses during Sangam Age and the sculptures and temples of Chola,Pallava and Pandya period
- To Explain about the water bodies of Sangam age and relate it to the agricultural usage
- To Outline to students the agriculture and irrigation technology during the Chola Period
- To help students Interpret and explain the digitalization of Tamil books and development of Tamil software

UNIT-I WEAVING AND CERAMIC TECHNOLOGY 3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT-II DESIGN AND CONSTRUCTION TECHNOLOGY 3

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 ofMamallapuram – 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

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

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

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 students should be able to

- **CO1:** Summarize the weaving industry and ceramic technology during Sangam Age
- **CO2:** explain the design and construction of houses during Sangam Age and the sculptures and temples of Chola,Pallava and Pandya period
- **CO3:** Explain about the water bodies of Sangam age and relate it to the agricultural usage
- **CO4:** Outline the agriculture and irrigation technology during the Chola Period
- **CO5:** Interpret and explain the digitalization of Tamil books and development of Tamil software

REFERENCES:

1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL
2. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
3. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

CO Nos.	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	1
1	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-		-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Overall correlation	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-

23EE281 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

L	T	P	C
2	0	2	3

(Common to Aero, Aerospace, Mech, Auto, CSE, IT, AI &DS, Cyber Security)

COURSE OBJECTIVES:

The learning objective of this course is to

- To introduce the basics of electric circuits and analysis
- To impart knowledge in the basics of working principles and application of electrical machines
- To introduce analog devices and their characteristics
- To educate on the fundamental concepts of digital electronics, functional elements and working of measuring instruments
- To demonstrate the load test on DC machines, working of PN Junction diodes, Zener diodes and rectifiers.

UNIT-I ELECTRICAL CIRCUITS **6**

DC Circuits:Circuit Components: Conductor, Resistor, Inductor, Capacitor– Ohm's Law-Kirchhoff's Laws -Nodal Analysis, Mesh analysis with independent sources only (Steadystate)- Introduction to AC Circuits –Steady state analysis of RL, RC, and RLC circuits (Simple problems only).

UNIT-II ELECTRICAL MACHINE **6**

Construction and Working principle of DC Generators, EMF equation, Types and Applications. Working Principle of DC motors,Torque Equation,Types and Applications. - Construction, Working principle and Applications of Single- Phase Transformer.

UNIT-III ANALOG ELECTRONICS **6**

PN Junction Diodes, Zener Diode–Characteristics & Applications–Bipolar Junction Transistor, JFET, SCR, MOSFET, – Types, I-V Characteristics and Applications – Rectifier.

UNIT-IV DIGITAL ELECTRONICS **6**

Review of number systems, Combination allogic (adder and subtractor) – representation of logicfunctions-SOP and POS forms, K-map representations and minimization using K-maps (up to 3 variables).

UNIT-V MEASUREMENTS AND INSTRUMENTATION **6**

Functional elements of an instrument, Standards and calibration, Operating Principle, types- Moving Coil and Moving Iron meters, InstrumentTransformers-

CTand PT, DSO-Block diagram-Data acquisition.

TOTAL:30 PERIODS

LAB COMPONENT **30 PERIODS**

1. Verification of Ohms and Kirchhoff's Laws.
2. Load test on DC Shunt Motor.
3. Characteristics of PN and Zener Diodes
4. Half Wave and Full Wave rectifiers
5. Implementation of Binary Adder and Subtractor
6. Study of DSO

TOTAL: 30+30 = 60 PERIODS

COURSE OUTCOMES:

After completing this course,the students will be able to

- **CO1:** Compute the electric circuit parameters for simple problems.
- **CO2:** Interpret the AC circuits and its steady state analysis.
- **CO3:** Illustrate the working principles of electrical machines and its application
- **CO4:** Explain various Analog devices and its V-I characteristics
- **CO5:** Summarize number systems, combinational logic, k maps in digital electronics and functional elements and working principle of measuring instruments

TEXT BOOKS:

1. KothariD P and I.J Nagrath,"Basic Electrical and Electronics Engineering" , Second Edition, McGraw Hill Education,2020
2. SedhaR.S.,"A textbook book of Applied Electronics", S.Chand & Co.,2008
3. A.K.Sawhney, Puneet Sawhney'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Raiand Co, 2015.

REFERENCES:

1. Kothari D P and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, Mc Graw Hill Education, 2019.
2. S.K. Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2017.
3. Thomas L.Floyd,' Digital Fundamentals', 11thEdition,Pearson Education,2017.
4. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
5. Mahmood Nahvi and Joseph A.Edminister, "Electric Circuits",

Schaum 'Outline Series, McGraw Hill, 2002.
6. H.S.Kalsi, 'Electronic Instrumentation' , Tata McGraw-Hill, NewDelhi, 2010
7. JamesA. Svoboda, Richard C.Dorf,"Dorf's Introduction to Electric Circuits", Wiley, 2018.

MAPPING OF COs WITH POs AND PSOs

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	1	1	-	-	2		1	-	-	-	1	3	-	1
2	2	1	1	-	-	2		1	-	-	-	1	2	-	1
3	2	1	1	-	-	1	1	1	-	-	-	1	2	-	1
4	2	1	1	-	-	1	1	1	-	-	-	1	2	-	1
5	2	1	1	-	-			1	-	-	-	1	2	-	1
Avg	**3**	**1**	**1**	**-**	**-**	**1**	**1**	**1**	**-**	**-**	**-**	**1**	**3**	**-**	**1**
Low (1); Medium (2); High (3)															

23EE282 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING **L T P C**
2 0 2 3

(Common to Civil and FT)

COURSE OBJECTIVES:

The learning objective of this course is to

- To introduce the basics of electric circuits and analysis
- To impart knowledge in domestic wiring
- To impart knowledge in the basics of working principles and application of electrical machines
- To introduce analog devices and their characteristics
- To introduce the functional elements and working of sensors and transducers

UNIT-I ELECTRICAL CIRCUITS **6**

DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law- Kirchhoff's Laws -Nodal Analysis, Mesh analysis within dependent sources only (Steady state)- Introduction to AC Circuits–Steady state analysis of RL, RC, and RL Circuits (Simple problems only).

UNIT- II ELECTRICAL INSTALLATIONS **6**

Domestic wiring, types of wires and cables, earthing, protective devices-switch fuse unit-Miniature circuit breaker-Moulded case circuit breaker- Earth leakage circuit breaker, safety precautions and First Aid.

UNIT-III ELECTRICAL MACHINES **6**

Construction and Working principle of DC Generators, EMF equation, Types and Applications.Working Principle of DC motors, Torque Equation, Types and Applications -Construction, Working principle and Applications of Single- Phase Transformer.

UNIT-IV ANALOG ELECTRONICS **6**

PN Junction Diodes, Zener Diode –characteristics & Applications – Bipolar Junction Transistor- JFET, SCR - I-V Characteristics and Applications- Rectifier.

.

UNIT-V SENSORS AND TRANSDUCERS **6**

Sensors, proximity sensors, piezo-electric hall effect, photo sensors, Strain gauge, LVDT, differential pressure transducer, Introduction to Smart sensors.

30 PERIODS

LAB COMPONENTS **30 PERIODS**

1. Verification of Ohms and Kirchhoff's Laws.
2. Load test on DC Shunt Motor.
3. Load test on Single phase Transformer
4. Characteristics of PN and Zener Diodes
5. Design and analysis of Half wave and Full Wave rectifiers
6. Measurement of displacement using LVDT

TOTAL: 30 +30 =60 PERIODS

TEXT BOOKS:

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

REFERENCES:

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

COURSE OUTCOMES:

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

- **CO1:** Compute the electric circuit parameters for simple problems and verify

with experiments

- **CO2:** Explain the concept of domestic wiring and protective devices.
- **CO3:** Illustrate the working principle and applications of electrical machines with experimental results.
- **CO4:** Discuss the characteristics of analog electronic devices and experimental study of Characteristics of PN and Zener Diodes.
- **CO5:** Explain the types and operating principles of various sensors and transducers and demonstrate the use of LVDT to measure displacement.

MAPPING OF COs WITH POs AND PSOs

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	-	-	1	1	1	-	1	3	-	-
2	2	1	1	1	-	-	-	1	1	1	-	1	2	-	-
3	2	1	-	-	-	1	1	1	1	1	-	1	2	-	-
4	2	1	-	-	-	1	1	1	1	1	-	1	2	-	-
5	2	1	-	-	-	-	-	1	1	1	-	1	2	-	-
Avg	3	2	1	1	-	1	1	1	1	1	-	1	3	-	-
Low (1); Medium (2); High (3)															

23EE283 BASIC ELECTRICAL, ELECTRONICS ENGINEERING AND MEASUREMENTS **L T P C**
2 0 2 3

(For Mechatronics Students)

COURSE OBJECTIVES:

The learning objective of this course is to

- To introduce the basics of electric circuits and analysis
- To impart knowledge in the basics of working principles and application of electrical machines
- To introduce analog devices and their characteristics
- To educate on the fundamental concepts of linear integrated circuits
- To introduce the functional elements and working of measuring instruments.

UNIT-I ELECTRICAL CIRCUITS **6**

DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor–Ohm's Law-Kirchhoff's Laws -Nodal Analysis, Mesh analysis within dependent sources only (Steady state)- Introduction to AC Circuits–Steady state analysis of RL, RC, and RL Circuits (Simple problems only).

UNIT-II ELECTRICAL MACHINES **6**

Construction and Working principle of DC Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications -Construction, Working principle and Applications of Single- Phase Transformer.

UNIT-III ANALOG ELECTRONICS **6**

PN Junction Diodes, Zener Diode –characteristics & Applications – Bipolar Junction Transistor- JFET, SCR - I-V Characteristics and Applications- Rectifier.

UNIT-IV LINEAR INTEGRATED CIRCUITS **6**

Ideal OP-AMP characteristics, Basic applications of op-amp – Inverting and Non-inverting Amplifiers, D/A converter (R- 2R ladder), A/D converters (Flash type) - ADC using OP-AMPS.

UNIT-V MEASUREMENTS AND INSTRUMENTATION **6**

Functional elements of an instrument, Standards and calibration, Operating Principle, types-Moving Coil and Moving Iron meters, Instrument Transformers- CT and PT, DSO-Block diagram-Data acquisition.

