Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

1st to 8th Semester

(Department of Computer Science and Engineering

B.Tech in Computer Science and Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Computer Science & Engineering)

B. Tech in Computer Science & Engineering)

SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER															
1	1	BS	GE/MTH	22CSE101	Differential Equation and Complex Analysis	T	3	1	0	4	4	30	20	50	3 Hrs
2	1	BS	GE/PHY	22CSE102	Engineering Physics	T	3	0	0	3	3	30	20	50	3 Hrs
3	1	BS	GE/PHY	22CSE103	Lab: Engineering Physics	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22CSE104	Social Science	T	3	0	0	3	3	30	20	50	3 Hrs
5	1	BES	ME/ME	22CSE105	Engineering Graphics	T	1	0	0	1	1	30	20	50	3 Hrs
6	1	BES	ME/ME	22CSE106	Lab: Engineering Graphics	P	0	0	4	4	2		60	40	
7	1	BES	CT/CT	22CSE107	Elements of AIML	T	3	0	0	3	3	30	20	50	3 Hrs
8	1	BES	CT/CT	22CSE108	Computer Workshop	P	0	0	2	2	1		60	40	
9	1	BES	CSE/CSE	22CSE109	Introduction to Computing with Python	T	3	0	0	3	3	30	20	50	3 Hrs
10	1	BES	CSE/CSE	22CSE110	Lab: Introduction to Computing with Python	P	0	0	2	2	1		60	40	
						TOTAL	**16**	**1**	**10**	**27**	**22**				
List of Mandatory Learning Course (MLC)															
1	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	**A**	2	0	0	2	0				
2	1	BES	GE/CHE	GE2132	Environmental Science	**A**	2	0	0	2	0				
SECOND SEMESTER															
1	2	BS	GE/MTH	22CSE201	Calculus Sequences and Series	T	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/CHE	22CSE202	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hrs
3	2	BS	GE/CHE	22CSE203	Lab: Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22CSE204	Professional Communication	T	3	0	0	3	3	30	20	50	3 Hrs
5	2	BES	CV/CV	22CSE205	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3 Hrs
6	2	BES	CV/CV	22CSE206	Lab: Engineering Mechanics	P	0	0	2	2	1		60	40	
7	2	BES	EE/EE	22CSE207	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
8	2	BES	IT/IT	22CSE208	Programming for Problem Solving	T	3	0	0	3	3	30	20	50	3 Hrs
9	2	BES	IT/IT	22CSE209	Lab: Programming for Problem Solving	P	0	0	2	2	1		60	40	
						TOTAL	**18**	**1**	**6**	**25**	**22**				
List of Mandatory Learning Course (MLC)															
1	2	HS	GE/HUM	GE2131	Universal Human Value	**A**	2	0	0	2	0				
2	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	**A**	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	**1.00**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2022-23 Onwards

Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
B.TECH SCHEME OF EXAMINATION 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Computer Science & Engineering)
B. Tech in Computer Science & Engineering)

SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	PC	CSE/CSE	22CSE301	Discrete Mathematics & Graph Theory	**T**	3	1	0	4	4	30	20	50	3 Hrs
2	3	PC	CSE/CSE	22CSE302	Computer Architecture and Organisation	**T**	3	0	0	3	3	30	20	50	3 Hrs
3	3	PC	CSE/CSE	22CSE303	Object Oriented Programming	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	3	PC	CSE/CSE	22CSE304	Lab: Object Oriented Programming	**P**	0	0	2	2	1		60	40	
5	3	PC	CSE/CSE	22CSE305	Data Structures I	**T**	3	0	0	3	3	30	20	50	3 Hrs
6	3	PC	CSE/CSE	22CSE306	Lab: Data Structures I	**P**	0	0	2	2	1		60	40	
7	3	PC	CSE/CSE	22CSE307	Web Technology	**T**	3	0	0	3	3	30	20	50	3 Hrs
8	3	PC	CSE/CSE	22CSE308	Lab: Web Technology	**P**	0	0	2	2	1		60	40	
						TOTAL	**15**	**1**	**6**	**22**	**19**				
List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC2123	YCCE Communication Aptitude Preparation (YCAP3)	**A**	3	0	0	3	0				
2	3	BSE	CSE	MLC115	Latex	**A**	2	0	0	2	0				
FOURTH SEMESTER															
1	4	BS	GE/GE	22CSE401	Linear Algebra	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	4	HS	GE/HUM	22CSE402	Fundamentals of Management and Economics	T	3	0	0	3	3	30	20	50	3 Hrs
3	4	PC	CSE/CSE	22CSE403	Theory of Computation	T	3	1	0	4	4	30	20	50	3 Hrs
4	4	PC	CSE/CSE	22CSE404	Operating Systems	**T**	3	0	0	3	3	30	20	50	3 Hrs
5	4	PC	CSE/CSE	22CSE405	Lab: Operating Systems	**P**	0	0	2	2	1		60	40	
6	4	PC	CSE/CSE	22CSE406	Data Structures II	**T**	3	0	0	3	3	30	20	50	3 Hrs
7	4	PC	CSE/CSE	22CSE407	Lab: Data Structures II	**P**	0	0	2	2	1		60	40	
8	4	PC	CSE/CSE	22CSE408	Introduction to Data Analysis	**T**	3	0	0	3	3	30	20	50	3 Hrs
9	4	PC	CSE/CSE	22CSE409	Lab: Introduction to Data Analysis	**P**	0	0	2	2	1		60	40	
10	4	PC	CV/CSE	22CSE410	Environmental Sustainability, Pollution and Management	**T**	3	0	0	3	3	30	20	50	3 Hrs
						TOTAL	**21**	**1**	**6**	**28**	**25**				
List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	YCCE Communication Aptitude Preparation (YCAP 4)	**A**	3	0	0	3	0				
2	4	BSE	CSE	MLC116	Ethics in IT	**A**	2	0	0	2	0				

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TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

Chairperson	**Dean (Acad. Matters)**	**June 2022**	**1.00**
		Date of Release	**Version**

Applicable for AY 2022-23 Onwards

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Computer Science & Engineering)

B. Tech in Computer Science & Engineering)

SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC	CSE/CSE	22CSE501	Computer Networks	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	5	PC	CSE/CSE	22CSE502	Lab: Computer Networks	**P**	0	0	2	2	1		60	40	
3	5	PC	CSE/CSE	22CSE503	Database Management Systems	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	5	PC	CSE/CSE	22CSE504	Lab: Database Management Systems	**P**	0	0	2	2	1		60	40	
5	5	PC	CSE/CSE	22CSE505	Design & Analysis of Algorithms	**T**	3	1	0	4	4	30	20	50	3 Hrs
6	5	PC	CSE/CSE	22CSE506	Lab: Design & Analysis of Algorithms	**P**	0	0	2	2	1		60	40	
7	5	PE	CSE/CSE		**Professional Elective-I**	**T**	3	0	0	3	3	30	20	50	3 Hrs
8	5	PE	CSE/CSE		**Lab: Professional Elective-I**	**P**	0	0	2	2	1		60	40	
9	5	OE	CSE/CSE		**Open Elective - I**	**T**	3	0	0	3	3	30	20	50	3 Hrs
10	5	OE	CSE/CSE		**Open Elective - II**	**T**	3	0	0	3	3	30	20	50	3 Hrs
11	5	**STR**	CSE/CSE	22CSE507	**Industrial training, Seminar & Report**	**P**	**0**	**0**	**1**	**1**	**1**		60	40	
						TOTAL	**18**	**1**	**9**	**28**	**24**				

List of Professional Electives-I

1	5	PE-I	CSE/CSE	22CSE511	PE-I: Digital Image Processing
2	5	PE-I	CSE/CSE	22CSE512	PE-I: **Lab:** Digital Image Processing
3	5	PE-I	CSE/CSE	22CSE513	PE-I: Advanced Web Technologies
4	5	PE-I	CSE/CSE	22CSE514	PE-I: **Lab:** Advanced Web Technologies
5	5	PE-I	CSE/CSE	22CSE515	PE-I: Machine Learning
6	5	PE-I	CSE/CSE	22CSE516	PE-I: **Lab:** Machine learning
7	5	PE-I	CSE/CSE	22CSE517	PE-I: Mobile operating system
8	5	PE-I	CSE/CSE	22CSE518	PE-I: **Lab:** Mobile operating system
Coursera Electives					
1	5	PE-I	PC	22CSE519	PE-I : DevOps and Software Engineering
2	5	PE-I	PC	22CSE520	PE I : **Lab.:** DevOps and Software Engineering

Open Elective-I

1	5	OE-I	CSE/CSE	22CSE531	OE I: Database System Essentials
2	5	OE-I	CSE/CSE	22CSE532	OE I: Programming with Python
3	5	OE-I	CSE/CSE	22CSE533	OE I: Introduction to Image Processing
4	5	OE-I	CSE/CSE	22CSE534	OE I: Essentials of IT

Open Elective-II

1	5	OE-II	CSE/CSE	22CSE551	OE II: Software Testing for Beginners
2	5	OE-II	CSE/CSE	22CSE552	OE II: Introduction to Web Technology
3	5	OE-II	CSE/CSE	22CSE553	OE II: Introduction to Cloud Computing
4	5	OE-II	CSE/CSE	22CSE554	OE II: Introduction to OS Concepts

List of Mandatory Learning Course (MLC)												
1	5	HS	T&P	MLC2125	**YCAP5:** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	0	
2	5	BSE	R&D	MLC125	Design Thinking	**A**	2	0	0	2	0	

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Yeshwantrao Chavan College of Engineering
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B. Tech in Computer Science & Engineering)

SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	CSE/CSE	22CSE601	Language Processor	**T**	3	0	0	4	4	30	20	50	3 Hrs
2	6	PC	CSE/CSE	22CSE602	Lab: Language Processor	**P**	0	0	2	2	1		60	40	
3	6	PC	CSE/CSE	22CSE603	Cloud Computing	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	6	PC	CSE/CSE	22CSE604	Software Engineering	**T**	3	0	0	3	3	30	20	50	3 Hrs
5	6	PC	CSE/CSE	22CSE605	Lab: Software Engineering	**P**	0	0	2	2	1		60	40	
6	6	PE	CSE/CSE		**Professional Elective-II**	**T**	3	0	0	3	3	30	20	50	3 Hrs
7	6	PE	CSE/CSE		**Lab: Professional Elective-II**	**P**	0	0	2	2	1		60	40	
8	6	OE	CSE/CSE		**Open Elective - III**	**T**	3	0	0	3	3	30	20	50	3 Hrs
9	6	OE	CSE/CSE		**Open Elective - IV**	**T**	3	0	0	3	3	30	20	50	3 Hrs
10	6	PR	CSE/CSE	22CSE606	PROJECT PHASE 1	**P**	0	0	4	4	2		60	40	
						TOTAL	**18**	**0**	**10**	**29**	**24**				

List of Professional Electives-II

1	6	PE-II	CSE/CSE	22CSE611	PE-II: Business Intelligence
2	6	PE-II	CSE/CSE	22CSE612	PE-II: **Lab:** Business Intelligence
3	6	PE-II	CSE/CSE	22CSE613	PE-II: Internet of Things
4	6	PE-II	CSE/CSE	22CSE614	PE-II: **Lab:** Internet of Things
5	6	PE-II	CSE/CSE	22CSE615	PE-II: Neural Network and applications
6	6	PE-II	CSE/CSE	22CSE616	PE-II: **Lab :** Neural Network and applications
7	6	PE-II	CSE/CSE	22CSE617	PE-II: Augmented and Virtual Reality
8	6	PE-II	CSE/CSE	22CSE618	PE-II: **Lab:** Augmented and Virtual Reality
Coursera Electives					
1	6	PE-II	CSE/CSE	22CSE619	PE-II: Deep Learning with PyTorch, Keras and Tensorflow
		PE-II	CSE/CSE	22CSE620	PE-II: **Lab.** Deep Learning with PyTorch, Keras and Tensorflow

Open Elective-III

1	6	OE-III	CSE/CSE	22CSE631	OE III: Database System Essentials
2	6	OE-III	CSE/CSE	22CSE632	OE III: Programming with Python
3	6	OE-III	CSE/CSE	22CSE633	OE III: Introduction to Image Processing
4	7	OE-III	CSE/CSE	22CSE634	OE III: Essentials of IT

Open Elective-IV

1	6	OE-IV	CSE/CSE	22CSE651	OE IV: Software Testing for Beginners
2	6	OE-IV	CSE/CSE	22CSE652	OE IV: Introduction to Web Technology
3	6	OE-IV	CSE/CSE	22CSE653	OE IV: Introduction to Cloud Computing
4	6	OE-IV	CSE/CSE	22CSE654	OE IV: Introduction to OS Concepts

List of Mandatory Learning Course (MLC)												
1	6	HS	T&P	MLC2126	YCAP6 : YCCE Communication Aptitude Preparation	**A**	3	0	0	3	0	