30 PERIODS

LAB COMPONENT **30 PERIODS**

1. Verification of Ohms and Kirchhoff's Laws.
2. Load test on DC Shunt Motor.
3. Load test on Single phase Transformer
4. Experiment on Operational Amplifier based Inverting and non-inverting amplifier
5. Experiments on ADC and 555 Timer
6. Measurement of Amplitude, Frequency, Time, Phase Measurement using DSO

TOTAL: 30+30 = 60 PERIODS

TEXT BOOKS:

1. D P Kothari and I.J Nagrath, "Basic Electrical and Electronics Engineering", McGraw Hill Education, Second Edition, 2020.
2. Allan S Moris, "Measurement and Instrumentation Principles", Third Edition, Butterworth Heinemann, 2001.
3. James A. Svoboda, Richard C. Dorf, "Dorf's Introduction to Electric Circuits", Wiley,2018

REFERENCES:

1. Thomas L. Floyd, 'Electronic Devices', 10th Edition, Pearson Education, 2018.
2. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, New Delhi, January 2015.
3. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017
4. S.K. Bhattacharya, Basic Electrical Engineering, Pearson Education, 2019

COURSE OUTCOMES:

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

- **CO1:** Compute the electric circuit parameters for simple problems and verify with experiments
- **CO2:** Explain the working principle and applications of electrical machines and correlate with experimental results
- **CO3:** Discuss the characteristics of analog electronic devices

- **CO4:** Explain the basic concepts of linear integrated circuits and study the op-amp based amplifier experimentally
- **CO5:** Explain the operating principles of measuring instruments and conduct the basic measurements using DSO.

MAPPING OF COs WITH POs AND PSOs

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	-	-	1	1	1	-	1	3	-	-
2	2	1	1	1	-	-	-	1	1	1	-	1	2	-	-
3	2	1	-	-	-	1	1	1	1	1	-	1	2	-	-
4	2	1	-	-	-	1	1	1	1	1	-	1	2	-	-
5	2	1	-	-	-	-	-	1	1	1	-	1	2	-	-
Avg	3	2	1	1	-	1	1	1	1	1	-	1	3	-	-
Low (1); Medium (2); High (3)															

23EE284 BASIC ELECTRICAL AND INSTRUMENTATION ENGINEERING

L	T	P	C
2	0	2	3

(For ECE Students)

COURSE OBJECTIVES:

The learning objective of this course is to

- To impart knowledge in types, construction and working of transformers
- To impart knowledge in types, construction and working of DC machines
- To impart knowledge in types, construction and working of AC rotating machines
- To introduce the functional elements and working of measuring instruments.
- To introduce the basics of power system and protection schemes

UNIT-I TRANSFORMER 6

Introduction - Ideal and Practical Transformer – Phasor diagram-– Per Unit System – Equivalent circuit- Testing- Efficiency and Voltage Regulation.

UNIT-II DC MACHINES 6

Introduction – Constructional Features– Motor and Generator mode - EMF and Torque equation – Methods of Excitation- Characteristics – Starting and Speed Control –Stepper Motors.

UNIT-III AC ROTATING MACHINES 6

Construction and Principle of operation of Three-phase induction motors –Types - Single phase Induction motors -Construction– types (starting methods) - Alternator: Working principle–Equation of induced EMF.

UNIT-IV MEASUREMENTS AND INSTRUMENTATION 6

Functional elements of an instrument, Standards and calibration, Operating Principle, types - Moving Coil and Moving Iron meters, Instrument Transformers CT and PT, DSO - Block diagram- Data acquisition.

UNIT-V BASICS OF POWER SYSTEMS 6

Power system structure -Generation, Transmission and Distribution, Various voltage levels, Earthing – methods of earthing, protective devices- switch fuse unit- Miniature circuit breaker - safety precautions and First Aid.

LAB COMPONENT

1. Load test on single phase Transformer.
2. Load test on DC shunt Generator
3. Load test on DC Motor.

4. Load test on single phase induction Motor.
5. Measurement of Amplitude, Frequency, Time, Phase Measurement using DSO
6. Study on Earthing Device.

TOTAL: 30+30 = 60 PERIODS

TEXT BOOKS:

1. D P Kothari and I.J Nagrath, "Basic Electrical and Electronics Engineering", McGraw Hill Education, Second Edition, 2020.
2. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, New Delhi, 2015.
3. C.L.Wadhwa, "Generation, Distribution and Utilisation of Electrical Energy", New Age International pvt.ltd., 2003

REFERENCES:

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019
2. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
3. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010
4. S.K. Bhattacharya, Basic Electrical Engineering, Pearson Education, 2019

COURSE OUTCOMES:

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

- **CO1:** Compute the efficiency and voltage regulation of a transformer and experimentally verify its characteristics
- **CO2:** Develop the characteristics of DC machine using the concept of EMF Torque equations and speed control techniques
- **CO3:** Illustrate the working principle and applications of AC electrical machines with experimental results.
- **CO4:** Explain the types and operating principles of measuring instruments
- **CO5:** Explain the basic power system structure and protection schemes

.

MAPPING OF COs WITH POs AND PSOs

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	-	-	-	-	1	1	1	-	1	3	-	-
2	3	2	1	-	-	-	-	1	1	1	-	1	3	-	-
3	2	1	-	-	-	1	1	1	1	1	-	1	2	-	-
4	2	1	-	-	-	1	1	1	1	1	-	1	2	-	-
5	2	1	-	-	-	-	-	1	1	1	-	1	2	-	-
Avg	3	2	1	-	-	1	1	1	1	1	-	1	3	-	-
Low (1); Medium (2); High (3)															

23CE201 BUILDING MATERIALS L T P C
3 0 0 3

COURSE OBJECTIVES:

The learning objective of this course is to introduce various materials commonly used in civil engineering construction and their properties

UNIT-I STONES - AGGREGATES 9

Stone as building material – Criteria for selection – Tests on stones – Deterioration and Preservation of stone work - Aggregates – Natural stone aggregates – Crushing strength – Impact strength – Flakiness Index – Elongation Index – Abrasion Resistance – Grading – Sand Bulking.

UNIT-II BRICKS – CONCRETE BLOCKS 9

Bricks – Classification – Manufacturing of clay bricks – Tests on bricks – Compressive Strength – Water Absorption – Efflorescence – Bricks for special use – Refractory bricks – Cement, Concrete blocks – Lightweight concrete blocks.

UNIT-III LIME – CEMENT– MORTAR 9

Lime – Preparation of lime mortar – Cement – Ingredients – Manufacturing process – Types and Grades – Properties of cement and Cement mortar – Hydration – Compressive strength – Tensile strength – Fineness– Soundness and consistency – Setting time – Industrial byproducts – Fly ash.

UNIT-IV TIMBER – METALS - OTHER MATERIALS 9

Timber – Market forms – Industrial timber– Plywood – Veneer – Thermacole – Panels of laminates – Steel – Aluminum and Other Metallic Materials – Composition – Aluminium composite panel – Uses – Market forms – Mechanical treatment – Paints – Varnishes – Distempers – Bitumens.

UNIT-V MODERN MATERIALS 9

Glass – Ceramics – Sealants for joints – Fibre glass reinforced plastic – Clay products – Refractories – Composite materials – Types – Applications of laminar composites – Fibre textiles – Geomembranes and Geotextiles for earth reinforcement.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Compare the properties of most common building material stones and aggregates.
- **CO2:** Expalin the properties and test on bricks and concrete blocks.
- **CO3:** Demonstate the typical and potential applications of lime, cement and mortar.
- **CO4:** Describe the applications of timbers, metals and other materials.

- **CO5:** Summarize the importance of modern material for construction.

TEXT BOOKS:

1. Varghese.P.C, "Building Materials", PHI Learning Pvt. Ltd, New Delhi, 2015.

2. Rajput. R.K., "Engineering Materials", S. Chand and Company Ltd., 2008.

3. Gambhir.M.L., "Concrete Technology", 3rd Edition, Tata McGraw Hill Education, 2004

4. Duggal.S.K., "Building Materials", 4th Edition, New Age International, 2008.

REFERENCES:

1. Jagadish.K.S, "Alternative Building Materials Technology", New Age International, 2007.

2. Gambhir. M.L., & Neha Jamwal., "Building Materials, products, properties and systems", Tata McGraw Hill Educations Pvt. Ltd, New Delhi, 2012.

3. IS456 - 2000: Indian Standard specification for plain and reinforced concrete, 2011

4. IS4926 - 2003: Indian Standard specification for ready–mixed concrete, 2012

5. IS383 - 1970: Indian Standard specification for coarse and fine aggregate from natural Sources for concrete, 2011

6. IS1542-1992: Indian standard specification for sand for plaster, 2009

7. IS 10262-2009: Indian Standard Concrete Mix Proportioning –Guidelines, 2009

CO Nos.	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	2	-	3	-	2	2	-	-	-	-	2	3	-	-
2	3	-	-	2	-	-	2	-	-	-	-	2	3	-	2
3	3	-	-	2	-	-	3	-	-	-	2	-	3	-	2
4	2	-	-	-	-	-	-	-	-	-	2	-	3	3	-
5	2	3	2	3	2	2	-	-	2		3	2	3	3	3
Overall correlation**	2	2	1	2	1	1	2	-	1		2	2	3	2	2

23AE201 ELEMENTS OF AERONAUTICAL ENGINEERING

L	T	P	C
3	0	0	3

COURSEOBJECTIVES:

1. To acquire theknowledge on the Historical evaluation of Airplanes
2. To learn the different component systems and functions
3. To know the concepts of basic properties and principles behind the flight
4. To learn the basics of different structures & construction
5. To learn the various types of powerplants used in aircrafts

UNIT-I HISTORY OF FLIGHT **9**

Balloon flight-ornithopter-Early Airplanes by Wright Brothers, biplanes and monoplanes, Developments in aerodynamics, materials, structures and propulsion over the years.

UNIT-II AIRCRAFT CONFIGURATIONS AND ITS CONTROLS **9**

Different types of flight vehicles, Classifications-Components of an airplane and their functions-Conventional control, powered control- Basic instruments for Flying-Typical systems for controlactuation.