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TA = for Practical : MSPA will be 15 marks each**

		June 2022	**1.00**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

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(Scheme of Examination w.e.f. 2022-23 onward)

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SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SEVENTH SEMESTER															
1	7	PC	CSE/CSE	22CSE701	Cryptography and Network Security	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	7	PC	CSE/CSE	22CSE702	Lab: Cryptography and Network Security	**P**	0	0	2	2	1		60	40	
3	7	PC	CSE/CSE	22CSE703	Artificial Intelligence	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	7	PC	CSE/CSE	22CSE704	Lab: Artificial Intelligence	**T**	0	0	2	2	1	30	20	50	3 Hrs
5	7	PE	CSE/CSE		**Professional Elective-III**	**T**	3	0	0	3	3	30	20	50	3 Hrs
6	7	PE	CSE/CSE		**Professional Elective-IV**	**T**	3	0	0	3	3	30	20	50	3 Hrs
7	7	PE	CSE/CSE		**Lab:Professional Elective-IV**	**P**	0	0	2	2	1		60	40	
8	7	PE	CSE/CSE		**Professional Elective-V**	**T**	3	0	0	3	3	30	20	50	3 Hrs
9	7	STR	CSE/CSE	22CSE705	Project Phase-II	**P**	0	0	10	10	5		60	40	
10	7	STR	CSE/CSE	22CSE706	Campus Recruitment Training (CRT)	**P**	0	0	0	0	2		100		
						TOTAL	**15**	**0**	**16**	**31**	**25**				

List of Professional Electives-III

1	7	PE-III	CSE/CSE	22CSE711	PE-III : Advanced computer architecture
2	7	PE-III	CSE/CSE	22CSE712	PE-III : Adhoc Wireless Network
3	7	PE-III	CSE/CSE	22CSE713	PE-III : Big data Analytics
4	7	PE-III	CSE/CSE	22CSE714	PE-III : Deep learning

List of Professional Electives-IV

1	7	PE-IV	CSE/CSE	22CSE731	PE IV: Cyber Forensic (industry aligned)
2	7	PE-IV	CSE/CSE	22CSE732	PE IV: **Lab:** Cyber Forensic
3	7	PE-IV	CSE/CSE	22CSE733	PE IV: Natural Language Processing
4	7	PE-IV	CSE/CSE	22CSE734	PE IV: **Lab:** Natural Language Processing
5	7	PE-IV	CSE/CSE	22CSE735	PE IV: Parallel Programming
6	7	PE-IV	CSE/CSE	22CSE736	PE IV: **Lab:** Parallel Programming
7	7	PE-IV	CSE/CSE	22CSE737	PE IV: Data mining
8	7	PE-IV	CSE	22CSE738	PE IV: **Lab:** Data mining

List of Professional Electives-V

1	7	PE-V	CSE/CSE	22CSE751	PE V: Information Retrival System
2	7	PE-V	CSE/CSE	22CSE752	PE V: Distributed System
3	7	PE-V	CSE/CSE	22CSE753	PE V: Human Computer Interaction
4	7	PE-V	CSE/CSE	22CSE754	PE V: Real Time System

Eighth Semester															
1	**8**	**STR**	CSE/CSE	22CSE801	Internship- Training Seminar & Report	**P**	0	0	12	12	3		60	40	
2	**8**	**STR**	CSE/CSE	22CSE802	Extra Curricular Activity Evaluation	**P**	0	0	0	0	2		100		
						TOTAL EIGHTH SEM	**0**	**0**	**12**	**12**	**5**				
						GRAND TOTAL	**121**	**5**	**75**	**202**	**166**				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA = for Practical : MSPA will be 15 marks each**

		June 2022	**1.00**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

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Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

1st Semester

(Department of Computer Science and Engineering

B.Tech in Computer Science and Engineering

28 June 2019

Nagar Yuwak Shikshan Sanstha's

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B.TECH SCHEME OF EXAMINATION 2022

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SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER															
1	1	BS	GE/MTH	22CSE101	Differential Equation and Complex Analysis	T	3	1	0	4	4	30	20	50	3 Hrs
2	1	BS	GE/PHY	22CSE102	Engineering Physics	T	3	0	0	3	3	30	20	50	3 Hrs
3	1	BS	GE/PHY	22CSE103	Lab: Engineering Physics	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22CSE104	Social Science	T	3	0	0	3	3	30	20	50	3 Hrs
5	1	BES	ME/ME	22CSE105	Engineering Graphics	T	1	0	0	1	1	30	20	50	3 Hrs
6	1	BES	ME/ME	22CSE106	Lab: Engineering Graphics	P	0	0	4	4	2		60	40	
7	1	BES	CT/CT	22CSE107	Elements of AIML	T	3	0	0	3	3	30	20	50	3 Hrs
8	1	BES	CT/CT	22CSE108	Computer workshop	P	0	0	2	2	1		60	40	
9	1	BES	CSE/CSE	22CSE109	Introduction to Computing with Python	T	3	0	0	3	3	30	20	50	3 Hrs
10	1	BES	CSE/CSE	22CSE110	Lab: Introduction to Computing with Python	P	0	0	2	2	1		60	40	
						TOTAL	**16**	**1**	**10**	**27**	**22**				
List of Mandetory Learning Course (MLC)															
1	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	**A**	2	0	0	2	0				
2	1	BES	GE/CHE	GE2132	Environmental Science	**A**	2	0	0	2	0				
SECOND SEMESTER															
1	2	BS	GE/MTH	22CSE201	Calculus Sequences and Series	T	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/CHE	22CSE202	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hrs
3	2	BS	GE/CHE	22CSE203	Lab: Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22CSE204	Professional Communication	T	3	0	0	3	3	30	20	50	3 Hrs
5	2	BES	CV/CV	22CSE205	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3 Hrs
6	2	BES	CV/CV	22CSE206	Lab: Engineering Mechanics	P	0	0	2	2	1		60	40	
7	2	BES	EE/EE	22CSE207	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
8	2	BES	IT/IT	22CSE208	Programming for Problem Solving	T	3	0	0	3	3	30	20	50	3 Hrs
9	2	BES	IT/IT	22CSE209	Lab: Programming for Problem Solving	P	0	0	2	2	1		60	40	
						TOTAL	**18**	**1**	**6**	**25**	**22**				
List of Mandetory Learning Course (MLC)															
1	2	HS	GE/HUM	GE2131	Universal Human Value	**A**	2	0	0	2	0				
2	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	**A**	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.00
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2022-23 Onwards

I SEMESTER

22CSE101: Differential Equation and Complex Analysis

Course Outcomes
Upon successful completion of the course the students will be able to
1. Use appropriate Methods to solve first order and higher order differential equations and apply it to find solutions of engineering problems.
2. Use appropriate methods to solve partial differential equations.
3. Determine the various functions of complex numbers.
4. Evaluate the integration of function of complex variables.

Unit I: Differential Equations I	**(7 Hrs.)**
Linear differential equations of first order and first degree, Differential equation reducible to linear form, Exact differential equations (excluding the case of integrating factor) and their applications to various fields. **(Contemporary Issues related to Topic)**	
Unit II: Differential Equations II	**(7 Hrs.)**
Higher order linear differential equations with constant coefficients, Complementary functions and Particular Integral for different cases, Method of variation of parameters, Examples on application to various fields. **(Contemporary Issues related to Topic)**	
Unit III: Differential Equations III	**(6 Hrs.)**
Cauchy's homogeneous linear differential equations, Legendre's linear differential equation, Applications of differential equations to various field (only up to second order). **(Contemporary Issues related to Topic)**	
Unit IV: Complex Numbers	**(6 Hrs.)**
Basic concepts of complex numbers and its various forms. Separation of real and imaginary parts, De Moivre's theorem, Application of De Moivre's theorem, Exponential function of complex numbers, Circular function of complex numbers, Hyperbolic functions and their inverse, Logarithm of a complex number. **(Contemporary Issues related to Topic)**	
Unit V: Complex Variables	**(7 Hrs.)**
Analytic function, Cauchy-Riemann conditions, Harmonic functions, Finding Harmonic conjugates, Taylor's and Laurent's Theorem (statement only), Examples on Taylor's and Laurent's Theorem, Evaluation integral by using Residue theorem. **(Contemporary Issues related to Topic)**	
Unit VI: Statistics	**(6 Hrs.)**
Partial Differential Equations of first order first degree i.e. Lagrange's form, linear homogeneous equations of higher order with constant coefficient. Application of variable separable method to solve first and second order partial differential equations. **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks:	
1.	Erwin Kreyzig, Advance Engineering Mathematics, 6th Edition, John Wiley and Sons, INC.
2.	H.K. Dass, Engineering Mathematics, 11th revised edition, S. Chand, Delhi.
3.	H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi.
4.	Dr. B.S. Grewal, Higher Engineering Mathematics, 42th edition, Khanna Publishers.
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.

Reference Books:	
1.	G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999.
2.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/111103070
2.	https://onlinecourses.nptel.ac.in/noc19_ma28/preview
3.	https://nptel.ac.in/courses/111/106/111106100/

I SEMESTER

22CSE102: Engineering Physics

Course Outcomes :

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

1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particle.
2. Justify the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands.
3. Illustrate working principle of lasers and optical fibers for their use in the field of industry.
4. Analyse the motion of charged particles in electric and magnetic field and its applications to electron optic devices.
5. Assess the characteristics of nano materials, synthesis methods and their applications.

Unit:1 Quantum Physics	**(6 Hrs.)**
Wave-particle duality, Davisson and Germer experiment, Wave packet, Heisenberg uncertainty principle, thought experiment, Significance, Applications. **(Contemporary Issues related to Topic)**	
Unit II: Introduction to Quantum Computing	**(7 Hrs.)**
Introduction of complex numbers, operators, eigen values, eigen functions. Wave function and its probability interpretation, Schrodinger Equation, Particle in infinite and finite potential well, quantum tunnelling, Introduction to Bits and Qubits. **(Contemporary Issues related to Topic)**	
Unit III: Semiconductor Physics	**(7 Hrs.)**
Formation of energy bands in solids; Classification of solids, Energy band diagram of Si/Ge, Intrinsic and extrinsic semiconductors, Conductivity, Law of mass action, Hall effect, Direct and Indirect semiconductor materials. **(Contemporary Issues related to Topic)**	
Unit IV: Fundamentals of Optical Communication	**(7 Hrs.)**
Interaction of radiation with matter, Population Inversion and Optical resonance cavity, diode laser, Properties and engineering applications of laser. Optical Fibre: Principle, structure and classification, Acceptance angle, Numerical aperture, Losses. **(Contemporary Issues related to Topic)**	
Unit V: Electron Ballistics and Devices	**(7 Hrs.)**
Motion of a charged particle in uniform electric and magnetic field, Cross field configuration; Electron refraction, Electron lens. Cathode ray oscilloscope (CRO), Block diagram, Application of CRO for amplitude, frequency and phase determination **(Contemporary Issues related to Topic)**	
Unit VI: Physics of Advanced Materials	**(6 Hrs.)**
Introduction to Nanoscience and nanomaterials, types of nano structures (0-D, 1-D, 2-D and 3-D) and their properties (structural, electrical, optical, magnetic and mechanical), Synthesis of nanomaterials: Top down and Bottom – up approach, Applications of nanomaterials. **(Contemporary Issues related to Topic)**	
Total Lecture	**40 Hours**

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Textbooks:	
1.	M. N. Avadhanulu, P. G. Kshirsagar, A Textbook of Engineering Physics, Revised 14th Edition, S. Chand & Company, 2014.
2.	Hitendra K Malik, A K Singh, Engineering Physics, 2nd Edition, Tata McGraw Hill Education Private Limited, 2015.

Reference Books:	
1.	David Halliday, Robert Resnick and Jerle Walker, Fundamentals of Physics,10th edition, John-Wiley India, 2013.
2.	Sanjay D Jain, Girish G Sahasrabudhe, Engineering Physics, 2nd Edition, Universities Press, 2015.
3.	P K Palanisamy, Engineering Physics, Revised Edition, SCITECH, 2015.
4.	John Allision, Electronic Engineering Materials and Devices, TMH edition, 10th reprint, Tata McGraw Hill.
5.	Arthur Beiser, Concept of Modern Physics, 6th edition, Tata McGraw - Hill Education, 2002.
6.	Subramanyam, Brijlal, M N Avadhanulu, Text Book of Optics, S. Chand & Company, 2006.
7.	M N Avadhanulu, An Introduction to Lasers: Theory & Applications, First Edition 2001, S. Chand & Company Pvt. Ltd, 2017.
8.	S O Pillai, Solid State Physics, 9th edition, New Edge International Publishers, 2021.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	chrome-http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Eisberg%20&%20Resnick%20-%20Quantum%20Physics.pdf
2	chrome-http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/2016_Book_ThePhysicsOfSemiconductors.pdf

MOOCs Links and additional reading, learning, video material	
1.	http://nptel.iitm.ac.in- Quantum Physics
2.	http://nptel.ac.in- CRO
3.	www.digimat.in/nptel/courses/video/115102124/L36.html - LASER

I SEMESTER

22CSE103: Lab : Engineering Physics

Course Outcomes
Upon successful completion of the course the students will be able to
1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particle. 2. Justify the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands. 3. Illustrate working principle of lasers and optical fibers for their use in the field of industry. 4. Analyse the motion of charged particles in electric and magnetic field and its applications to electron optic devices. 5. Assess the characteristics of nano materials, synthesis methods and their applications.