UNIT-III BASICS OF AERODYNAMICS **9**

Physical Properties and structures of the Atmosphere,Temperature,pressure and altitude relationships, Newton's Law of Motions applied to Aeronautics-Evolution of lift, drag and moment. Aerofoils, Machnumber, Manoeuvres.

UNIT-IV BASICSOFAIRCRAFTSTRUCTURES **9**

General types of construction, Monocoque, semi-monocoque and geodesic constructions, typicalwing and fuselage structure. Metallic and non-metallic materials. Use of Aluminium alloy, titanium,stainless steel and composite materials.Stresses and Strains-Hooke's law- stress-strain diagrams-elasticConstants-Factor of Safety.

UNIT-V BASICSOF PROPULSION **9**

Basic ideas about piston, turbo prop fan and jet engines–use of propeller and jets for thrust Production- Comparative merits, Principle of operation of rocket, types of rocket and typical applications, Exploration into space.

TOTAL: 45 PERIODS

TEXTBOOKS:

1. Anderson, J.D., Introduction to Flight, McGraw-Hill; 8th edition, 2015
2. E Rathakrishnan, "Introduction to Aerospace Engineering: Basic Principles of Flight", JohnWiley, NJ, 2021
3. Stephen.A.Brandt, Introduction to aeronautics: A design perspective, 2nd edition, AIAA Education Series, 2004.

REFERENCES:

1. Sadhu Singh,"Internal Combustion Engines and Gas Turbine", SS Kataraia & Sons, 2015
2. Kermode, "Flight without Formulae", Pitman; 4th revised edition 1989.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to

- **CO1:** Illustrate the history of aircraft &developments over the years
- **CO2:** Ability to identify the types & classifications of components and control systems
- **CO3:** Explain the basic concepts of flight & Physical properties of Atmosphere
- **CO4:** Identify the types of fuselage and constructions.
- **CO5:**Distinguish the types of Engines and explain the principles of Rocket

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	-	-	-	-	-	-	-	-	-	-	-	2	1	-
2	1	2	2	2	2	-	-	-	-	-	1		2	1	-
3	1	2	2	2	2	-	-	-	-	-	1		2	1	-
4	1	2	2	2	2	-	-	-	-	-	1		2	1	-
5	1	2	2	2	2	-	-	-	-	-	1		2	1	-
Avg	1	2	2	2	2	-	-	-	-	-	1		2	1	-

23AS201 ELEMENTS OF AEROSPACE ENGINEERING **L T P C**
3 0 0 3

COURSE OBJECTIVES:

1. Use the standard atmosphere tables and equations.
2. Find lift and drag coefficient data from NACA plots.
3. Apply the concept of static stability to flight vehicles.
4. Describe the concepts of stress, strain, Young'smodulus, Poisson's ratio, yield strength.
5. Demonstrate a basic knowledge of dynamics relevant to orbital mechanics.

UNIT-I BASICS OF FLIGHTAND CONTROLS **6**

History of aviation – Different types of flight vehicles – standard atmosphere - pressure, temperature and density altitude- Conventional controls –Powered controls– Basic instruments for Flying-Typical systems for control actuation.

UNIT-II AERODYNAMICS **10**

Aerodynamic forces – Lift generation Viscosity and its implications - Shear stress in a velocityprofile - Lagrangian and Eulerian flow field - Concept of a streamline – Aircraft terminology and geometry - Aircraft types - Lift and drag coefficients using NACA data.

UNIT-III PERFORMANCE AND PROPULSION **9**

Viscous and pressure drag-flow separation-aerodynamic drag –thrust calculations-Thrust/power available and thrust/power required.

UNIT-IV AIRCRAFT STABILITYAND STRUCTURAL THEORY **10**

Degrees of freedom of aircraft motions - stable, unstable and neutral stability - concept of static stability - Hooke's Law- brittle and ductile materials - moment of inertia – section modulus.

UNIT-V SPACE APPLICATIONS **10**

History of space research-space craft trajectories and basic orbital manoeuvres -six orbital elements - Kepler's laws of orbits - Newtons law of gravitation.

TOTAL: 45 PERIODS

TEXTBOOKS:

1. JohnD.Anderson, Introduction to Flight, 8th Ed., McGraw-Hill

Education, NewYork, 2015.
2. E Rathakrishnan,"Introduction toAerospaceEngineering: Basic Principles of Flight",John Wiley, NJ, 2021.
3. Stephen. A. Brandt, " Introduction to Aeronautics: A design perspective " American Institute of Aeronautics & Astronautics, 1997.

REFERENCE:

1.Kermode, A.C.,"MechanicsofFlight",HimalayanBook,1997.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to

- **CO1**: Illustrate the history of a viation & developments over the years
- **CO2**: Ability to identify the types & classifications of components and control systems
- **CO3**: Explain the basic concepts of flight & Physical properties of Atmosphere
- **CO4**: Identify the types of fuselage and constructions.
- **CO5**: Distinguish the types of Engines and explain the principles of Rocket

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	2	2	2	2	-	-	-	-	-	-	-	1	2	-
2	1	2	2	2	2	-	-	-	-	-	1	-	1	2	-
3	1	2	2	2	2	-	-	-	-	-	1	-	1	2	-
4	1	2	2	2	2	-	-	-	-	-	1	-	1	2	-
5	1	2	2	2	2	-	-	-	-	-	1	-	1	2	-
AVG	1	2	2	2	2	-	-	-	-	-	1	-	1	2	-

23AE221 AERO MODELLING LABORATORY

COURSE OBJECTIVES:

- To learn the theories behind flight.
- To learn the art of making model airplanes
- To learn problem solving skills related to flight principles and interpretation ofexperimental data
- To determine error in experimental measurements and techniques used to minimizesucherror.
- To make the student as an active participant in each part of all lab exercises.

LIST OF EXPERIMENTS (30Hrs)

1. Introduction to wing plan forms and Aerofoil
2. Introduction to Gliders & its Design calculation.
3. Fabrication of Un-powered Gliders.
4. Flight Simulation of RC plane using simulators
5. Fabrication of aerofoil
6. Connection test on RC Plane electronics
7. Design calculation of RC plane
8. Fabrication of powered RC plane
9. Programming a flight control system
10. Programming an autonomous dronemission

TOTAL: 30 PERIODS

COURSE OUTCOMES:

After completing this course, the students will be able to

- Describe the principles of flight
- Explain the importance of c.glocation in an aircraft
- Design airplane models
- Fabricate airplane models
- Fly model airplanes
- Demonstrate the importance of Flight control systems

CO's	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
2	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
3	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
4	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
5	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
AVG	3	2.4	2.6	1	1										

23AS221 AEROSPACE MODELLING LABORATORY L T P C

0 0 4 2

COURSE OBJECTIVES

- To learn the theories behind flight
- To learn the art of making model airplanes
- To learn problem solving skills related to flight principles and interpretation of experimental data
- To determine error in experimental measurements and techniques used to minimize sucherror.
- To make the student as an active participant in each part of all lab exercises.

LIST OF EXPERIMENTS (30 Hrs)

1. Introduction to wing plan forms and Aerofoil
2. Introduction to Gliders & its Design calculation.
3. Fabrication of Un-powered Gliders.
4. Flight Simulation of RC plane using simulators
5. Fabrication of aerofoil
6. Connection test on RC Plane electronics
7. Design calculation of RC plane
8. Design and Fabrication of CUBE SAT
9. Design and Fabrication of CAN SAT
10. Design and Fabrication of NANO SAT

TOTAL: 30 PERIODS

COURSE OUTCOMES:

After completing this course, the students will be able to

- Describe the principles of flight
- Explain the importance of c.g location in an aircraft
- Design airplane models
- Fabricate airplane models
- Fly model airplanes
- Demonstrate the importance of Flight control systems

CO's	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
2	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
3	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
4	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
5	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
AVG	3	2.4	2.6	1	1										

23CE221 MATERIALS TESTING LABORATORY L T P C
0 0 4 2

COURSE OBJECTIVES:

To develop skills to test various construction materials.

I TESTS ON FINE AGGREGATE

a. Determination of specific gravity and water absorption of fine aggregate
b. Determination of grading of fine aggregate
c. Determination of water absorption for fine aggregate

II TESTS ON COARSE AGGREGATE

a. Determination of compacted and loose bulk density of coarse aggregate
b. Determination of impact value of coarse aggregate
c. Determination of elongation index of coarse aggregate
d. Determination of flakiness index of coarse aggregate
e. Determination of aggregate crushing value of coarse aggregate
f. Determination of specific gravity and water absorption of coarse aggregate

III TESTS ON BRICKS

a. Determination of compressive strength of bricks
b. Determination of water absorption of bricks
c. Determination of efflorescence of bricks

IV TEST ON WOOD

a. Determination of Compression test on wood

V TESTS ON CEMENT

a. Determination of fineness of cement
b. Determination of consistency of cement
c. Determination of specific gravity of cement
d. Determination of initial and final setting time of cement

VI TESTS ON BITUMEN

a. Specific gravity of bitumen
b. Penetration test on bitumen
c. Viscosity test for bitumen
d. Softening point test for bitumen
e. Estimation of loss of bitumen on heating
f. Ductility Test for bitumen
g. Marshall Stability and Flow Values

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, the student is expected to

- **CO1:** Determine the mechanical properties of steel.
- **CO2:** Determine the physical properties of cement.
- **CO3**: Determine the physical properties of fine and coarse aggregate.
- **CO4**: Determine the workability and compressive strength of concrete.
- **CO5:** Determine the strength of brick and wood.

REFERENCES

1. Gambhir. M.L., & Neha Jamwal., "Building Materials, products, properties and systems", Tata McGraw Hill Educations Pvt. Ltd, New Delhi, 2012.
2. IS456 - 2000: Indian Standard specification for plain and reinforced concrete, 2011
3. IS4926 - 2003: Indian Standard specification for ready–mixed concrete, 2012
4. IS383 - 1970: Indian Standard specification for coarse and fine aggregate from natural Sources for concrete, 2011
5. S1542-1992: Indian standard specification for sand for plaster, 2009
6. IS 10262-2009: Indian Standard Concrete Mix Proportioning –Guidelines, 2009
7. HighwayMaterialsandPavementTesting,NemChandandBros.,Roorkee,RevisedFifthEdition,2009
8. N.L.Arora,ATextbookofTransportationEngineering,NewIndiaPublication,1997
9. http://vlabs.iitb.ac.in/vlabsdev/labs/nitk_labs/Transportation_Engineering_Lab/index.html
10. LaboratoryManualinHighwayengineeringpublished,Duggal,AjayK2017

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2	2	1	3	1	2	2	1	3	1	1	2	2	2	2
2	3	2	1	3	1	2	2	1	3	1	1	2	3	2	2
3	3	3	2	3	1	2	2	1	3	1	1	2	3	2	2
4	3	3	2	3	1	2	2	1	3	1	1	2	3	2	2
5	3	3	2	3	2	2	2	1	3	1	1	2	3	2	2
AVG	3	3	2	3	1	2	2	1	3	1	1	2	3	2	2

23EE201 ELECTRIC CIRCUIT ANALYSIS L T P C

3 1 0 4

COURSE OBJECTIVES:

The learning objective of this course is to

- To introduce electric circuits and its analysis
- To provide key concepts to analyze and understand electrical circuits
- To impart knowledge on solving circuit equations using network theorems
- To educate on obtaining the transient response of circuits.
- To introduce the phenomenon of resonance in coupled circuits.
- To perform the analysis of three phase circuits.

UNIT-I BASIC CIRCUITS ANALYSIS 12

Fundamentals concepts of R, L and C Elements-Energy Sources- Ohm's Law - Kirchhoff 's Laws – DC Circuits – Resistors in series and parallel circuits - A.C Circuits -Complex Impedance - Real and Reactive Power, Power Factor, Energy - Mesh current and node voltage methods of analysis D.C and A.C Circuits.

UNIT-II NETWORK REDUCTION AND THEOREMS FOR DC AND AC CIRCUITS 12

Network reduction: voltage and current division, source transformation – star delta conversion. Theorems – Superposition, Thevenin's and Norton's Theorem – Maximum power transfer theorem –Millman's theorem.

UNIT-III TRANSIENT RESPONSE ANALYSIS 12

Introduction – Laplace transforms and inverse Laplace transforms- standard test signals -Transient response of RL, RC and RLC circuits using Laplace transform for source free and DC input

UNIT-IV RESONANCE AND COUPLED CIRCUITS 12

Series and parallel resonance –frequency response – Quality factor and Bandwidth – Self and mutual inductance – Coefficient of coupling – Dot rule- Analysis of coupled circuits

UNIT-V THREE PHASE CIRCUITS 12

Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced and unbalanced – phasor diagram of voltages and currents.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Make use of mesh current and nodal voltage methods for solving the given DC and AC circuits.
- **CO2:** Apply network theorems such as Thevenin's Theorem, Norton's Theorem, Superposition Theorem, Maximum Power Transfer Theorem and Milliman's theorem for solving the given DC and AC networks.
- **CO3:** Apply Laplace transform to the given RL, RC and RLC Circuits with DC input to determine their transient response.
- **CO4:** Solve the given resonant and coupled circuits.
- **CO5:** Solve the given three phase circuits. (Star and Delta)

TEXT BOOKS:

1. William H. HaytJr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", McGraw Hill publishers, 9th edition, New Delhi, 2020.
2. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", Second Edition, McGraw Hill, 2019.
3. Allan H. Robbins, Wilhelm C. Miller, "Circuit Analysis Theory and Practice", Cengage Learning India, 2013.

REFERENCES:

1. Chakrabarti A, "Circuits Theory (Analysis and synthesis), Dhanpat Rai& Sons, New Delhi, 2020.
2. Joseph A. Edminister, Mahmood Nahvi, "Electric circuits", Schaum's series, McGraw-Hill, First Edition, 2019.
3. M E Van Valkenburg, "Network Analysis", Prentice-Hall of India Pvt Ltd, New Delhi, 2015.
4. Richard C. Dorf and James A. Svoboda, "Introduction to Electric Circuits", 7th Edition, John Wiley & Sons, Inc. 2018.
5. Sudhakar A and Shyam Mohan SP, "Circuits and Networks Analysis and Synthesis", McGraw Hill, 2015.

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	2	1	1	2	-	2	1	3	-	-	1	1	-	1
CO2	3	2	1	1	2	-	2	1	3	-	-	1	2	-	1
CO3	3	2	1	1	2	-	2	1	3	-	-	1	2	-	1
CO4	3	2	1	1	2	-	2	1	3	-	-	1	-	-	1
CO5	3	2	1	1	2	-	2	1	3	-	-	1	-	-	1
Avg	**3**	**2**	**1**	**1**	**2**	**-**	**2**	**1**	**3**	**-**	**-**	**1**	**2**	**-**	**1**
Low (1); Medium (2); High (3)															

23EE221 ELECTRIC CIRCUITS LABORATORY L T P C
0 0 4 2

COURSE OBJECTIVES:

The learning objective of this course is to

- To simulate various electric circuits using PSPICE/ MATLAB/MULTISIM
- To gain practical experience on electric circuits and verification of theorems.

LIST OF EXPERIMENTS

1. Simulation and experimental verification of series and parallel electrical circuit using fundamental laws.
2. Simulation and experimental verification of electrical circuit problems using Thevenin's theorem.
3. Simulation and experimental verification of electrical circuit problems using Norton's theorem.
4. Simulation and experimental verification of electrical circuit problems using Superposition theorem.
5. Simulation and experimental verification of Maximum Power transfer theorem.
6. Simulation and Experimental validation of R-L electric circuit transients.
7. Simulation and Experimental validation of R-C electric circuit transients.
8. Simulation and Experimental validation of RLC electric circuit transients.
9. Simulation and Experimental validation of frequency response of RLC electric circuit.
10. Simulation and experimental verification of three phase balanced and unbalanced star, delta networks circuit.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

- **CO1:** Apply basic electrical laws such as Kirchhoff's voltage and current laws to electric circuits
- **CO2:** Apply Thevenin's and Norton Theorem to electric circuits
- **CO3:** Apply Superposition and Maximum Power Transfer Theorem to electric circuits
- **CO4:** Demonstrate the measurement of Time constant and frequency response parameters of RC and RLC circuits
- **CO5:** Analyse the given electrical circuit such as filter circuits, three phase balanced and unbalanced networks using MATLAB/PSPICE

MAPPING OF COs WITH POs AND PSOs

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	2	-	2	1	2	3	-	1	3	2	1
2	3	2	1	1	2	-	2	1	2	3	-	1	3	2	1
3	3	2	1	1	2	-	2	1	2	3	-	1	3	2	1
4	2	1	-	-	-	-	2	1	3	1	-	1	3	2	1
5	3	3	2	2	2	-	2	1	-	1	-	1	3	3	1
Avg	3	2	1	1	2	-	2	2	2	2	-	2	3	2	2
Low (1); Medium (2); High (3)															

23EC201 **CIRCUIT ANALYSIS** **L T P C**
3 1 0 4

Course Objective

The students will be able to

i) To make the students capable of analysing any given electrical network

ii) To make the students learn how to synthesize an electrical network from a given impedance/admittance function

UNIT-I NETWORK THEOREMS FOR DC AND AC CIRCUITS **9**

Review of Current Electricity and basic Kirchoff's Laws- Star-Delta Transformation - Mesh Analysis-Nodal Analysis - Superposition Theorem-Thevenin Theorem, Norton Theorem-Maximum Power Transfer Theorem.

UNIT-II NETWORK PARAMETERS **9**

Open circuit impedance (Z) parameters - short circuit admittance (Y) parameters - transmission (ABCD)parameters and inverse transmission parameters -Hybrid (h) parameters and inverse hybrid parameters -Conversion between parameters - interconnection of two-port networks.

UNIT-III TRANSIENT RESPONSE **9**

Transients: First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem solving using R-L-C elements with DC excitation and AC excitation. Solutions using Laplace transform method

UNIT-IV RESONANCE CIRCUITS **9**

Sinusoidal Steady – State analysis, Characteristics of Sinusoids, The Complex Forcing Function, The Phasor, Phasor relationship for R, L, and C, impedance and Admittance-Instantaneous Power, Average Power, apparent Power and Power Factor, Complex Power.

UNIT-V NETWORK TOPOLOGY **9**

Graph of a network -Concept of tree, co-tree link, chord , forest, co-forest; Planar and non-planar graph; Incidence matrix, tie set matrix, cut set matrix; Fundamental cut

set and tie set schedule; Introduction to equation formulation graphically; Duality of network.

Lecture: 45 Periods
Tutorial :15 Periods
Total: 60 Periods

COURSE OUTCOME:

- **CO1**: Infer the circuit using Kirchhoff's law and Network simplification theorems for DC and AC Circuits
- **CO2**: Explain the process to estimate parameters of two port network
- **CO3**: Infer and evaluate transient response for the RLC Circuit
- **CO4**: Explain the transient response for any RC, RL and RLC circuits and frequency response of parallel and series resonance circuits
- **CO5**: Explain the various network topologies

Text Book:

1. Hayt W. H., Kemmerly J. E. and Durbin S. M., "Engineering Circuit Analysis", 6th Ed., Tata McGraw-Hill Publishing Company Ltd.,2008.

Reference Book:

1. Valkenberg V., "Network Analysis", 3rd Ed., Prentice Hall International Edition., 2007.
2. Joseph Edminister and Mahmood Nahvi, "Electric Circuits", Tata McGraw Hill Publishing Company, Schaum'sOutline Series, Fourth Edition New Delhi, 2003.
3. Network AnalysisandSynthesis, Ravish R Singh,McGraw Hill Education (India) Private Limited

CO.No,	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	-	-	-	1	-	1	-	-	1	-	-
2	3	3	3	3	-	-	-	1	-	1	-	-	1	-	-
3	3	3	3	3	-	-	-	1	-	1	-	-	1	-	-
4	3	3	3	2	-	-	-	1	-	1	-	-	1	-	-
5	3	3	3	2	-	-	-	1	-	1	-	-	1	-	-
Overall correlation **	3	3	3	2	-	-	-	1	-	1	-	-	1	-	-

23EC221 CIRCUIT ANALYSIS LABORATORY L T P C
0 0 4 2

COURSE OBJECTIVES:

- To gain hands- on experience in Thevenin & Norton theorem, KVL & KCL, and Superposition Theorems.
- To understand the working of RL,RC and RLC circuits

List of Experiments

1. To Verify Kirchoff's Voltage Law (KVL) and Kirchoff's current Law (KCL).
2. To Verify Thevenin's Theorem for Resistive Network.
3. To Verify Norton's Theorem for Resistive Network.
4. To Verify Maximum Power Transfer Theorem for Resistive Network.
5. To Verify Superposition theorem for Resistive Network.
6. Transient Response of a RL Circuit.
7. Transient Response of a RC Circuit.
8. Determination of Z-Parameters of given Two Port Network.
9. Determination of ABCD Parameters of given Two Port Network.
10. Determination of H- Parameters of given Two Port Network.