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on
1	Determination of Planck's Constant
2	Study of Tunnel Diode.
3	Determination of Hall coefficient and density of charge carriers using Hall effect.
4	Dependence of Hall coefficient on temperature.
5	The study of V-I characteristics of a semiconductor diode (Germanium and silicon) in forward and reverse bias mode.
6	Determination of Band gap in a semiconductor by four probe method.
7	Determination of Band gap in a semiconductor using reverse biased p-n diode.
8	Determination of wavelength of laser using diffraction grating.
9	Determination of divergence of laser beam.
10	Determination of Acceptance angle and numerical aperture of a given optical fiber.
11	To measure the phase shift introduced by a phase shift network using Dual beam CRO.
12.	Determination of amplitude and frequency of sinusoidal signal using C.R.O.

I SEMESTER
22CSE104: Social Science

Course Outcomes
Upon successful completion of the course the students will be able to 1. Explain the basic concepts of social sciences. 2. Describe the development of various Civilizations and their culture. 3. Explain the basic idea of Constitution of India and aware about their rights & Duties. 4. Analyze the Impact of Industrialization on Society and discuss the Fundamental Concepts of Society.

Unit I: Social Sciences & Its Utility	**(6 Hrs.)**
Meaning & Scope of Social Science, General Utility of Social Sciences to Engineers, Applied Humanities, Social Engineering, Society its types & Characteristics. **(Contemporary Issues related to Topic)**	
Unit II: Human Civilization	**(7 Hrs.)**
Development of human civilization with specific reference to monumental studies of engineering skill, Ancient Indian Civilization:- a) Indus Valley Civilization b) Vedic Civilization, c) Indian Art & Architecture. **(Contemporary Issues related to Topic)**	
Unit III: Fundamental Concept in Social Science	**(7 Hrs.)**
Social Structure and Social System, Socialization, Social Control and Social Change, Culture: Characteristics and Features. **(Contemporary Issues related to Topic)**	
Unit IV: Introduction to Constitution of India	**(7 Hrs.)**
Significance of Preamble, Fundamental Rights and Duties, Directive principles of state policy. Federal System Concept of industrial Democracy. **(Contemporary Issues related to Topic)**	
Unit V: Industrial Organization & Society	**(6 Hrs.)**
Industrialization and its impact on society, Selection, Training & Motivation of workers, Industrial Psychology, Industrial sociology, Work Organization, Power, Authority and Status system. **(Contemporary Issues related to Topic)**	
Unit VI: Industrial Management	**(6 Hrs.)**
Labour Union Organization, Discipline in Industry, Labour Turnover, Industrial Fatigue of workers, Health and Safety of Workers. **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

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Textbooks:	
1.	S. Shabbir & Sheikh, A New Look Into Social Sciences, S.Chand , New Delhi,1993.
2.	C N Shankar Rao, Sociology Principles of Sociology With An Introduction To Social Thought, S. Chand, New Delhi, 2010.
3.	O P Khanna, Industrial Engineering And Management, Dhanpat Rai Publication, New Delhi, 2010.
4.	Dr. G. N. Nimbarte, Social Science, Sankalp Publications, Nagpur.

Reference Books:	
1.	C. N. Shankar Rao, Sociology: Principal of Sociology with an introduction to social thought, Publication: S. Chand, New Delhi.
2.	O. P. Khanna, Industrial Engineering and Management, Dhanpat Rai Publication, New Delhi.
3.	Reader's Digest Vanished Civilizations, The Reader's Digest Association Limited, New York.
4.	Constitution of India: Dr B. R. Ambedkar: Government of India, Government of India.
5.	B. L. Kayastha, Recent trends in Humanities and Social Sciences, 1st Ed., Akinik Publications, New Delhi.

MOOCs Links and additional reading, learning, video material	
1.	https://mobidrive.com/sharelink/r/4I2bDsxN9YrVI03vMZaInJ5VBpojBmR9EqKv7nin9pkN
2.	https://mobidrive.com/sharelink/r/4I2bDsxN9YrVI03vMZaInJ2sUn37wK4V3CpGhemYRKnz

I SEMESTER

22CSE105: Engineering Graphics

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Construct orthographic drawing and isometric drawing of a given object
2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects
3. Develop the lateral surfaces of various solids, their section and intersection**.**
4. Practice the use of software tools used for Two dimensional drawings.

Unit I: Theory of Orthographic Projections:	**(3 Hrs.)**
Introduction, Quadrant system, Theory of orthographic projection, Projection method and principal planes, First and Third angle projections. **(Contemporary Issues related to Topic)**	
Unit II: Theory of Isometric Projections:	**(2 Hrs.)**
Theory of isometric projection, Method for drawing isometric views, Different problems on isometric projections. **(Contemporary Issues related to Topic)**	
Unit III: Lines:	**(2 Hrs.)**
Projection of points, Projection of lines, True lengths and inclinations, apparent lengths and inclinations, various positions of lines in different quadrants, Traces of lines, projection of line on auxiliary plane. **(Contemporary Issues related to Topic)**	
Unit IV: Planes and Solids:	**(4 Hrs.)**
Projection planes: (Polygonal Lamina, Circular Lamina), Projection of Perpendicular planes and oblique planes. Auxiliary views (Auxiliary planes) Projection of Solids :(Inclined to One Plane Only) - Polyhedra (Regular and Irregular Polyhedra), Solids of Revolution. **(Contemporary Issues related to Topic)**	
Unit V: Section of Solids and Development of Surfaces:	**(2 Hrs.)**
Types of Section planes, Sectional top view, True shape. Development of different solids using Radial line and parallel line methods. **(Contemporary Issues related to Topic)**	
Unit VI: Intersection of Surfaces of solids:	**(2 Hrs.)**
Intersection between similar solids, Intersection between dissimilar solids, Lines and Curves of Intersection. **(Contemporary Issues related to Topic)**	
Total Lecture	**15 Hours**

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Textbooks:	
1.	D.M. Kulkarni, A. P. Rastogi and A. K. Sarkar , Engineering Graphics with AutoCAD PHI learning Pvt. Ltd., Revised Edition(2014),
2.	N. D. Bhatt ,Engineering Drawing Charotar Publishing House Pvt. Ltd, 53 rd Edition 2017

Reference Books:	
1.	D. A. Jolhe Engineering Drawing , Tata McGraw Hill Publications , 2008,
2.	K. L. Narayana & P. Kannaiah , Engineering Drawing SciTech Publication , 2010
3.	R. K. Dhawan Engineering Drawing S. Chand Publication Multicolor revised edition 2015

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	Intranet on address 172.16.1.10. data/CCC/software / AutoCAD Software Setup.

MOOCs Links and additional reading, learning, video material	
1.	https://youtube.com/playlist?list=PLLy_2iUCG87Bw9XPfEF3r3EW5UlAOv8iz
2.	https://nptel.ac.in/courses/112105294

I SEMESTER

22CSE106: Lab : Engineering Graphics

Course Outcomes
Upon successful completion of the course the students will be able to
1. Construct orthographic drawing and isometric drawing of a given object
2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects
3. Develop the lateral surfaces of various solids, their section and intersection**.**
4. Practice the use of software tools used for Two dimensional drawings.

Practical's to be performed from the list as below

SN	Experiments based on	No.of Practical's
1	Introduction of AutoCAD Basic Commands	02
2	Orthographic Projection	03
3	Isometric Projection	03
4	Projection of Straight Line	03
5	Projection of Planar Surface	03
6	Projection of Solid	03
7	Section and Development of Solid	04
8	Intersection of Surfaces	03
9	Drawing Sheet 1: Convention for various lines, Dimensioning and Orthographic Projection	02
10	Drawing Sheet 2: Projection of line, planar surface or solid. (Any one)	02
	Total Practical's	**28 Hours**

I SEMESTER

22CSE107: Elements of AIML

Course Outcomes :

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

1. Develop an understanding what is involved in AIML.
2. Understand learning algorithms of AIML.
3. Understand the deep learning.
4. Apply the knowledge for the selection of tool and languages for problem solving
5. Understand the use of AIML for real world problems.

Unit I: Introduction to Artificial Intelligence	**(7 Hrs.)**
What Is Artificial Intelligence? History, AI and Society, Agents and Knowledge based systems, Components of AI. **(Contemporary Issues related to Topic)**	
Unit II: Propositional Logic	**(7 Hrs.)**
Propositional Logic, First order logic, limitations of logic, Search, Games and Problem Solving, Reasoning with Uncertainty. **(Contemporary Issues related to Topic)**	
Unit III: Machine Learning	**(7 Hrs.)**
Supervised learning, Unsupervised learning, Reinforcement learning: Model based learning, Regression, Decision trees, Linear Discrimination, Kernel Machines and Graphical Models. **(Contemporary Issues related to Topic)**	
Unit IV: Artificial Neural Networks and Deep Learning	**(7 Hrs.)**
Biological neural network, Artificial neural network, Hopfield network, Neural Associative memory, Linear networks, Backpropogation algorithm, Support Vector Machines, Basics of deep learning. **(Contemporary Issues related to Topic)**	
Unit V: Introduction to Platforms, Tools, Frameworks and languages for AIML	**(6 Hrs.)**
Top AIML Softwares: Salesforce Einstein, IBM Watson, Deep Vision, Cloud Machine Learning Engine, Azure Machine Learning Studio, Nvidia Deep Learning AI, Playment; Machine learning tools: TensorFlow, Amazon Machine Learning, Accord.NET, Apache Mahout, Shogun; Programming languages: Python, R, Java, Julia, C/C++, Others: Scikit Learn, Theano, Caffe, MxNet, Keras, PyTorch, CNTK, Auto ML, OpenNN, H20: Open Source AI Platform, Google ML Kit. **(Contemporary Issues related to Topic)**	
Unit VI: Applications of AI and ML	**(6 Hrs.)**
Working with software based AI Applications, Working with AI in hardware Applications, Health, Banking and Finance, Automobile, Surveillance, Social Media, Education, Space, etc. **(Contemporary Issues related to Topic)**	
Total Lecture	**40 Hours**

Textbooks:	
1.	Wolfgang Ertel, "Introduction to Artificial Intelligence" 2nd Edition, UTiCS, Springer
2.	Ethem Alpaydın ,"Introduction to Machine Learning" 3rd Edition,The MIT Press, Cambridge, Massachusetts London, England.