Course Outcome:

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

- **CO1:** Build a circuit to verify the Kirchoff's Voltage Law (KVL) and Kirchoff's Law (KCL)
- **CO2:** Construct a circuit to verify the theorems for the electrical circuits
- **CO3:** Design an Electric Circuit to test the RL Condition
- **CO4:** Construct an Electric Circuit to test the RC Condition
- **CO5:** Build a circuit to verify the two port network parameters for the electrical circuit.

TEXT BOOK:

1. Network Analysis and Synthesis by U.A.Patel 6th Edition, Mahajan Publishing House. REFERENCE BOOKS:
2. Circuit Theory (Analysis and Synthesis) By A. Chakrabarti, Dhanpat Rai & Company. Network Analysis by M.E.Vanvalkenburg, PHI Publication

23ME211	ENGINEERING GRAPHICS	L T P C
	(Common to all Departments)	3 0 2 4

COURSE OBJECTIVES:

The learning objective of this course is to

- Gain a solid foundation in the fundamental principles and concepts of engineering graphics, including conic sections, orthographic projection, isometric projection, section views and development of surfaces, perspective projection, and dimensioning.
- Develop graphic skills for communication of concepts, ideas and design of engineering products.
- Gain knowledge on drafting software to construct part models.
- Familiarize with existing national standard practices and conventions related to technical drawings.
- Enhance the ability to visualize objects in three dimensions and translate them into 2D representations.

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 + 6**

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 - Drawing of tangents and normal to the above curves.

LIST OF EXERCISES:

1. Drawing of a title block with necessary text, projection symbol and lettering using drafting software.
2. Drafting of Conic curves - Ellipse, Parabola and Hyperbola.

UNIT-II PROJECTION OF POINTS, LINES AND PLANE SURFACE **9+6**

Orthographic projection - principles - Principal planes - First angle projection - projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method. Projection of planes (hexagonal and pentagonal planes only) inclined to both the principal planes by rotating object method.

LIST OF EXERCISES:

1. Draw the projection of points when it is placed in different quadrants
2. Draw the projection of lines when it is placed in first quadrant
3. Draw the planes when it is placed in first quadrant

UNIT-III PROJECTION OF SOLIDS AND FREE HAND SKETCHING 9+6

Projection of simple solids - hexagonal prism, pentagonal pyramid and cone inclined to the horizontal plane by rotating object method. Free Hand sketching: Visualization principles - Representation of Three Dimensional objects - Layout of views - Free hand sketching of multiple views from pictorial views of objects

LIST OF EXERCISES:

1. Practicing three dimensional modeling of simple objects.
2. Drawing of orthographic views from the given pictorial diagram.

UNIT-IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 9+6

Sectioning of hexagonal prism, pentagonal pyramid and cone when the cutting plane is inclined to the horizontal plane, Development of lateral surfaces of simple and sectioned solids – hexagonal prism and cone cut by a plane inclined to horizontal plane only.

LIST OF EXERCISES:

1. Draw the sectioned views of prisms and pyramids
2. Draw the development of hexagonal prism cut by a section plane inclined to the horizontal plane

UNIT-V ISOMETRIC PROJECTION 9+6

Principles of isometric projection - Isometric scale – Isometric view - Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions.

LIST OF EXERCISES:

1. Drawing Isometric view and projection of simple solids.
2. Drawing three dimensional modeling of isometric projection of combination of solids.

Total: 75 Periods

COURSE OUTCOMES:

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

- **CO1:** Construct the conic curves, involutes and cycloids.
- **CO2:** Draw the orthographic projections of points, lines and plane surfaces.
- **CO3:** Draw the orthographic projections of simple solids.
- **CO4:** Draw the projections of sectioned solids and development of the lateral surfaces of solids.
- **CO5:** Sketch the isometric sections of solids.

TEXT BOOKS:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.

2. Basant Agarwal and Agarwal C.M.,"Engineering Drawing", McGraw Hill, 2nd Edition, 2019

REFERENCES:

1. Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.

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.

6. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.

Publication of Bureau of Indian Standards:

1. IS10711 - 2001: Technical products Documentation - Size and layout of drawing sheets.
2. IS 9609 (Parts 0 & 1) - 2001: Technical products Documentation - Lettering.
3. IS 10714 (Part 20) - 2001 & SP 46 - 2003: Lines for technical drawings.
4. IS 11669 - 1986 & SP 46 -2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) - 2001: Technical drawings - Projection Methods.

CO – PO Mapping:

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
2	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
3	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
4	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
5	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
Avg	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
Low(1)	Medium(2)				High(3)										

LIST OF EQUIPMENT FOR A BATCH OF 60 STUDENTS

S. No.	Description of Equipment	Quantity
1.	Computer nodes or systems with suitable graphics facility	60 Nos.
2.	Software for Drafting and Modelling	60 Users
3.	Laser Printer to print drawings	1 No.

23ME221 ENGINEERING PRACTICES LABORATORY L T P C
(Common to all Departments) 0 0 4 2

COURSE OBJECTIVES:

The learning objective of this course is to

- Familiarize students with basic engineering tools and equipment.
- Educate students on the importance of safety practices, including proper handling of equipment, adherence to safety protocols, and understanding potential hazards in the laboratory environment.
- Develop basic manufacturing and fabrication skills.
- Provide hands on training to the students in plumbing and wood working.
- Provide hands on training to the students in welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment; Making a tray out of metal sheet using sheet metal work.
- Demonstrate the wiring and measurement methods in common household electrical applications.
- Study the basic electronic components, Gates and provide hands on training in soldering.

GROUP A (CIVIL & MECHANICAL)

PART I CIVIL ENGINEERING PRACTICES 15

PLUMBING WORK:

a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
b) Preparation of plumbing line sketches.
c) Laying pipe connection to the suction side of a pump
d) Laying pipe connection to the delivery side of a pump.
e) Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK:

a) Sawing
b) Planing
c) Making of T-Joint, Mortise joint and Tenon joint and Dovetail joint.

Wood Work Study:

a) Study of joints in door panels and wooden furniture
b) Study of common industrial trusses using models.

PART II MECHANICAL ENGINEERING PRACTICES 15

WELDING WORK:

a) Study of Welding and its tools.
b) Welding of Butt Joints, Lap Joints and Tee Joints by metal arc welding.
c) Study of Gas Welding.

BASIC MACHINING PRACTICE:

a) Facing and Plain Turning
b) Taper Turning
c) Drilling and Tapping

SHEET METAL WORK:

a) Forming and Bending
b) Making of a square Tray

MACHINE ASSEMBLY WORK:

a) Study of Centrifugal Pump
b) Study of Air Conditioner

FOUNDRY PRACTICE:

a) Demonstration on Foundry operations like mould preparation.

GROUP B (ELECTRICAL & ELECTRONICS)

PART III ELECTRICAL ENGINEERING PRACTICES 15

1. Residential House wiring using Switches, Fuse, Indicators, Lamp and Energ Meter.
2. Staircase Wiring.
3. Fluorescent Lamp Wiring with Introduction to CFL and LED Types.
4. Measurement of Energy using Single Phase Energy Meter.
5. Study of Iron Box Wiring and Assembly
6. Study of Fan Regulator – Electronic Type

PART IV ELECTRONICS ENGINEERING PRACTICES 15

1. Study of Electronic components and equipment – Resistors, Colour coding measurement of AC signal parameter (peak-peak, RMS period, frequency) using CRO.

2. Study of logic gates AND, OR, EX-OR and NOT.
3. Generation of Clock Signal.
4. Soldering simple electronic circuits and checking continuity.
5. Study the elements of smart phone
6. Study of LED TV (Block diagram)

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work.
- **CO2:** Use welding equipment to join the structures, perform the basic machining operations, make joints in wood materials and make the models using sheet metal works.
- **CO3:** Demonstrate on centrifugal pump, air conditioner and foundry operations.
- **CO4:** Demonstrate the Electrical wiring connections for household applications and study the working of Iron Box and Fan Regulator.
- **CO5:** Identify the basic electronic components and explain Gates and soldering techniques.

CO – PO Mapping:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
4	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
5	3	2	-	-	1	1	1	-	-	-	-	2	2	0	1
Avg.	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
Low (1) ; Medium (2) ; High (3)															

23ME201 APPLIED MECHANICS **L T P C**
3 0 0 3

COURSE OBJECTIVES:

The learning objective of this course is to

- Inculcate the ability to analyze any problem in a simple and logical manner.
- Learn the use of scalar and vector analytical techniques for analysing forces in statically determinate structures.
- Introduce the equilibrium of rigid bodies, vector methods and free body diagram.
- Learn the principles of friction, forces and to determine and apply the concepts of frictional forces at the contact surfaces of various engineering systems.
- To develop basic dynamics concepts such as force, momentum, work and energy.
- To apply the well understood basic principles for the real time problems.

UNIT-I BASICS AND STATICS OF PARTICLES **9**

Introduction – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces - vector representation of forces – Vector operations of forces -additions, subtraction, dot product, cross product - Coplanar Forces - rectangular components - Equilibrium of a particle – Forces in space – Equilibrium of a particle in space - Equivalent systems of forces, Free body diagram.

UNIT-II EQUILIBRIUM OF RIGID BODIES **9**

Principle of transmissibility - Varignon's theorem -Types of supports - Action and reaction forces - stable equilibrium - Moment of a force about a point and about an axis – Single equivalent force - Equilibrium of rigid bodies in two dimensions - Equilibrium of rigid bodies in three dimensions, Analysis of Trusses – Method of Joints and Method of sections.