Reference Books:	
1.	John Paul Mueller, Luca Massaron John Wiley & Sons ,"Artificial Intelligence for Dummies" First, 2018
2.	Steven W. Knox,Wiley" Machine Learning A Concise Introduction" First, 2018

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=kwSTs0QVRfU
2.	https://www.youtube.com/watch?v=GHpchgLoDvI&list=PLp6ek2hDcoNB_YJCruBFjhF79f5ZHyBuz
3.	https://nptel.ac.in/courses/106105077

I SEMESTER

22CSE108: Computer workshop

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Understand the fundamentals of computer hardware and working of Linux operating system 2. Use Linux commands to manage files and file systems 3. Execute Scripts 4. Debug Programs on various IDEs

Unit I: Computer Hardware	**(4 Hrs.)**
Computer Hardware, RAM, HDD, Levels of Caches, Setting environment variables, Installation of software in Linux, Installing printers **(Contemporary Issues related to Topic)**	
Unit II: Introduction to Linux/Unix OS	**(4 Hrs.)**
Introduction to Linux/Unix OS - ls, wc, chdir, mkdir, chmod, cd, mv, df, du, netstat, ps, more, set, env, setenv, chgrp, man, rm, rmdir, grep, vi, tar, untar, uuencode, find, cat, history, ping, ifconfig, traceroute **(Contemporary Issues related to Topic)**	
Unit III: Unix tools	**(4 Hrs.)**
Unix tools - Awk, sed, Emacs **(Contemporary Issues related to Topic)**	
Unit IV: Scripting	**(4 Hrs.)**
Scripting – variables, conditionals, loops, finding logged in users , Parameter passing to C program from shell (argc / argv) **(Contemporary Issues related to Topic)**	
Unit V: Installing Linux (or any variant)	**(4 Hrs.)**
Installing Linux (or any variant): Introduction to using different tools for identification of possible errors in C program – gdb, concepts of "core dump", backtracing using "bt", using "info" to dump all registers, creating watch-list / watch variables. DDD (Data Display Debugger) – introduction and usage **(Contemporary Issues related to Topic)**	
Unit VI: IDE for code development	**(4 Hrs.)**
IDE for code development Using DevCpp and/or Visual Studio, Create a project using multiple .c and .h files with cross-references, Setting compiler options and linker options, Understanding different settings **(Contemporary Issues related to Topic)**	
Total Lecture	**24 Hours**

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Textbooks:	
1.	Linux Pocket Guide, Daniel J. Barrett, 3rd edition, O'Reilly Media
2.	The Linux Command Line, William Shotts, 2nd edition, No Starch Press
3.	Linux for Beginners, Jason Cannon, 1st edition, Independently Published

Reference Books:	
1.	Linux Command Line and Shell Scripting Bible, Richard Blum, 3rd edition, Wiley
2.	Command Line Kung Fu, Jason Cannon, 1st edition, Independently Published

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1	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/COMPUTER%20TECHNOLOGY/COMPUTER%20TECHNOLOGY%20(G%20Series).pdf
2	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/COMPUTER%20TECHNOLOGY/COMPUTER%20TECHNOLOGY%20(I%20Series).pdf
3	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/COMPUTER%20TECHNOLOGY/COMPUTER%20TECHNOLOGY%20(PE%20Series).pdf

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=19O5kFdtKb0
2.	https://www.youtube.com/watch?v=ZtqBQ68cfJc
3.	https://www.youtube.com/watch?v=kfjDWygSvnw
4.	https://www.youtube.com/watch?v=GtovwKDemnI&t=1578s
5.	https://www.youtube.com/watch?v=J7L2x1ATOgk
6.	https://www.youtube.com/watch?v=85FrhrIwBtw

I SEMESTER

22CSE109: Introduction to Computing with Python

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand the basic data types, built in data structures, control statements and loops and write simple programs in Python. 2. Apply the concepts of functions modules and packages and write programs using them. 3. Design and develop classes in Python. 4. Solve real world problems and develop interesting applications using Python

Unit:1	**Introduction to Python**	**7 Hours**
Build-in Data types & variables, arithmetic operators, assignment statement, print & input function, relational and logical operators, if, if – else & nested if- else statements, writing simple programs. **(Contemporary Issues related to Topic)**		
Unit:2	**Data Structures**	**6 Hours**
Built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays, mutability. Usage and Comparison of built in data structures, Standard library functions in Python, Programs based on the built in data structures. **(Contemporary Issues related to Topic)**		
Unit:3	**Looping**	**6 Hours**
Loop statements: For, while, continue and break statements, list comprehension. Bitwise operators, programs for computing GCD, LCD, Taylor's series expansion, bisection method, etc. Real world problem solving based on built in data structures and loops. **(Contemporary Issues related to Topic)**		
Unit:4	**Functions**	**6 Hours**
User defined Functions, returning values, keyword arguments and default values, local & global variables , global statement, doc strings for functions, developing useful functions, Modules and Packages, import statement. **(Contemporary Issues related to Topic)**		
Unit:5	**Introduction to Object oriented programming in Python**	**7 Hours**
Features of object oriented programming, Python Objects and Classes: defining classes, member variables, doc strings for classes, Private members, Operator Overloading, inheritance and polymorphism. **(Contemporary Issues related to Topic)**		
Unit :6	**Application Development**	**5 Hours**
Basics of file handling, developing useful applications using built in and custom modules and packages. **(Contemporary Issues related to Topic)**		
	Total Lecture Hours	**37 Hours**

Textbooks:	
1	Python Programming, A Modular Approach, Sheetal Taneja and Naveen Kumar, Pearson

Reference Books:	
1	Introduction to Computation and Programming Using Python, John V. Guttag, Second Edition,2016, PHI EEE (MIT Press).
2.	Python for Programmers, Paul Deitel and Harvey Deitel, Pearson
3.	Learn Python Programming, Fabrizio Romano, Heinrich Kruger, Third Edition, 2020, PACKT Publishing

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/python-basics-sample-chapters.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/practical-machine-learning-python-problem-solvers.pdf

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc20_cs70/preview
2	https://onlinecourses.nptel.ac.in/noc20_cs83/preview

I SEMESTER

22CSE110: Lab : Introduction to Computing with Python

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Implement solution to the real-world problems using various Python features

Sr. No.	Experiments based on
MSPA-1	Writing simple programs using various operators and decision making
MSPA-2	Writing real world programs using built in data structures and loops
MSPA-3	Writing real world programs using user defined classes, functions and modules
MSPA-4	Develop an useful real world application using files, modules and packages, and exception handling

I SEMESTER
Audit Course
MLC2121: YCAP1-Get Set Go

Objective	Outcomes
Get Set Go program is designed to introduce students to the real world. It gives them the skills they need to reach their goals and live up to their full potential at college, home and work. The program was developed with feedback from students; it consists of interactive sessions that include real-life scenarios and role-playing. It can help young adults become more confident and better able to cope with the pressure and stress they face.	The students gain more confidence and skills required to deal with the challenges they will face in college and at home. Their interpersonal and intrapersonal skills are enhanced pushing them to think towards their future and aim for their goals.

Syllabus Subject: Communication Skills – 1st Year, No. of hours - 18

Unit No.	Topic	Duration
1	Topic: Build a foundation for success - Explain the Importance of Process of improvement, stating your Name with Impact, Recall and Use Names, Name Remembering Formula o LIRA o PACE – Individual Activity o BRAMMS o Chaining Method, Introduce "My Vision	2.5 Hours
2	Topic: Communication Fundamentals for Building Trust- Be a good listener, use conversation links, show genuine interest Hi-Five of Success ♣ Build on Memory Skills and Enhance Relationships ♣ PEG words ♣ Explain Permanent PEG Memory System, energize our Communications – Explain 3Vs of communication – Visual-Vocal-Verbal	3.5 Hours
	Practice Conversations, Activity – Pause-Part-Punch, Group Activity	

Unit No.	Topic	Duration
3	Topic: Increase Self Confidence -• Use our experiences to communicate more confidently • Communicate with clarity and conciseness • Discover how past experiences influence behavior	2.5 Hours
4	Topic: Motivate Others and Enhance Relationships-• Learning Objectives • Explain Gain Willing Cooperation Principles • Group Presentation • Explain Demonstration of Leadership Principles • Explain "Evidence" critical in establishing credibility	4 Hours
	Individual Activity – Sharing of defining moment, Skit to demonstrate Leadership Principles, Stranded on Island	

Unit No.	Topic	Duration
5	Topic: Fundamentals of Communication (Earn the right – Excite -Eagerness) ♣ Elevator Pitch ♣ Develop more Flexibility, ♣ Recap and Summarize	3.5 Hours
6	Activities - – Individual Presentation, Flexibility Drills, Individual Presentations – My Vision Assignment	2 Hours

Reference Books:

1. How to win friends & influence people – Dale Carnegie

I SEMESTER
Audit Course
GE2132 : Environmental Science

Course Outcome :
Upon successful completion of the course the students will be able 1. To understand the basic concepts and problems and follow sustainable development practices 2. To enhance knowledge skills and attitude towards environment 3. To understand natural environment and its relationship with human activities. 4. To evaluate local, regional and global environmental topics related to resource use and management.

Unit I: : Introduction	**(2Hrs.)**
Definition, scope and importance; Need for public awareness – institutions in environment, people in environment.	

Unit II: : Natural Resources	**(2 Hrs.)**
Renewable and non-renewable and associated problems; Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.	

Unit III: Ecosystems	**(4 Hrs.)**
Concept of an ecosystem – understanding ecosystems, ecosystem degradation, resource utilization. Structure and functions of an ecosystem – producers, consumers and decomposers. Energy flow in the ecosystem – water, carbon, oxygen, nitrogen and energy cycles, integration of cycles in nature. Ecological succession; Food chains, food webs and ecological pyramids; Ecosystem types – characteristic features, structure and functions of forest, grassland, desert and aquatic ecosystems.	

Unit IV: Bio-diversity	**(4 Hrs.)**
Introduction – biodiversity at genetic, species and ecosystem levels Bio-geographic classification of India. Value of biodiversity – Consumptive use value, productive use value, social, ethical, moral, aesthetic and optional vlue of biodiversity. India as a mega-diversity nation; hotspots of biodiversity.Threats to bio-diversity – habitat loss, poaching of wildlife, man-wild life conflicts. Common endangered and endemic plant and animal species of India. Insitu and Exsitu conservation of biodiversity. Role of individual and institutions in prevention of pollution.Disaster management – Floods, earthquake, cyclone, landslides.	

Unit V: Pollution	**(4 Hrs.)**
Definition; Causes, effects and control measures of air, water, soil, marine, noise and thermal pollutions and nuclear hazards. Solid waste management – Causes, effects and control measures of urban and industrial waste.	

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Unit VI: Social Issues and the Environment	**(4 Hrs.)**
Unsustainable to sustainable development; Urban problems related to energy; Water conservation, rainwater harvesting, watershed management; Problems and concerns of resettlement and rehabilitation of affected people. Environmental ethics – issues and possible solutions – Resource consumption patterns and need for equitable utilization; Equity disparity in Western and Eastern countries; Urban and rural equity issues; need for gender equity. Preserving resources for future generations. Te rights of animals; Ethical basis of environment education and awareness; Conservation ethics and traditional value systems of India. Climate change, global warming, acid rain, Ozone layer depletion, nuclear accidents and holocasts. Wasteland Reclamation; Consumerism and Waste products. Environment legislations – The Environment (Protection) Act; The water (Prevention and Control of Pollution) Act; The Wildlife Protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislations – environment impact assessment (EIA), Citizens actions and action groups. Public awareness – Using an environmental calendar of activities, self-initiation.	
Unit VII : Human Population and the Environment	**(4Hrs.)**
Global population growth, variation among nations. Population explosion; Family Welfare Programmes – methods of sterilization; Urbanization. Environment and human health – Climate and health, infectious diseases, water-related diseases, risk due to chemicals in food, Cancer and environment. Human rights – equity, Nutrition and health rights, Intellectual property rights (IPRS), Community Biodiverstity registers (CBRs). Value education – environmental values, valuing nature, valuing cultures, social justice, human heritage, equitable use of resources, common property resources, ecological degradation. HIV / AIDS; Women and Child Welfare; Information technology in environment and human health.	
Total Lecture	**24 Hours**

Textbooks:	
1.	Perspectives in environmental studies by A. Kaushik and C. P. Kaushik.
2.	Textbook for Environmental studies by Erach Bharucha for UGC
3.	Textbook of Environmental studies by Shanta Satyanarayan, Dr. Suresh Zade, Dr. Shashikant Sitre & Dr. Pravin Meshram.
4.	Fundamental concepts in Environmental studies by Dr. D.D. Mishra. S. Chand publications

Reference Books:	
1.	Essentials of Ecology and Environmental Science by Dr. S .V .S. Rana,PHI Learning Pvt. Ltd, Delhi
2.	Environmental Chemistry by Anil Kumar De, Wiley Eastern Limited
3.	Environmental Science by T.G. Miller, Wadsworth Publishing Co, 13th edition.
4.	Ecology and Environment by P. D. Sharma, Rastogi publications

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

2nd Semester

(Department of Computer Science and Engineering

B.Tech in Computer Science and Engineering

28 June 2019

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Computer Science & Engineering)

B. Tech in Computer Science & Engineering)

SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER															
1	1	BS	GE/MTH	22CSE101	Differential Equation and Complex Analysis	T	3	1	0	4	4	30	20	50	3 Hrs
2	1	BS	GE/PHY	22CSE102	Engineering Physics	T	3	0	0	3	3	30	20	50	3 Hrs
3	1	BS	GE/PHY	22CSE103	Lab: Engineering Physics	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22CSE104	Social Science	T	3	0	0	3	3	30	20	50	3 Hrs
5	1	BES	ME/ME	22CSE105	Engineering Graphics	T	1	0	0	1	1	30	20	50	3 Hrs
6	1	BES	ME/ME	22CSE106	Lab: Engineering Graphics	P	0	0	4	4	2		60	40	
7	1	BES	CT/CT	22CSE107	Elements of AIML	T	3	0	0	3	3	30	20	50	3 Hrs
8	1	BES	CT/CT	22CSE108	Computer workshop	P	0	0	2	2	1		60	40	
9	1	BES	CSE/CSE	22CSE109	Introduction to Computing with Python	T	3	0	0	3	3	30	20	50	3 Hrs
10	1	BES	CSE/CSE	22CSE110	Lab: Introduction to Computing with Python	P	0	0	2	2	1		60	40	
						TOTAL	**16**	**1**	**10**	**27**	**22**				
List of Mandetory Learning Course (MLC)															
1	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	**A**	2	0	0	2	0				
2	1	BES	GE/CHE	GE2132	Environmental Science	**A**	2	0	0	2	0				
SECOND SEMESTER															
1	2	BS	GE/MTH	22CSE201	Calculus Sequences and Series	T	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/CHE	22CSE202	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hrs
3	2	BS	GE/CHE	22CSE203	Lab: Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22CSE204	Professional Communication	T	3	0	0	3	3	30	20	50	3 Hrs
5	2	BES	CV/CV	22CSE205	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3 Hrs
6	2	BES	CV/CV	22CSE206	Lab: Engineering Mechanics	P	0	0	2	2	1		60	40	
7	2	BES	EE/EE	22CSE207	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
8	2	BES	IT/IT	22CSE208	Programming for Problem Solving	T	3	0	0	3	3	30	20	50	3 Hrs
9	2	BES	IT/IT	22CSE209	Lab: Programming for Problem Solving	P	0	0	2	2	1		60	40	
						TOTAL	**18**	**1**	**6**	**25**	**22**				
List of Mandetory Learning Course (MLC)															
1	2	HS	GE/HUM	GE2131	Universal Human Value	**A**	2	0	0	2	0				
2	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	**A**	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.00
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

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II SEMESTER

22CSE201: Calculus, Sequences and Series

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Apply the knowledge of differentiation, sequence and series to solve engineering problems.
2. Determine the derivatives of functions of several variables and develop the mathematical equation.
3. Apply the knowledge of Beta and Gamma functions to solve the integrals.
4. Evaluate the multiple integrals and apply it to compute the area and volume of various structures.

Unit I: Sequence and Series	**(6 Hrs.)**
Sequence, types of sequence, test of convergence of sequences, Cauchy sequence, infinite series, power series, Alternating series, tests of convergence and absolute convergence of series. **(Contemporary Issues related to Topic)**	
Unit II: Ordinary Differentiation	**(7 Hrs.)**
Successive differentiation; Leibnitz theorem, Taylor's and Maclaurin's series for functions of single variable and its applications. **(Contemporary Issues related to Topic)**	
Unit III: Partial Differentiation	**(7 Hrs.)**
First and higher order derivatives of Functions of several variables, Euler's theorem, Chain Rule, Jacobians Maxima and minima and saddle point of functions of two variables. . **(Contemporary Issues related to Topic)**	
Unit IV: Curve Tracing and Improper Integrals	**(6 Hrs.)**
Tracing of curves, Beta, Gamma functions and its applications.. **(Contemporary Issues related to Topic)**	
Unit V: Multiple integrals	**(7 Hrs.)**
Elementary double integrals and triple integrals, Change of variables (simple transformations) and Jacobian of transformations, Change of order of integration (Cartesian and polar).. **(Contemporary Issues related to Topic)**	
Unit VI: Application of Multiple Integral	**(6 Hrs.)**
Surface area, Calculation of mass, Centre of gravity of an arc and Centre of gravity of an area, Volume of solid by revolution of an area (Double integral). **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

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Textbooks:	
1.	Erwin Kreyzig, Advance Engineering Mathematics, 6th Edition, John Wiley and Sons, INC.
2.	H.K. Dass, Engineering Mathematics, 11th revised edition, S. Chand, Delhi.
3.	H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi.
4.	Dr. B.S. Grewal, Higher Engineering Mathematics, 43rd edition, Khanna Publishers.
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.

Reference Books:	
1.	G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999.
2.	Michael Spivak and Tom Apostol, Calculus, VolI & Vol II 2nd edition, Wiley.
3.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/111/106/111106146/
2.	https://nitkkr.ac.in/docs/5-Multiple%20Integrals%20and%20their%20Applications.pdf
3.	https://nptel.ac.in/courses/111/106/111106100/

II SEMESTER

22CSE202: Engineering Chemistry

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Illustrate different thermodynamic functions and chemical reaction rates. (L3) 2. Apply concepts of electrochemistry for energy storage devices. (L3) 3. Develop awareness about global environmental concerns. (L2) 4. Establish insight into engineering materials. (L2)

Unit I : Unit-I Thermodynamics	**(7 Hrs.)**
Introduction, Spontaneous and non-spontaneous processes, Internal energy, enthalpy, Gibb's free energy, Free energy, types of equilibrium. I and II law of thermodynamics. Entropy and its significance. Numerically on Internal energy and enthalpy change. General applications of thermodynamics in engineering. **(Contemporary Issues related to Topic)**	
Unit II: Electrochemistry	**(7 Hrs.)**
Introduction, metallic and electrolytic conductance, resistance, specific resistance, conductance, specific conductance, equivalent and molar conductance. Variation of conductance with dilution. Electrode and electrode potentials. Nernst Equation. Faraday's laws and Numerical. Industrial applications: Electroforming, Electro winning, Electrolytic refining. **(Contemporary Issues related to Topic)**	
Unit III: Energy Storage Devices Basic concepts	**(6 Hrs.)**
Primary and secondary battery. Energy density, power density, energy efficiency, cycle life, shelf life. Secondary battery: Ni-metal hydride battery, Lithium-ion battery. H2-O2 Fuel cell: Principle, working, advantages, disadvantages, applications. Differences between battery and a fuel cell. Supercapacitors: Definition, types, characteristics, and application. **(Contemporary Issues related to Topic)**	
Unit IV: Chemical Kinetics	**(6 Hrs.)**
Introduction, Rate of reaction and factors influencing rate of reaction, order & molecularity of reaction. Kinetic equations of different orders: Zero Order, First Order, Second Order and numerical. **(Contemporary Issues related to Topic)**	
Unit V: e-waste Management	**(6 Hrs.)**
Introduction, e-waste pollution, its impact on environment, rules of regeneration of e-waste recycling and its managements as per government norms. e -waste on Battery waste management. Control measures for e-waste Management. Nanotechnology for waste reduction and improved energy efficiency. **(Contemporary Issues related to Topic)**	
Unit VI: Polymeric Materials	**(7 Hrs.)**
Conducting Polymers: Intrinsic and extrinsic conducting polymers, doping, factors responsible for conduction. General properties and applications of conducting polymers. Liquid Crystal Polymers: Phases of LCP's, general properties and applications. Silicon Chips: Introduction, properties and applications. Polymers in electronic industries: Piezo, pyroelectric, Ferroelectric polymers. Smart materials: Properties and applications of shape memory alloys, chromo active, photoactive and magneto rheological materials. **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

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Textbooks:	
1.	S S. Dara , A Text book of Engineering Chemistry , S.Chand & Co New Delhi. Eleventh Edition.
2.	P.C. Jain and Monica Jain , Engineering Chemistry , Dhanpat Rai & sons New Delhi , Sixteenth Edition.
3	P. W. Atkins, Physical Chemistry ,Oxford Publications,Eighth edition .
4	Erach Bharucha ,Textbook for Environmental studies for UGC,Universities press ,Third edition.

Reference Books:	
1.	B.K.Sharma Krishna , Engineering Chemistry ,Prakashan media private LTD. 1st Edition, 2014.
2.	CNR Rao ,Chemistry of Advanced Materials , Willey Publications, 1993.
3.	Fred. Billmeyer Jr. ,A textbook of polymer science ,Wiley India, 2nd Edition.
4.	Robert B Leighou , Chemistry of Engineering Materials ,Hill Book Company, Inc New York
5.	T.G. Miller, Environmental Science Wadsworth Publishing Co, 13th edition.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/CHEMISTRY/

MOOCs Links and additional reading, learning, video material	
1.	Silicon Chips: What is Computer Chips Made Of? https://www.intel.com/content/www/us/en/history/museum-making-silicon.html
2.	https://www.youtube.com/watch?v=XTt3gXB0a84
3.	https://www.youtube.com/watch?v=iihYXx79QiE
4.	https://www.youtube.com/watch?v=JfJ7MlP9Dco
5.	https://www.youtube.com/watch?v=L2VSOccUrSk

II SEMESTER

22CSE203: Lab : Engineering Chemistry

Course Outcomes
Upon successful completion of the course the students will be able to
1. Illustrate different thermodynamic functions and chemical reaction rates. (L3)
2. Apply concepts of electrochemistry for energy storage devices. (L3)
3. Develop awareness about global environmental concerns. (L2)
4. Establish insight into engineering materials. (L2)

Total 10 experiments are to be performed
(4 each from Phase I and Phase II and two demonstration experiments)

SN	Experiments based on
	List of Experiments-Phase I
1	Determination of total hardness of water sample.
2	Determination of alkalinity present in the water sample.
3	Estimation of Fe^{2+} ions by redox titration
4	Determination of copper by iodometric titration
5	Estimation of Nickel.
6	To determine the strength of a given potassium dichromate solution with N/20 sodium thiosulphate solution
7	Determination of COD of water sample.
8	Synthesis of polyaniline.
9	Determination of rate of the reaction of hydrolysis of ethyl acetate at room temperature and analysis of experimental data using Computational Software.
	List of Experiments-Phase II
1	Determination of viscosity of lubricating oil by Redwood Viscometer I or II
2	Determination of Cation exchange capacity of an ion exchange resin
3	Determination of molecular weight of a polymer.
4	Oil Testing for Flash Point / Cloud Point/Pour Point/Aniline Point
5	Proximate analysis of coal
6	Determination of surface tension of liquids using stalagmometer.
7	Determination of electrochemical equivalence of Copper using Faradays Law
8	To determine the heat of solution of potassium nitrate calorimetrically.
9	Determination of conductivity of water sample by conductivity meter.
10.	To verify Beer-Lambert law for KMnO4 and determine the concentration of the given solution of KMnO4

	List of Demonstration Experiments
1	Determination of pH of water sample by pH meter
2	Synthesis of urea formaldehyde resin.
3	Determination of consistency of grease sample by using penetrometer.
4	Determination of Drop Point of grease sample.

II SEMESTER

22CSE204: Professional Communication

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Apply different modes for effective communication. 2. Use competently phonology of English language. 3. Apply nuances of LSRW skills. 4. Communicate through different channels.

Unit I: Basics of Communication	**(7 Hrs.)**
Language as a tool of communication & characteristics of language Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational). **(Contemporary Issues related to Topic)**	
Unit II: English Phonetics	**(6 Hrs.)**
Speech Mechanism, Organs of speech, Consonant and Vowels sounds, Word stress rules. **(Contemporary Issues related to Topic)**	
Unit III: Presentation & Visual Communication	**(7 Hrs.)**
Presentation and audience analysis, Organizing content, Nuances of presentation, Visual Communication – Introduction & importance, Role & Psychology of color in visual communication. **(Contemporary Issues related to Topic)**	
Unit IV: Verbal Skills	**(7 Hrs.)**
Listening Skills -definition types and traits. Group Communication- (Purpose, Different types of Group Communication, Organizational GD, GD as a part of selection process), Meeting (purposes, preparation, procedure and minutes of meeting). **(Contemporary Issues related to Topic)**	
Unit V: Interview Skills	**(6 Hrs.)**
Purpose, expectations of employer and preparation for Interview, Types, Types of Questions & Answering Techniques, Telephonic Interviews – preparation and guidelines, Reading Techniques (Exercise based on Complex Unseen passages. **(Contemporary Issues related to Topic)**	
Unit VI: Technical Written Communication	**(6 Hrs.)**
Memo, Email, Report -Types, Characteristics, prewriting aspects of report and preparing writing aspects of report), Types of paragraphs.. **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

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Textbooks:	
1.	Raman & Sharma, Technical Communication, Oxford University Press.
2.	T. Balasubramaniam, Textbook of English Phonetics for Indian Students, Macmillan India Ltd.

Reference Books:	
1.	Public Speaking, Dale Carnegie, How to Develop Self – Confidence & Influence People.
2.	Asha Kaul, Communication Skills.
3.	Allen Peas, Body Language.
4.	Gerson's Gerson, Technical Communication.