UNIT-III PROPERTIES OF SURFACES AND SOLIDS **9**

Centroids and centre of mass - Centroids of lines and areas - Rectangular, circular, triangular areas by integration - T section, I section, Angle section, Hollow section by using standard formula - Theorems of Pappus - Area moments of inertia of plane areas - rectangular, circular, triangular areas by integration - T section, I section, Angle section, Hollow section by using standard formula - Parallel axis

theorem and Perpendicular axis theorem - Principal moments of inertia of plane areas - Principal axes of inertia-Mass moment of inertia - mass moment of inertia for prismatic, cylindrical and spherical solids from first principle – Relation to area moments of inertia.

UNIT-IV FRICTION 9

Friction force - Ladder Friction, Wedge friction, Screw friction - Rolling resistance, Square threaded Screws, Journal Bearings, Thrust Bearings, Disc friction, Wheel friction, Rolling resistance.

UNIT-V DYNAMICS OF PARTICLES 9

Newton's laws of motion - Principle of Work and Energy, Applications of the Principle of Work and Energy, Power and Efficiency, Conservation of Energy, Principle of Impulse and Momentum, Impacts of bodies - Work Energy Equation - Impulse and Momentum equation.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- **CO1:** Apply law of forces on particles.
- **CO2:** Calculate forces on rigid bodies.
- **CO3:** Calculate area moment of inertia of planar body and mass moment of inertia of rigid bodies.
- **CO4:** Determine frictionand its effects at the surfaces of contact for ladder, wedge, belt and bearings.
- **CO5:** Calculate dynamic forces on rigid bodies.

TEXT BOOKS:

1. Beer, F.P and Johnston Jr. E.R., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", 8th Edition, Tata McGraw-Hill Publishing company, New Delhi (2004).

2. Bhavikatti, S.S and Rajashekarappa, K.G., "Engineering Mechanics", New Age International (P) Limited Publishers, 1998.

REFERENCES:

1. Hibbeller, R.C and Ashok Gupta, "Engineering Mechanics: Statics and Dynamics", 11th Edition, Pearson Education 2010.

2. Irving H. Shames and Krishna Mohana Rao. G., “Engineering Mechanics – Statics and Dynamics”, 4th Edition, Pearson Education 2006.

3. Meriam J.L. and Kraige L.G., “ Engineering Mechanics- Statics - Volume 1, Dynamics - Volume 2”, Third Edition, John Wiley & Sons, 1993.

4. Rajasekaran S and Sankarasubramanian G., “Engineering Mechanics Statics and Dynamics”, 3rd Edition, Vikas Publishing House Pvt. Ltd., 2005.

CO	PO												PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	2	1	2	-	-	-	-	-	-	2	3	1	1
2	3	2	2	1	2	-	-	-	-	-	-	2	3	1	1
3	3	2	3	1	2	-	-	-	-	-	-	2	3	1	2
4	3	2	3	1	2	-	-	-	-	-	-	2	3	1	2
5	3	2	3	1	2	-	-	-	-	-	-	2	3	1	2
Avg.	3	2	3	1	2	-	-	-	-	-	-	2	3	1	2
Low (1) ; Medium (2) ; High (3)															

23ME222 **APPLIED MECHANICS LABORATORY** **L T P C**
0 0 4 2

COURSE OBJECTIVES:

The learning objective of this course is to

- Study the physics behind the physical systems.
- Acquire knowledge on application of laws of mechanics.
- Study the dynamics of rigid bodies.

LIST OF EXPERIMENTS

1. Verify the Law of Polygon of Forces
2. Determination of Rolling Friction
3. Determination of Sliding Friction
4. Determination of Efficiency of Square Threaded Screw Jack.
5. Equilibrium of Forces in space Apparatus
6. Sliding Friction Apparatus.
7. Determination of the Force acting on a Balloon
8. Determination of Torque transmitted by a Drum
9. Static and Dynamic conditions - Spring mass system
10. Power and Efficiency of the rope brake arrangement

COURSE OUTCOMES:

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

- **CO1:** Apply the laws of mechanics.
- **CO2:** Apply the concept of rolling friction.
- **CO3:** Apply the concept of screw friction.
- **CO4:** Resolve the forces acting on the body in space.
- **CO5:** Use the static and dynamic conditions of a rigid body.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	2	2	2	-	-	-	-	-	-	-	2	-	-
2	2	2	2	2	2	-	-	-	-	-	-	-	2	-	-
3	2	2	2	2	2	-	-	-	-	-	-	-	2	-	-
4	2	2	2	2	2	-	-	-	-	-	-	-	2	-	-
5	2	2	2	2	2	-	-	-	-	-	-	-	2	-	-
Avg.	2	2	2	2	2	-	-	-	-	-	-	-	2	-	-
Low (1) ; Medium (2) ; High (3)															

23ME271 BASIC MECHANICAL AND BUILDING SCIENCES

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- The learning objective of this course is to
- Introduce fundamental concepts of civil and mechanical engineering.
- Develop interdisciplinary knowledge and skills.
- Acquire knowledge on traditional & new energy sources and to gain basic knowledge about the functioning of basic energy conversion devices like boilers, turbines and pumps.
- Gain basic knowledge on the construction and working of IC engines, refrigerator and air-conditioner.
- Acquire knowledge on basic power plant engineering.
- Acquire knowledge on surveying and construction materials.
- Provide knowledge on building foundation, components and construction.

UNIT-I ENERGY SOURCES, BOILERS, TURBINES AND PUMPS 9

Conventional and Renewable sources of energy, Indian and global energy scenario, Working Principle of boilers - fire tube and water tube (one example for each type), Turbines-Hydraulic, Steam, and Gas turbines, Reciprocating Pumps (single acting and double acting) and Centrifugal Pumps.

UNIT-II IC ENGINES, REFRIGERATOR AND AIR CONDITIONER 9

Internal combustion engines - Petrol and Diesel Engines - Four stroke and Two stroke cycles, Comparisons, Refrigeration and Air Conditioning- Vapour compression and Vapour absorption system - Layout of typical domestic refrigerator - Window and Split type room Air conditioner.

UNIT-III POWER PLANTS 9

Principle of operation, construction and working of Hydel, Steam, Diesel, Gas and Nuclear power plants, accessories - selection, comparison, merits and demerits.

UNIT-IV SURVEYING AND CONSTRUCTION MATERIALS 9

Surveying: Objects – Classification – Principles – Measurements of Distances and angles – Leveling – Determination of areas– Contours. Construction Materials: Bricks – Stones – Sand – Cement – Concrete – Steel - Timber - Modern Materials, Thermal and Acoustic Insulating Materials, Decorative Panels, Water Proofing Materials. Modern uses of Gypsum.

UNIT-V FOUNDATION AND BUILDING COMPONENTS 9

Building plans – Foundations - Types of foundations - Bearing capacity and settlement – Brick masonry – Stone Masonry – Beams – Columns – Lintels – Roofing

– Flooring – Plastering. Types of Bridges and Dams – Water Supply Network - Rain Water Harvesting – Solid Waste Management.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Shanmugam G and Palanichamy M S, "Basic Civil and Mechanical Engineering", 2nd edition, Tata McGraw Hill Publishing Co., New Delhi, 2000.

REFERENCE BOOKS:

1. Ramamrutham S., "Basic Civil Engineering", Dhanpat Rai Publishing Co.(P) Ltd, 2013.
2. Seetharaman S., "Basic Civil Engineering", Anuradha Agencies, 2005.
3. Shantha Kumar S R J., "Basic Mechanical Engineering", Hi-tech Publications, Mayiladuthurai, 2000.
4. Venugopal K. and Prahu Raja V., "Basic Mechanical Engineering", Anuradha Publishers, Kumbakonam, 2000.

COURSE OUTCOMES:

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

- **CO1:** Gain knowledge on traditional and renewable energy sources, working of basic energy conversion devices like boilers, turbines and pumps.
- **CO2:** Acquire knowledgeabout the IC Engines, refrigerator and air-conditioner, its construction and working.
- **CO3:** Demonstrate the layout and working principle of basic power plants.
- **CO4:** Acquire knowledge about surveying, its types, and determining an area and various types of construction materials.
- **CO5:** Gain knowledge about the foundation of a building, its types and building components for construction.

CO – PO Mapping:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	-	-	-	-	-	1	2	1	2	-	2	-	-	-
2	2	-	-	-	-	-	1	2	1	2	-	2	-	-	-
3	2	-	-	-	-	-	1	2	1	2	-	2	-	-	-
4	2	-	-	-	-	-	1	2	1	2	-	2	-	-	-
5	2	-	-	-	-	-	1	2	1	2	-	2	-	-	-
Avg.	2	-	-	-	-	-	1	2	1	2	-	2	-	-	-
Low (1) ; Medium (2) ; High (3)															

23AD201 C AND DATA STRUCTURES L T P C
3 0 0 3

COURSE OBJECTIVES:

The main objective is:

- To introduce the basics of C programming language.
- To learn the concepts of advanced features of C.
- To learn the concepts of linear data structure.
- To know the concepts of non-linear data structure and hashing.
- To familiarize the concepts of sorting and searching techniques.

UNIT-I C PROGRAMMING FUNDAMENTALS 9

Data Types – Variables – Operations – Expressions and Statements – Conditional Statements – Functions – Recursive Functions – Arrays – Single and Multi-Dimensional Arrays.

UNIT-II C PROGRAMMING - ADVANCED FEATURES 9

Structures – Union – Enumerated Data Types – Pointers: Pointers to Variables, Arrays and Functions – File Handling – Preprocessor Directives.

UNIT-III LINEAR DATA STRUCTURES 9

Abstract Data Types (ADTs) – List ADT – Array-Based Implementation – Linked List – Doubly- Linked Lists – Circular Linked List – Stack ADT – Implementation of Stack – Applications – Queue ADT – Priority Queues – Queue Implementation – Applications.

UNIT-IV NON-LINEAR DATA STRUCTURES 9

Trees – Binary Trees – Tree Traversals – Expression Trees – Binary Search Tree – Hashing - Hash Functions – Separate Chaining – Open Addressing – Linear Probing– Quadratic Probing – Double Hashing – Rehashing.