MOOCs Links and additional reading, learning, video material	
1.	https://dl.uswr.ac.ir/bitstream/Hannan/141245/1/9781138219120.pdf
2.	https://www.pdfdrive.com/word-power-made-easy-the-complete-handbook-for-building-a-superior-vocabulary-e157841139.html
3	https://www.pdfdrive.com/improve-your-communication-skills-present-with-confidence-write-with-style-learn-skills-of-persuasion-e156963640.html
4	https://www.pdfdrive.com/21-days-of-effective-communication-everyday-habits-and-exercises-to-improve-your-communication-skills-and-social-intelligence-e158273760.html

II SEMESTER

22CSE205: Engineering Mechanics

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Describe the fundamental concepts of statics and dynamics. 2. Apply the basic concepts of applied mechanics for solution of problems on planar force system. 3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body. 4. Analyze pin jointed truss frame structure and beam structure analytically and graphically. 5. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

Unit I: Resultant of planar force System	**(7 Hrs.)**
Fundamental concepts, system of forces, laws of mechanics, principle of transmissibility of force, Moment of force, Principle of moment, Couple, Resultant of a planar force system, Equivalent force couple system. **(Contemporary Issues related to Topic)**	
Unit II: Equilibrium of planar force System	**(6 Hrs.)**
Free body diagrams, Conditions of equilibrium, types of supports, types of beams, types of loads on beam, Equilibrium of a planar force system **(Contemporary Issues related to Topic)**	
Unit III: Friction and Trusses	**(7 Hrs.)**
Friction: Coulomb's laws of dry friction, plane friction, belt friction. Trusses: Types of trusses, assumptions in analysis of truss, Analysis of truss by method of joint. **(Contemporary Issues related to Topic)**	
Unit IV: Properties of Surfaces	**(6 Hrs.)**
Centroid: Introduction, First Moment of Area, Centroid of composite areas. Moment of Inertia: Introduction, Second Moment of Area, Polar moment of Inertia, Radius of Gyration, Transfer formula for moment of Inertia, Product of Inertia, Moment of Inertia, and product of inertia for composite areas, Principal Moments of Inertia. **(Contemporary Issues related to Topic)**	
Unit V: Virtual Work Method and Kinetics of Particle	**(7 Hrs.)**
Virtual Work Method: Introduction, Principle of virtual work, Application to beam and frame. Kinetics of Particle: Introduction, Newton's law of motion for a Particle, D' Alembert's principle, Translation of particle and connected system.	
Unit VI: Work Energy and Impulse Momentum Method	**(6 Hrs.)**
Work Energy Method: Introduction, Work energy equation for translation, Work energy applied to particle motion and connected system. Impulse Momentum Method: Introduction, Linear Impulse momentum, Conservation of linear momentum, coefficient of restitution, elastic impact, Impulse momentum in plane motion. **(Contemporary Issues related to Topic)**	
	Total Lecture **39 Hours**

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Textbooks:	
1.	Nelson A., Engineering Mechanics (Statics and Dynamics), ed 2009, Tata Mc. Grew Hill Education Pvt. Ltd., New Delhi, 2009.
2.	Dubey N.H., Engineering Mechanics (Statics and Dynamics) first edition 2013, Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi, 2013.
3.	Singer F.L, Engineering Mechanics (Statics and Dynamics), Harper and Rowe publication, New Delhi, 1994.
Reference Books:	
1.	Timoshenko S, Young D.H and Rao J.V, Engineering Mechanics, Mc. Graw Hill Publication, New Delhi, 2007.
2.	Bhattacharyya B., Engineering Mechanics, Oxford University Press, New Delhi, 2008.
3.	Hibbeler R.C, Engineering Mechanics (Statics and Dynamics), Pearson Publication, Singapore, 2000.
4.	Shames I.H. and Rao J.V., Engineering Mechanics (Statics and Dynamics), First Edition, Pearson Publication, New Delhi, 2003.
5.	Beer F.P. and Johnston E.R; Vector Mechanics for Engineers, 9th edition Tata Mc. Graw Hill Publication, New Delhi. 2007.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf
2	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf
3	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf
MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=nGfVTNfNwnk
2.	https://www.youtube.com/watch?v=6nguX-cEsvw
3.	https://nptel.ac.in/courses/112103108

II SEMESTER

22CSE206: Lab : Engineering Mechanics

Course Outcomes
Upon successful completion of the course the students will be able to 1. Describe the fundamental concepts of statics and dynamics. 2. Apply the basic concepts of applied mechanics for solution of problems on planar force system. 3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body. 4. Analyze pin jointed truss frame structure and beam structure analytically and graphically. 5. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

Minimum Eight Practical's to be performed from the list as below

SN	**Experiments based on**
1	To find determine the support reactions of a Simply Supported Beam experimentally and analytically.
2	To determine the forces in the members of a Jib Crane Apparatus experimentally and graphically.
3	To determine the coefficient of friction between two surfaces of different material on Plane Friction Apparatus.
4	To determine the coefficient of friction of Coil Friction Apparatus.
5	To determine the forces in members of a Shear Leg Apparatus experimentally and manually.
6	To determine the mass moment of inertia of a fly wheel using Fly Wheel Apparatus
7	To determine efficiency and law of machine of Differential Axel & Wheel machine.
8	To determine efficiency and Law of machine of Single Purchase Crab machine.
9	To determine efficiency and Law of machine of Double Purchase Crab machine.
10	To verify law of polygonal of forces using Law of Polygon Apparatus.
11	To find support reactions of a simply supported beam using graphical method and hand calculation.
12.	To find the forces in the member of truss using graphical method and hand calculation.
13.	To find (1) Principle moment of inertia and (2) Moment of inertia and product of inertia about any inclined axis for a composite figure using Mohr's circle and hand calculation,

II SEMESTER

22CSE207: Basic Electrical and Electronics Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Understand, and explain the fundamental concepts of analog and digital electronic circuits
2. Understand, and explain the fundamental concepts of Electrical circuit elements
3. Analyse simple analog and digital electronic circuits.
4. Analyse simple electrical and electronic circuits for a given application.

Unit:1	CIRCUIT ELEMENTS AND ENERGY SOURCES	6 Hours
Circuit Elements, Series and Parallel Combination of Resistances, Inductance and Capacitances, Energy Sources, Source Transformation, Sources with Periodic Waveforms, A.C. in Inductance and Capacitance, Star-Delta Connection **(Contemporary Issues related to Topic)**		
Unit:2	**TRANSFORMER AND MOTORS**	**6 Hours**
Introduction to Transformer, Construction, Working principle, Types of transformers, Introduction to DC Motor , Working Principle of DC Motor , Types of Motors. **(Contemporary Issues related to Topic)**		
Unit:3	**DIODE AND TRANSISTOR**	**7 Hours**
Introduction to Semiconductor, P-N junction diodes, Biasing & Characteristics of diodes. Diode Circuits - Half wave rectifier, full wave rectifier, bridge rectifier. Introduction to BJT- NPN and PNP, biasing, Modes of operation. **(Contemporary Issues related to Topic)**		
Unit:4	**NUMBER SYSTEM AND CODES**	**6 Hours**
Introduction, Number System, Binary Number System, Signed Binary Numbers, Binary Arithmetic, 1's and 2's Complement Arithmetic, Octal Number System, Hexadecimal Number System, Codes- BCD code and Gray Code , BCD arithmetic **(Contemporary Issues related to Topic)**		
Unit:5	**DIGITAL PRINCIPLES**	**7 Hours**
Logic Gates, Boolean Laws & Algebras, Sum of Product & Product of Sum, k-Map (up to 3-variable). **(Contemporary Issues related to Topic)**		
Unit :6	**LOGIC DESIGN**	**7 Hours**
Combinational Logic Design - Adder, Subtractor, Multiplexer and Demultiplexer , Sequential Logic Circuits – Flip-flops, Registers and Introduction to counters. **(Contemporary Issues related to Topic)**		
Total Lecture Hours		**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks	
1	Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford Higher Education, First Edition 2005
2	Electronics Devices and circuits, Millman Jacob, McGraw Hill Education, Fourth Edition (2015)
3	"Modern Digital Electronics" by R. P. Jain, 4th Edition, McGraw Hill Education Private Limited, published in 2015

Reference Books	
1	Fundamentals of Digital Circuits. Kumar A. Anand, PHI Learning Pvt. Ltd., 18-Jul-2016
2	Basic Electrical Engg - VK Mehta , S Chand & Company (1 December 2006).

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

II SEMESTER

22CSE208: Programming for Problem Solving

Course Outcomes :
On completion of this course, the student will be able to
1) Describe the basics of computer system components and operation, basics of algorithms and flowcharts (L2) 2) Develop programs using conditional statements and loops user defined functions, and pointers.(L3) 3) Analyze single and multi-dimensional arrays as a data structure and its use in problem solving.(L4) 4) Describe the basics of Strings, Structures, Unions, and File handling and its use for problem solving.(L2)

Unit I: Computer System Basics:	**(6 Hrs.)**
Introduction to components of a computer system (disks, memory, processor), how program is executed, understanding of concepts such as operating system, compilers, source and object programs, etc. Introduction to algorithms and flowcharts. **Basic building blocks of C:** Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, precedence of operators **(Contemporary Issues related to Topic)**	
Unit II: Basics of C Programming	**(6 Hrs.)**
Expressions, sizeof() operator, constants, typedef statement, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts), Introduction to library functions, writing straight line programs.Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement. **(Contemporary Issues related to Topic)**	
Unit III: Loop Structures:	**(6 Hrs.)**
While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, bitwise operators, real life programming examples. **(Contemporary Issues related to Topic)**	
Unit IV: Modular programming:	**(7 Hrs.)**
Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value , C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, Concepts of a pointer, call by reference, types of programming errors, real life programming examples **(Contemporary Issues related to Topic)**	
Unit V: Arrays:	**(7 Hrs.)**
One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting techniques – Bubble sort , and selection sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. Strings: string representation and string handling functions, real life programming examples **(Contemporary Issues related to Topic)**	
Unit VI: Structure and Union, Concepts of files:	**(7 Hrs.)**
Introduction to structure and union, types of files, file opening in various modes, file opening and closing, fseek(), reading and writing text files, concept of pre-processor directives and macros, command line arguments, real life programming examples **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks:	
1.	Mastering C, K.R.Venugopal& S.R. Prasad, TMH,2007.
2.	Programming in ANSI C, E. Balaguruswamy, Mc Graw Hill Education
3.	The C Programming Language., J.B.W.Kernighan&D.M.Ritchie, Prentice Hall

Reference Books:	
1.	Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Education
2.	Programming with C, Byron Gottfried, Schaum;s Outline Series
3.	How to solve it by computers, R. G. Dromey, Prentice Hall India

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/27.c.pdf
2	http://103.152.199.179/YCCE/DTEL%20Material/7.Information%20Technology/DTEL%20PPTs/11.ITCP_E_SSG.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/106/104/106104128/

II SEMESTER

22CSE209: Lab: Programming for Problem Solving

Course Outcomes
Upon successful completion of the course the students will be able to
1) Describe the basics of computer system components and operation, basics of algorithms and flowcharts (L2)
2) Develop programs using conditional statements and loops user defined functions, and pointers.(L3)
3) Analyze single and multi-dimensional arrays as a data structure and its use in problem solving.(L4)
4) Describe the basics of Strings, Structures, Unions, and File handling and its use for problem solving.(L2)

SN	**Experiments based on**
1(A)	Introduction to Linux Operating system & it's different commands.
1(B)	Introduction to Vi editor, Compilation and Execution of a program in Linux.
2	Practical based on Arithmetic and Conditional operators.
3(A)	Practical based on Decision Control statements
3(B)	Practical based on Case Control statements (switch)
4	Practical based on Looping Statements. (for/while/do-while)
5	Practical based on Functions and Recursion.
6(A)	Practical based on 1-D Array. (Searching)
6(B)	Practical based on 1-D Array. (Sorting)
7	Practical based on 2-D Array.
8	Practical based on Strings
9	Practical based on Structures.
10	Practical based on Files.

II SEMESTER
Audit Course
GE2131: Universal Human Value

Course Outcomes
Upon successful completion of the course the students will be able to
1.Experiential validation through the way to verify right or wrong.
2. Practice living in harmony with natural acceptance.
3. Realize the importance of relationships**.**
4. Recognize the importance of sustainable co-existence in existence.

Unit I: Course Introduction Need, Basic Guidelines, Content and Process for Value Education	**(4 Hrs.)**
Understanding the need, basic guidelines, content and process for Value Education Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations	
Unit II: Understanding Harmony in the Human Being - Harmony in Myself!	**(4 Hrs.)**
Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I'	
Unit III: Understanding Harmony in the Family	**(4 Hrs.)**
Understanding Harmony in the family – the basic unit of human interaction Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship Understanding the meaning of Vishwas; Difference between intention and competence Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship	

Unit IV: Understanding Harmony in the Society-	**(4 Hrs.)**
Difference between intention and competence, Understanding the meaning of Samman, Difference between respect and ,differentiation; the other salient values in relationship ,Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sahasttva as comprehensive Human Goals,Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhauma Vyavastha)- from family to world family! ,Practice Exercises and Case Studies will be taken up in Practice Sessions	
Unit V: Understanding Harmony in the Nature -	**(4Hrs)**
Whole existence as Co-existence, Understanding the harmony in the Nature Interconnectedness and mut Practice Exercises and Case Studies will be taken up in the Practice Sessions.ual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Practice Exercises and Case Studies will be taken up in the Practice Sessions.	
Unit VI :Understanding Harmony in the Existence -	**(4Hrs)**
Understanding Existence as Coexistence (Sah-astitva) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence ,Practice Exercises and Case Studies will be taken up in the Practice Sessions.	
Total Lecture	**24 Hours**

Textbooks:	
1.	**The primary resource material for teaching this course consists of text book** A foundation course in Human Values and professional Ethics, Excel books, 1st Edition 2011, R.R Gaur, R Sangal, G P Bagaria

Reference Books:	
1.	**The teacher's manual** A foundation course in Human Values and professional Ethics, Excel books,1st Edition 2011, R.R Gaur, R Sangal, G P Bagaria

II SEMESTER

Audit Course

MLC2122: YCAP2 -Functional English

MLC2122 YCAP-II	**No of Evaluations**	**Result of successful completion of YCAP II shall be calculated based on the basis of evaluations.** **To pass the exam a students must score 50% marks**
Evaluation Scheme	EVAL-I	
	100 marks	

Objective	Objective
The aim of this course is to get the students to a common level in spoken English. The majority of the target group is expected to know English as a foreign/official language. Thus the objective of the course is to make the students comfortable in using it as a spoken language when the situation demands	Students will heighten their awareness of correct usage of English grammar in writing and speaking.