UNIT-V SORTING AND SEARCHING TECHNIQUES 9

Insertion Sort – Quick Sort – Heap Sort – Merge Sort –Linear Search – Binary Search.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On completion of the course, students will be able to:

- **CO1:** Develop C programs for any real world/technical application.
- **CO2**: Apply advanced features of C in solving problems.

- **CO3:** Write functions to implement linear data structure operations.
- **CO4:** Suggest and use appropriate non–linear data structure operations.
- **CO5:** Appropriately use sort and search algorithms for a given application.

TEXT BOOKS:

1. Reema Thareja, "Programming in C", Second Edition, Oxford University Press, 2016.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 1997.
3. Gilberg and Forouzan: "Data Structure- A Pseudo code approach with C" by Thomson publication
4. "Data structure in C" by Tanenbaum, PHI publication / Pearson publication

REFERENCES:

1. Brian W. Kernighan, Rob Pike, "The Practice of Programming", Pearson Education, 1999.

2. Paul J. Deitel, Harvey Deitel, "C How to Program", Seventh Edition, Pearson Education, 2013.

3. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education,1983.

4. Ellis Horowitz, SartajSahni and Susan Anderson, "Fundamentals of Data Structures", Galgotia, 2008.

COs	PO												PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	3	2	-	-	-	-	-	2	2	3	3	-
2	3	3	3	3	2	-	-	-	-	-	2	2	3	-	-
3	3	3	3	3	2	-	-	-	-	-	2	-	3	-	-
4	2	2	-	2	2	-	-	-	-	-	1	-	3	-	-
5	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-
AVG.	**2**	**3**	**3**	**3**	**2**	-	-	-	-	-	**2**	**2**	**3**	**3**	-

23AD221 C AND DATA STRUCTURES LABORATORY L T P C
0 0 4 2

COURSE OBJECTIVES:

- To write a basic level programming in C
- To develop applications in C
- To implement linear and non-linear data structures
- To understand the different operations of search trees
- To get familiarized to sorting and searching algorithms.

List of Exercises:

1. Practice of C programming using statements, expressions, decision making and iterative statements
2. Practice of C programming using Functions and Arrays
3. Implement C programs using Pointers and Structures
4. Implement C programs using Files
5. Development of real time C applications
6. Array implementation of List ADT
7. Array implementation of Stack and Queue ADTs
8. Linked list implementation of List, Stack and Queue ADTs
9. Applications of List, Stack and Queue ADTs
10. Implementation of Binary Trees and operations of Binary Trees
11. Implementation of Binary Search Trees
12. Implementation of searching techniques
13. Implementation of Sorting algorithms: Insertion Sort, Quick Sort, Merge Sort
14. Implementation of Hashing – any two collision techniques

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Reema Thareja, "Programming in C", Second Edition, Oxford University Press, 2016.
2. MarkAllen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 1997.
3. Gilberg and Forouzan: "Data Structure- A Pseudo code approach with C" by Thomson publication
4. "Data structure in C" by Tanenbaum, PHI publication / Pearson publication

COURSE OUTCOMES:

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

- **CO1:** Use different constructs of C and develop applications.
- **CO2:** Write functions to implement linear data structure operations.

- **CO3:** Suggest and use the appropriate non-linear data structure operations.
- **CO4:** Implement Sorting and searching algorithms for a given application.
- **CO5:** Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval.

COs	PO												PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	2	2	2	1	1	1	1	1	2	3	3	-
2	3	3	3	3	2	2	1	1	1	1	1	2	3	3	-
3	3	3	3	3	2	2	1	1	1	1	1	2	3	3	-
4	3	3	3	3	2	2	1	1	1	1	1	2	3	3	-
5	3	3	3	3	2	2	1	1	1	1	1	2	3	3	-
AVG.	3	3	3	2.8	2	2	1	1	1	1	1	2	3	3	-

23FT201 INTRODUCTION TO GLOBAL FASHION INDUSTRY AND FASHION DESIGN

L	T	P	C
3	0	0	3

OBJECTIVES:

- To introduce briefly about the global and Indian fashion industry
- To introduce briefly about the basic concepts of fashion and design to the students.
- To acquaint the student with the history of fashion, its elements, traditional costumes of various cultures of the world,

UNIT-I INTRODUCTION TO GLOBAL FASHION INDUSTRY 9

A brief introduction to the history of global and Indian fashion industry. An outline on the various processes involved from idea conceptualization to manufacturing of garments. Brief on the roles various entities of the fashion triangle. Overview on the current status of global and Indian fashion industry

UNIT-II BASICS OF DESIGN FUNDAMENTALS 9

Introduction and application of Elements of Design –line, shape, form, size, colour, texture and pattern; Introduction and application of Principles of design – Harmony, Balance, Rhythm introducing element and principles of design in apparels., Emphasis and Proportion;
Introduction and application of Colour – definition; dimensions of colour-hue, value and intensity; colour harmonies, warm and cool colours; advancing and receding colours; colour theories – Prang colour system and Munsell colour system;.

UNIT-III FASHION FUNDAMENTALS & TERMINOLOGIES 9

Fashion fundamentals– definition, tangibles and intangibles of fashion; fashion life cycle; fact influencing fashion; fashion adoption theories. Fashion terminology -street fashion, recurring fashion, mass fashion, fashion trend, fashion shows, style, chic, boutique, Haute Couture; role of a fashion designer.

UNIT-IV HISTORY OF WORLD COSTUMES 9

World costumes –principle garments and textiles of Egyptian, Greek, medieval English, Renaissance French costumes History of Indian costumes – Ancient garments during the Mauryan and Guptha period Traditional Indian costumes - Tamil Nadu, Kerala, Gujarat, Rajasthan, Bengal, Manipur, Jammu & Kashmir, Manipur, Orissa, Maharashtra

UNIT-V TRADITIONAL INDIAN TEXTILES 9

Motifs, colour combinations and designs of Hand-woven Textiles - Banaras Brocades, Jamdani Saris, Paithani Saris, Kanchipuram Saris, Chanderi Saris Printed Textiles - Bagru prints from Rajasthan, Kalamkari from Andhra Pradesh. Embroidered Textiles - Kashida, Phulkari, Chamba, Rumal, Chikankari, Phool Patti ka Kaam, Zardozi, Kasuti, Kantha, Pipli Applique. Resist Dyed Textiles - Bandhani, Bandhej & Lehariya of Rajasthan, Ikat and Patola of Gujarat.

45 PERIODS

OUTCMES:

Upon the completion of this course, the students shall understand the

- **CO1:** Describe the history and current status of the global and Indian fashion industry
- **CO2:** Apply elements & principles of design in context to Textiles and Apparels
- **CO3:** Identify basic concepts of fashion fundamentals and terminologies
- **CO4:** Classify the traditional world costumes and textiles of India.
- **CO5:** Summarize the traditional Indian textiles, embroideries and printing

TEXT BOOKS:

1. Vandana Bhenderi, "Costume, Textiles and Jewellery of India – Traditions in Rajasthan", 78 Prakash Books, New Delhi, 2004.
2. Fillow J and Bernard N Thomas and Hudson, "Traditional Indian Textiles", Prentice Hall, India,1993. 3. Alkazi, Roshen. Ancient Indian Costume. [New Delhi]: Art Heritage, 1983.

REFERENCES:

. Hart A North S V and A Museum, "Historical Fashion in detail the 17th and 18th Centuries", McMillan, India, 1998.
2. Kathy Alert, "Traditional folk costumes of Europe paper dolls in full color", Dover publications, Inc., Newyork,1984.
3. Diane T. and Cassidy T., "Colour forecasting", Blackwell Publishing, 2005, ISBN: 1405121203 / ISBN: 978-1405121200.
4. Elaine Stone and Jean A. Samples, "Fashion Merchandising", McGraw-Hill Book Company, 1985, ISBN: 0070617422.
5. Marian L. Davis, "Visual Design and Dress", Prentice Hall, New Jersey, 1996, ISBN: 0131121294 / ISBN: 978-0131121294.
6. Naik, S. D., Traditional embroideries of India. 1996, APH Publishing.

COs	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	1	1	-	-	-	-	1	2	2	3	-	2
2	3	2	2	1	1	-	-	-	-	1	2	2	3	-	2
3	3	2	2	1	1	-	-	-	-	1	2	2	3	-	2
4	3	2	2	1	1	-	-	-	-	1	2	2	3	-	2
5	3	2	2	1	1	-	-	-	-	1	2	2	3	-	2
Avg	3	2	2	1	1	-	-	-	-	1	2	2	3	-	2

23FT221 FASHION DESIGNING LABORATORY L T P C
0 0 4 2

COURSE OBJECTIVES

To train the students in fashion illustration

LIST OF EXPERIMENTS

1. Motif Development – Design Repeat and positioning.
2. Practice various shading concepts.
3. Drape of fabrics and shading with different mediums.
4. Preparing swatches for dimensions of colour, different colour theories and harmonies.
5. Rendering prints and textures with various fabric constructions (wovens, non-wovens and knit).
6. Drawing different Silhouettes & garment components - sleeves, collars, necklines, cuffs, skirts, pants.
7. Human Anatomy- Figure basics, Constant proportions, Shapes and parts of human body.
8. Understanding human anatomy and practicing 8 head, 10 head, 12 head theories
9. Different postures of male and female figure - ¾ view, back view, side view. S-Pose, X-Pose, and T-pose.
10. Draing croqui figures using template, model, imagination and photograph.
11. Create a mood board based on a selected theme.
12. Design garments on croqui figures (Male and female) deriving inspirations from the developed mood board.

TOTAL: 60 PERIODS

COURSE OUTCOMES

Upon completion of this course, the student would be able

- **CO1:** Develop motifs, draw objects and shade them
- **CO2:** Illustrate fabric drapes and shading with different color mediums.
- **CO3:** Illustrate different fabric swatches and garment components
- **CO4:** Illustrate basic human figures
- **CO5:** Create a mood board based on a selected theme and design garments

COs	PO												PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	1	-	1	1	3	1	2	1	1	3	1	2	3	3	3
2	1	1	1	1	3	1	2	1	1	3	1	2	3	3	3
3	1	1	1	1	3	1	2	1	1	3	1	2	3	3	3
4	1	1	1	3	3	1	2	1	3	3	1	2	3	3	3
5	1	1	1	3	3	1	2	1	3	3	1	2	3	3	3
Avg	1	1	1	2	3	2	2	2	2	3	1	2	3	3	3

23CS201 DATA STRUCTURES USING C L T P C
3 0 0 3

COURSE OBJECTIVES:

- To understand the concepts of ADTs.
- To Learn linear data structures – lists, stacks, and queues.
- To understand non-linear data structures – trees and graphs.
- To understand sorting, searching and hashing algorithms.
- To apply Tree and Graph structures.

UNIT-I LISTS 9

Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation – Singly linked lists – Circularly linked lists – Doubly-linked lists – Applications of lists – Polynomial ADT.

UNIT-II STACKS AND QUEUES 9

Stack ADT – Operations – Applications – Balancing Symbols – Evaluating arithmetic expressions- Infix to Postfix conversion –Queue ADT – Operations – Circular Queue – DeQueue – Applications of Queues.

UNIT-III TREE STRUCTURES 9

Tree ADT – Tree Traversals - Binary Tree ADT – Expression trees – Binary Search Tree ADT –Priority Queue (Heaps) – Binary Heap-Multiway Search Trees - B-Tree – B+ Tree.

UNIT-IV SORTING AND SEARCHING 9

Sorting – Bubble sort – Selection sort – Insertion sort –Merge Sort – Quick Sort –Shell sort — Radix sort. Searching – Linear Search – Binary Search.

UNIT-V GRAPH STRUCTURES 9

Graph Definition – Representation of Graphs – Types of Graph - Breadth-first traversal – Depth-first traversal –– Bi-connectivity –Topological Sort – Dijkstra's algorithm – Minimum Spanning Tree – Prim's algorithm – Kruskal's algorithm.

COURSE OUTCOMES:

- **CO1**: Define linear and non-linear data structures.
- **CO2**: Implement linear and non–linear data structure operations.
- **CO3**: Use appropriate linear/non–linear data structure operations for solving a given problem.
- **CO4**: Apply appropriate graph algorithms for graph applications.
- **CO5**: Analyze the various searching and sorting algorithms.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson Education, 2005.
2. Kamthane, Introduction to Data Structures in C, 1st Edition, Pearson Education, 2007

REFERENCES:

1. Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, Mcgraw Hill/ MIT Press, 2022.

3. Alfred V. Aho, Jeffrey D. Ullman,John E. Hopcroft ,Data Structures and Algorithms, 1st edition, Pearson, 2002.
4. Kruse, Data Structures and Program Design in C, 2nd Edition, Pearson Education, 2006.

23CS221 DATA STRUCTURES USING C LABORATORY

Course Objectives:

- To demonstrate array implementation of linear data structure algorithms.
- To implement the applications using Stack.
- To implement the applications using Linked list
- To implement Binary search tree algorithms.
- To implement the Heap algorithm.
- To implement Dijkstras algorithm.
- To implement Prims algorithm
- To implement Sorting, Searching algorithms.

List of Exercises:

1. Array implementation of Stack, Queue and Circular Queue ADTs
2. Implementation of Singly Linked List.
3. Linked list implementation of Stack and Linear Queue ADTs.
4. Implementation of Polynomial Manipulation using Linked list.
5. Implementation of Evaluating Postfix Expressions, Infix to Postfix conversion.
6. Implementation of Heaps using Priority Queues
7. Implementation of Linear Search and Binary Search.
8. Implementation of Insertion Sort and Selection Sort.
9. Implementation of Quick Sort.
10. Implementation of Binary Search Trees
11. Implementation of Dijkstra's Algorithm
12. Implementation of Prim's Algorithm

COURSE OUTCOMES: Data Structures Laboratory

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

- **CO1:** Implement linear data structure algorithms.
- **CO2:** Implement applications using Stacks and Linked lists
- **CO3:** Implement Binary Search tree.
- **CO4:** Implement graph algorithms.
- **CO5:** Analyze the various searching and sorting algorithms.

23IT201 DATA STRUCTURES AND ALGORITHMS L T P C
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COURSE OBJECTIVES

- To impart the basic concepts of data structures and algorithms.
- To be familiar with writing recursive methods.
- To implement operations on Linked List, Stack and Queues.
- To implement traversal operations of trees and graphs.
- To understand concepts about various algorithm design techniques, searching and sorting techniques.

UNIT-I INTRODUCTION TO ALGORITHMS 9

Introduction to Data vs Information - Data Structures - Classification Abstraction - Abstract data types (ADT) - Array - haracteristics - Storage Representations. Array Order Reversal- Recursion- Array operations, Algorithm- complexity Time and Space trade off.

UNIT-II LINKED LIST 9

Array Vs Linked List Singly linked list - Representation of a linked list in memory - Operations on a singly linked list - Merging two singly linked lists into one list - Reversing a singly linked list Polynomial Manipulation using List - Advantages and disadvantages of singly linked list - Circular linked list- Doubly linked list - Circular Doubly Linked List.

UNIT-III STACKS & QUEUES 9

Introduction Array Representation of a Stack Linked List Representation of a Stack - Stack Operations - Algorithm for Stack Operations - Stack Applications: Tower of Hanoi - Infix to postfix Transformation - Evaluating Arithmetic Expressions. Queue Introduction Array Representation of Queue Linked List Representation of Queue - Queue Operations - Algorithm for Queue Operations - Queue Applications: Priority Queue.

UNIT-IV TREES AND GRAPHS 9

Preliminaries of Tree ADT - Binary Trees - The Search Tree ADT Binary Search Trees - AVL Trees - Tree Traversals - B-Trees – Heap Tree Preliminaries of Graph ADT - Representation of Graph, Graph Traversal - BFS DFS Applications of Graph Shortest – Path Algorithms Minimum Spanning Tree Prims Algorithm.

UNIT-V ALGORITHM DESIGN TECHNIQUES & SEARCHING AND SORTING TECHNIQUES 9

Divide and Conquer Strategy Greedy Algorithm Dynamic Programming Backtracking Strategy - List Searches using Linear Search - Binary Search - Fibonacci

Search - Sorting Techniques - Insertion sort - Heap sort - Bubble sort - Quick sort - Merge sort - Analysis of sorting techniques.

TOTAL: 45 PERIODS

COURSE OUTCOMES

On comletion of the course the student will be able to

- **CO1:** Understand the concept of recursive algorithms.
- **CO2:** Demonstrate the different types of data structures.
- **CO3:** Able to understand the operations on linear data structures.
- **CO4:** choose appropriate data structure as applied to specified problem definition.
- **CO5:** Understand and implement the various algorithm design techniques.

TEXT BOOKS

1. Jean-Paul Tremblay, Paul G. Sorenson, 'An Introduction to Data Structures with Application', TMH,2017.

REFERENCE BOOKS

1. Richard F, Gilberg, Forouzan, "Data Structures", Cengage, 2nd Edition,2004.

2. Larry R. Nyhoff," ADTs, Data Structures, and Problem Solving with C++", Prentice Hall Edition, 2004.

3. Thomas H. Cormen, Charles E. Leiserson, "Introduction to Algorithms", 3rd Edition, 2010.

CO's-PO's&PSO'sMAPPING

COs	PO												PSO		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	1	2	2	3	1	-	-	-	2	-	2	1	1	1	1
2	2	3	2	2	2	-	-	-	2	-	2	2	3	2	2
3	2	2	3	2	3	-	-	-	3	-	2	2	3	2	2
4	3	3	3	3	1	-	-	-	3	-	2	2	3	2	3
5	2	2	3	1	3	-	-	-	3	-	2	1	3	2	2
AVg.	2	3	3	3	2	-	-	-	3	-	2	2	3	2	2

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

23IT221 DATA STRUCTURES AND ALGORITHMS LAB **L T P C**

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COURS OBJECTIVES

- To impart the basic concepts of data structures and algorithms.
- To be familiar with writing recursive methods.
- To implement operations on Linked List, Stack and Queues.
- To implement traversal operations of trees and graphs.
- To understand concepts about various algorithm design techniques, searching and sorting techniques.

LIST OF EXPERIMENTS

1. Program to find the largest and smallest number in an unsorted array.
2. Program to construct operations on a Singly linked list.
3. Program to implement operations on a doubly linked list.
4. Program to sort the elements using insertion sort.
5. Program to sort the elements using quick sort.
6. Program to sort the elements using merge sort.
7. Program to construct t a Stack using an array and Linked list.
8. Program to perform Queue using an array and Linked list.
9. Program to execute Circular Queue.
10. Program to convert an infix expression to postfix expression.
11. Program to achieve BFS and DFS
12. Program to implement N Queens problem.
13. Program to apply Binary Tree Traversal
14. Program to carry out Travelling Salesman Problem.

TOTAL: 60 PERIODS

COURSE OUTCOMES

On completion of the course, student will be able to

- **CO1**: Remembering the concept of data structures through ADT including List, Stack and Queues.
- **CO2**: Understand basic concepts about stacks, queues, lists, trees and graphs.
- **CO3**: Able to apply and implement various tree traversal algorithms and ensure their correctness.
- **CO4**: Ability to analyze algorithms and develop algorithms through step-by-step approach in solving problems with the help of fundamental data structures.
- **CO5**: Design applications and justify use of specific linear and binary data structures for various Applications.

TEXT BOOKS

1. Jean-Paul Tremblay, Paul G. Sorenson, 'An Introduction to Data Structures with Application', TMH, 2017.

REFERENCE BOOKS

1. Richard F, Gilberg, Forouzan, "Data Structures", Cengage, 2nd Edition,2004.
2. Larry R. Nyhoff," ADTs, Data Structures, and Problem Solving with C++", Prentice Hall Edition, 2004.
3. Thomas H. Cormen, Charles E. Leiserson, "Introduction to Algorithms", 3rd Edition, 2010.

CO's-PO's&PSO'sMAPPING

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	1	1	1	-	-	-	2	3	1	2	1	2	1
2	3	3	2	-	1	-	-	-	2	3	1	2	2	2	1
3	2	2	2	1	1	-	-	-	2	3	1	2	1	3	1
4	3	1	2	1	1	-	-	-	2	3	1	2	1	3	1
5	3	2	2	1	1	-	-	-	2	3	1	2	1	2	1
AVG.	2.75	2	1.75	1	1	-	-	-	2	3	1	2	1.25	2.5	1

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