Syllabus Subject: Functional English – 2nd Sem , No. of hours - 20

Unit No.	Topic	Duration
1	Introduction to Functional English - What is FE? And Areas of application. Basic Interactive sentences - Greetings & Replies, Asking for information, Telling people what you do, Asking somebody's opinion, Giving your opinion, Saying someone is correct, Saying that someone is wrong, Apologizing, Praising someone's work, Saying goodbye	2 hours
2	Introduction & Basics of Common Expressions – Offer, Request, Gratitude, Apology Modal Verbs - Words used often : Can- could, Will – would, Shall – should, Ought to-Must, May-might	2 hours
	Practice exercises, Practice Conversations, Script Activity	1.5 Hours
	Quiz on the above Topics, Exercises for Evaluation	0.5 Hours

Unit No.	Topic	Duration
3	Topic: Internet & Social Media Communication Introduction & Basics to Social Networking, Texting & Instant messaging, Blogs & Discussion Board- discussion with examples, Ethics of Social media & communication	3 Hours
	Topic: Introduction to Creative Ads Why Ads, Whats in it for me?, Characteristics of ads, Assignment	
4	Topic: Tenses -1 Introduction & Basics, Simple Tense (Past, Present, Future), Continuous Tense (Past, Present, Future) – discussion with examples	4 Hours
	Assignment Presentation on Mad Ads, Quiz on Tenses and Social Media-Internet Communication	

Unit No.	Topic	Duration
5	Topic: Tenses -2 Introduction & Basics, Perfect Tense (Past, Present, Future), Perfect Continuous Tense (Past, Present, Future) – discussion with examples	3.5 Hours
	Topic: Introduction to Movie Magic Learn English with films, Film Vocabulary, Describing a film, Types of Films,	
6	Topic: Written Communciation Introduction & Basics of Writing, Five methods of communication, Mind your grammar, Commonly confusing words Letters – Format, Parts of a business letter, When does communication fail?, Things to remember, Positive language not negative language, Active voice not passive voice Effective emailing -How to make an effective e-mail, Few common e-mail habits that cause problems, Parts of an e-mail, Some other important aspects	3.5 Hours
	Assessment – Letter and Email Writing, Tenses - Quiz	

Reference Books:	
1.	Soft Skills and Professional Communication, Francis Peters SJ, Mcgraw Hill Education
2.	Bringing out the best in People, Aubrey Daniels, Mcgraw Hill

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/channel/UCLsI5-B3rIr27hmKqE8hi4w
2.	https://www.youtube.com/channel/UC1Y1I4shF84scQ4HBThahcg

			July 2022	1.00	Applicable for AY 2022-23 Onwards
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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

3rd Semester

(Department of Computer Science and Engineering

B.Tech in Computer Science and Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Computer Science & Engineering)

B. Tech in Computer Science & Engineering)

SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	PC	CSE/CSE	22CSE301	Discrete Mathematics & Graph Therory	**T**	3	1	0	4	4	30	20	50	3 Hrs
2	3	PC	CSE/CSE	22CSE302	Computer Architecture and Organisation	**T**	3	0	0	3	3	30	20	50	3 Hrs
3	3	PC	CSE/CSE	22CSE303	Object Oriented Programming	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	3	PC	CSE/CSE	22CSE304	Lab: Object Oriented Programming	**P**	0	0	2	2	1		60	40	
5	3	PC	CSE/CSE	22CSE305	Data Structures I	**T**	3	0	0	3	3	30	20	50	3 Hrs
6	3	PC	CSE/CSE	22CSE306	Lab: Data Structures I	**P**	0	0	2	2	1		60	40	
7	3	PC	CSE/CSE	22CSE307	Web Technology	**T**	3	0	0	3	3	30	20	50	3 Hrs
8	3	PC	CSE/CSE	22CSE308	Lab: Web Technology	**P**	0	0	2	2	1		60	40	
						TOTAL	**15**	**1**	**6**	**22**	**19**				
List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC2123	YCCE Communication Aptitude Preparation (YCAP3)	**A**	3	0	0	3	0				
2	3	BSE	CSE	AU115	Latex	**A**	2	0	0	2	0				
FOURTH SEMESTER															
1	4	BS	GE/GE	22CSE401	Linear Algebra	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	4	HS	GE/HUM	22CSE402	Fundamentals of Management and Economics	T	3	0	0	3	3	30	20	50	3 Hrs
3	4	PC	CSE/CSE	22CSE403	Theory of Computation	T	3	1	0	4	4	30	20	50	3 Hrs
4	4	PC	CSE/CSE	22CSE404	Operating Systems	**T**	3	0	0	3	3	30	20	50	3 Hrs
5	4	PC	CSE/CSE	22CSE405	Lab:Operating Systems	**P**	0	0	2	2	1		60	40	
6	4	PC	CSE/CSE	22CSE406	Data Structures II	**T**	3	0	0	3	3	30	20	50	3 Hrs
7	4	PC	CSE/CSE	22CSE407	Lab: Data Structures II	**P**	0	0	2	2	1		60	40	
8	4	PC	CSE/CSE	22CSE408	Introduction to Data Analysis	**T**	3	0	0	3	3	30	20	50	3 Hrs
9	4	PC	CSE/CSE	22CSE409	Lab: Introduction to Data Analysis	**P**	0	0	2	2	1		60	40	
10	4	PC	CV/CSE	22CSE410	Environmental Sustainability, Pollution and Management	**T**	3	0	0	3	3	30	20	50	3 Hrs
						TOTAL	**21**	**1**	**6**	**28**	**25**				
List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	YCCE Communication Aptitude Prepartion (YCAP 4)	**A**	3	0	0	3	0				
2	4	BSE	CSE	MLC116	Ethics in IT	**A**	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	**1.00**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2022-23 Onwards

III Semester

22CSE301–Discrete Mathematics & Graph Theory

Course Outcome
With the completion of this syllabus students will be familiar with mathematical , logic and set theory and their methods of solutions and graph theory, group theory with simple applications

UNIT I: Mathematical Logic and Set Theory	6
Statement and Notation: Negation, Conjunction, Disjunction, Tautologies, Truth Tables, Basic Concepts of Set Theory, Inclusion & equality of set, Power Set, Ordered Pairs and n-tuples, Operations on Sets, Partial order, Equivalence relations, mathematical induction. Propositions, Predicate, logic, formal mathematical systems. **(Contemporary Issues related to Topic)**	
UNIT II: Relations and Functions	6
Relation and Ordering, Properties of Binary in a set, Relation Matrix and Graphs, Partition and Covering of a set, Equivalence relation, Partial ordering, Partially Ordered sets, Function (Definition and Introduction), Composition of functions, Inverse Functions, Characteristics function of a set. **(Contemporary Issues related to Topic)**	
UNIT III: Group Theory	7
Groups (Definitions and Examples) Subgroups and Homomorphism, Cosets and Lagrange's theorem, Normal subgroups, Codes and Group Codes. Semi groups and Monoids (definitions and examples). Homomorphism of semi groups and monoids, Sub semi groups and monoids. **(Contemporary Issues related to Topic)**	
UNIT IV: Rings (Definitions and Examples)	7
Integral domain, ring homomorphism, ideas of ring polynomial, Field, Lattice. **(Contemporary Issues related to Topic)**	
UNIT V: Fuzzy Sets and Fuzzy Logic	6
Fuzzy sets and systems, crisp sets, overview of fuzzy logic and classical logic, fuzzy compliment, fuzzy union, fuzzy intersection and combinations of these fuzzy sets operations crisp and fuzzy relations. **(Contemporary Issues related to Topic)**	
UNIT VI: Graph Theory	7
Basic concepts of graph theory, Basic definitions, Paths and circuits, Reach ability and connectedness, Matrix Representation of graphs, Tree and their representation and operations, Rooted trees, Path lengths in rooted trees, Multi graphs and weighted graphs, and graph isomorphism, shortest paths in weighted graphs, Hypergraphs, transitive closure, Spanning trees, Kruskal's algorithm, Prim's algorithm. **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

Text Books	
1.	Discrete Mathematics Structure with application to Computer Science, 23rd re-print, 2005, J. P. Tremblay & R. Manohar ,Tata McGraw-Hills Publication Company Limited, New Delhi.
2.	Advanced Engineering Mathematics, 8th revised edition, 2007, H.K. Dass, by.S.Chand and Company Limited Delhi.
3.	Fuzy Logic with Engineering Applications, T. J. Ross, John Wiley &Sons, Ltd. ISBN: 978-81-265-3126-4

Reference Books	
1.	Discrete Mathematics ,2nd edition, Lipschutz, by Schaums's Outline series, Tata McGraw-Hills Publication Company Limited, New Delhi.
2.	Discrete Mathematical structures ,3rd edition,2001, Bernard Kolman ,Robert C.Busby,Sharon Ross,Prentice Hall of India, New Delhi.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc20_cs82/preview
2.	https://onlinecourses.nptel.ac.in/noc20_cs37/preview

III Semester

22CSE302– Computer Architecture and Organization

Course Outcome
On completion of the course, student will be able to 1. Understand and demonstrate the basic computer architecture concepts related to the working of processors, memory systems, and input output systems. 2. Differentiate among various addressing modes and develop ability to write assembly language programs. 3. Comprehend information representation in computer and perform arithmetic operations using algorithms suitable for hardware implementation. 4. explain and compare techniques for improving the performance of a computer system components like CPU, main memory, input/output system and pipelining.

UNIT I: Basic Structure of Computer Hardware and Software	6
Functional Units, Basic Operational Concepts, Bus Structures, Software, processor clock and basic performance evaluation, number systems, and arithmetic operations, Memory Locations, addressing and encoding of information, instruction and instruction sequencing, branching, condition codes, zero, one and two address instructions, RISC vs CISC computers. **(Contemporary Issues related to Topic)**	
UNIT II: Addressing modes	7
Addressing modes, Stacks, and Subroutines, Processing Unit, Some fundamental concepts, Execution of a complete instruction, One, two, and three bus organization, Sequencing of control Signals, Assembly language programming. **(Contemporary Issues related to Topic)**	
UNIT III: Processor Design, hardwired control, Microprogrammed Control	7
Microinstructions, Grouping of control signals, Microprogram sequencing, Micro Instructions with next Address field, prefetching microinstructions. **(Contemporary Issues related to Topic)**	
UNIT IV: Arithmetic (Fixed and Floating point)	7
Number Representation, Addition of Positive numbers, Logic Design for fast adders, Addition and Subtraction, Arithmetic and Branching conditions, Multiplications of positive numbers, Signed- Operand multiplication, Booth's Algorithm , fast Multiplication, Integer Division algorithms, Floating point numbers and operations, IEEE floating point standards**(Contemporary Issues related to Topic)**	
UNIT V: The Main Memory & Cache Memory	6
The Main Memory: Basic concepts, Memory Hierarchy, semiconductor RAM memories, Static RAM vs Dynamic RAM, semiconductor ROM memories, DDRAM, Memory system considerations, Speed , Size and Cost. Cache Memory: cache memory mapping techniques, secondary storage devices, HDD vs SSD, Performance Considerations. **(Contemporary Issues related to Topic)**	

UNIT VI: Computer Peripherals, I/O modules and I/O Devices, I/O transfers	6
Computer Peripherals, I/O modules and I/O Devices, I/O transfers, Program controlled, memory mapped and I/o mapped I/O, Interrupt handling and Interrupt driven I/O, DMA. Pipelining: Basic Concepts, Data Hazards and Instruction Hazards. Introduction to GPU and GPU Computing. **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

Text Books	
1	Computer Organization , 5th edition ,V. Carl Hamacher, Zvonko Vranesic, McGraw Hill Publications.
2	Computer Architecture: A Quantitative approach, 6th edition, John L. Hennessy, David A. Patterson, MK series in computer architecture and design

Reference Books	
1	Computer Organization and Architecture , 6th edition Willaiam Staling, Pearson Education
2	Computer Architecture & Organization , 3rd edition ,J.P. Hayes ,McGraw Hill Publications

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	file://172.16.1.10/cse/Ebooks/COmputer%20Organization%20Zaky%205th%20.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Technology/53-CAO_V.%20Carl%20Hamacher-GKY.pdf
3	

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/106105163

III Semester
22CSE303– Object Oriented Programming

Course Outcome
After completion of the course students will be able to: 1. Demonstrate the understanding of Object oriented concepts. 2. Analyse problem statement and identify appropriate objects and methods for problem solving. 3. Make use of predefined classes and frameworks for reducing coding efforts and improving performance. 4. Apply features of object oriented programming to write programs to solve real world problems.

UNIT I: Introduction to object oriented programming paradigm	7
Introduction to object oriented programming paradigm, procedure oriented programming vs OOP, features of OOP, benefits of OOP, defining class, instantiating a class. Declaring Classes and objects, Creating Classes and objects, methods, argument passing, Recursion, this keyword, constructors ,Visibility control **(Contemporary Issues related to Topic)**	
UNIT II: Other Class Modifiers	7
static, final, Abstract, Method overloading, Super keyword, Overriding (polymorphism), nested inner classes, packages (encapsulation), Interfaces (multiple Inheritances) **(Contemporary Issues related to Topic)**	
UNIT III: Arrays	7
Arrays, Strings Arrays, One Dimensional Arrays, Two Dimensional Arrays, variable size arrays, Strings and String Buffer classes, Wrapper Classes **(Contemporary Issues related to Topic)**	
UNIT IV: Exception handling mechanism	6
Fundamentals exception types, uncaught exception, try-catch Block, displaying description of an exception, multiple catch clauses, nested try-catch statements, throw, throws, finally, built in exceptions, creating own exception subclasses. Introduction to multithreading, life cycle of Thread, Runnable interface and Thread class. **(Contemporary Issues related to Topic)**	
UNIT V: Collection Vector and Framework	6
Introduction to collection framework, Vectors, Array List, Linked list, Hashset, Treeset, Hashmap, Accessing a collection via Iterator, Comparators. **(Contemporary Issues related to Topic)**	

UNIT VI: IO Steam	6
Introduction to stream classes, use of stream classes,I/O stream, bytes stream, character stream, predefined stream, reading console input, reading character, reading string, writing console output, the print write class, reading & writing files, transient and volatile modifiers, Introduction to AWT, Working with Windows, Graphics and Text, Introduction to Swings. **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

Text Books	
1.	Java Complete Reference, 7th, Herbert Schildt, McGraw-Hill

Reference Books	
1.	Thinking in Java, 4th, Bruce Eckel, Prentice Hall
2.	Programming with Java, E. Balagurusamy, TATA McGraw-Hill

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/JAVA_Complete_Reference_Fifth_Edition.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/thinking_in_java_4th_edition.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc22_cs47/preview

III Semester
22CSE304– Lab.: Object Oriented Programming

List of Experiment

Sr. No.	Experiments based on
1	Implement the concept of Class and its data members and member functions in Java
2	Implement the concept of method overloading in Java
3	Implement the concept of class constructor and its type in Java
4	Implement the concept of Abstraction in Java
5	Implement the concept of all types of inheritance in Java
6	Implement the concept of arrays in Java
7	Implement the concept of run time polymorphism in Java
8	Implement the concept of Files in Java
9	Implement the concept of exception in Java
10	Implement the concept of swing to prepare a web application in Java

III Semester

22CSE305– Data Structures I

Course Outcome
1. To review programming concepts and understand fundamental concepts in data structures
2. To apply and analyse algorithms for performing operations on data structures
3. To Evaluate the performance of data structures and its applications.
4. Simulate the algorithms for performing operations on data structures.

UNIT I:	6
Types and operations, Iterative constructs and loop invariants, Quantifiers and loops, Structured programming and modular design, Illustrative examples, Scope rules, parameter passing mechanisms, recursion, program stack and function invocations including recursion **(Contemporary Issues related to Topic)**	
UNIT II:	7
Overview of arrays and array based algorithms - searching and sorting: mergesort, quick sort, Sparse matrices. **(Contemporary Issues related to Topic)**	
UNIT III:	7
Structures (Records) and array of structures (records). Database implementation using array of records. Dynamic memory allocation and deallocation. Dynamically allocated single and multi-dimensional arrays, polynomial representation. **(Contemporary Issues related to Topic)**	
UNIT IV:	6
Concept of an Abstract Data Type (ADT), Lists as dynamic structures, operations on lists, implementation of linked list using arrays and its operations. Introduction to linked list implementation using self-referential-structures/pointers. **(Contemporary Issues related to Topic)**	
UNIT V:	7
Stack, Queues and its operations. Implementation of stacks and queues using both array-based and pointer-based structures. Applications of stacks and queues. **(Contemporary Issues related to Topic)**	
UNIT VI:	6
File organisation, examples of using file, file access methods , Hashing and collision resolution techniques **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

TEXT BOOKS	
1.	Data Structures and Program Design in C, Robert Kruse, G. L. Tondo andB. Leung ,PHI-EEE
2.	Fundamentals of Data Structures in C, Ellis Horowitz, Satraj Sahni and Susan, Anderson-Freed, W. H. Freeman and Company.
3.	How to Solve it by Computer, R. G. Dromey, Pearson Education

Reference Books	
1.	Data Structures with C, Seymour Lipschutz, TMH

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/Book%20Fundamentals%20of%20Data%20Structure%20(1982)%20by%20Ellis%20Horowitz%20and%20Sartaj%20Sahni.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/Data%20Structures%20Succinctly%20Part%201.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/106102064
2.	https://archive.nptel.ac.in/courses/106/106/106106127/

III Semester

22CSE306– Lab.: Data Structures I

List of Experiment

Sr. No.	Experiments based on
1	C Programs for using various loop constructs
2	C Program for generating list
3	C Programs for illustrating recursion
4	C Programs for allocating memory dynamically for a single dimensional array and sorting it .
5	C Program for allocating memory dynamically for two-dimensional array , printing it
6	C Program to create a link list and print it.
7	C Program/s to create stack using array and link list
8	C Program/s to create Queue using array and link list
9	C Program to create file for storing , perform file operations
10	C Program on hashing

III Semester

22CSE307– Web Technology

Course Outcome
Upon successful completion of the course the students will be able to 1. Design Web pages using HTML5 2. Build an interactive website with CSS3 3. Develop basic programming skills using JavaScript 4. Create XML documents and Schemas.

UNIT I: Introduction to internet	6
Overview of Internet, Intranet, WWW, Internet Protocols (HTTP, FTP, SMTP), Email, broadband. **(Contemporary Issues related to Topic)**	
UNIT II: Introduction to HTML5	7
Web server, Web Client/Browser, Structure of an HTML Program, Basic HTML Tags(Headings, Paragraph, Division, Text formatting, Image, Anchors), HTML Lists (Ordered Lists, Unordered Lists, Description Lists), HTML Attributes, HTML Links (Href Attribute, Target Attribute). **(Contemporary Issues related to Topic)**	
UNIT III: Table handling in HTML and Creating Forms	7
Table handling in HTML: width and border attribute, CELLPADDING attribute, CELLSPACING attribute, COLSPAN and ROWSPAN attributes, background color attribute, HTML Forms: Elements to Capturing Form Data, Properties of Form Elements, HTML Layout Elements(Semantic Elements), HTML style attribute, HTML class and id attribute. **(Contemporary Issues related to Topic)**	
UNIT IV: Cascading Style Sheets (CSS3)	6
Introduction to CSS, Differences between CSS3 and earlier CSS specifications, CSS Syntax, CSS selectors, Inserting CSS: Inline, Internal, External, CSS properties: Background, Text, Font, Border, Margin, Padding, List, Dimension, and Classification. **(Contemporary Issues related to Topic)**	
UNIT V: Java Script	7
Introduction to Java Script, Functions of Javascript, Variables and Data Types, Operators, Loops and control statement: if Statement, if...else Statement, else if Statement, JavaScript Switch Statement, JavaScript Functions, JavaScript Loops: for loop, while loop, do...while loop, Dialog Boxes, JavaScript Events. **(Contemporary Issues related to Topic)**	

UNIT VI: Introduction to XML	6
What is XML?, Features of XML, XML Syntax and Structure Rules(Start tags, End tags, Empty elements, XML tag attributes),XML Document Type Declaration(DTD, Internal DTD's, External DTD's. **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

Text Books	
1.	Web Technologies Black Book: HTML, JavaScript, PHP, Java, JSP, XML and AJAX, 1st Edition, Dreamtech Press

Reference Books	
1.	HTML & CSS: The Complete Reference, Fifth Edition, Thomas A. Powell, The McGraw-Hill Companies, Inc.
2.	Web Technologies, Ivan Bayross, BPB Publication

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/HTML.._the_complete_reference.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/JavaScript%20Programmer's%20Reference.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.swayam2.ac.in/nou20_cs05/preview

III Semester
22CSE308– Lab.: Web Technology

List of Experiment

Sr. No.	Experiments based on
1	Implement basic HTML Tags. Write a HTML code to illustrate the usage of the following - Ordered Lists - Unordered Lists - Description Lists
2	Write a HTML code to display data in tabular form (row* column) using HTML table tags
	Write a HTML code to create a home page having three links: About us, Services and Contact us create separate web pages for the three links.
3	Create web forms by using form tags in HTML. (Use any example)
4	Develop and demonstrate the usage of inline, internal and external style sheet using CSS3.
5	Write JavaScript to validate the following fields of the Registration page. 1. First Name (Name should contains alphabets and the length should not be less than 6 characters). 2. Password (Password should not be less than 6 characters length). 3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com) 4. Mobile Number (Phone number should contain 10 digits only). 5. Last Name and Address (should not be Empty).
6	Introduction to XML program to demonstrate the use of External and Internal DTD
7	Create a web page which show the use of Canvas & SVG.
8	Develop a small web application using suitable web service framework and implement it.

III Semester
Audit Course
MLC2123 - YCCE Communication Aptitude Preparation (YCAP3)

III Semester

Audit Course

MLC115 : Latex

Course Outcomes
After studying this course the student will be able to: i) Create and typeset a LaTeX document. ii) Typeset a mathematical document using LaTex. iii) Learn about pictures and graphics in LaTex. iv) Create beamer presentations. v) Create web page using HTML.

Unit I: Getting Started with LaTeX	**6**
Introduction to TeX and LaTeX, Typesetting a simple document, Adding basic information to a document, Environments, Footnotes, Sectioning and displayed material.	
Unit II: LaTeX /Document Structure	**6**
LaTeX /Document Structure, Document classes, Packages, The document environment, Book structure, References	
Unit III: Mathematical Typesetting with LaTeX	**6**
Accents and symbols, Mathematical typesetting (elementary and advanced): Subscript/ Superscript, Fractions, Roots, Ellipsis, Mathematical Symbols, Arrays, Delimiters, Multiline formulas, Spacing and changing style in math mode.	
Unit IV: Graphics and Beamer Presentation in LaTeX	**6**
Graphics in LaTeX, Simple pictures using PSTricks, Plotting of functions, Beamer presentation.	
Total Lectures	**24 Hrs**

Text Books:	
1.	A Student's Guide to the Study, Practice, and Tools of Modern Mathematics, Bindner, Donald & Erickson, Martin CRC Press, Taylor & Francis Group
2	LaTeX: A Document Preparation System, User's Guide and Reference Manual, Lamport, Leslie, Pearson Education

Reference Book:	
1.	LaTeX and Friends, Dongen, M. R. C. van, Springer-Verlag

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.swayam2.ac.in/aic20_sp17/preview

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

4th Semester

(Department of Computer Science and Engineering

B.Tech in Computer Science and Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Computer Science & Engineering)

B. Tech in Computer Science & Engineering)

SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	PC	CSE/CSE	22CSE301	Discrete Mathematics & Graph Therory	**T**	3	1	0	4	4	30	20	50	3 Hrs
2	3	PC	CSE/CSE	22CSE302	Computer Architecture and Organisation	**T**	3	0	0	3	3	30	20	50	3 Hrs
3	3	PC	CSE/CSE	22CSE303	Object Oriented Programming	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	3	PC	CSE/CSE	22CSE304	Lab: Object Oriented Programming	**P**	0	0	2	2	1		60	40	
5	3	PC	CSE/CSE	22CSE305	Data Structures I	**T**	3	0	0	3	3	30	20	50	3 Hrs
6	3	PC	CSE/CSE	22CSE306	Lab: Data Structures I	**P**	0	0	2	2	1		60	40	
7	3	PC	CSE/CSE	22CSE307	Web Technology	**T**	3	0	0	3	3	30	20	50	3 Hrs
8	3	PC	CSE/CSE	22CSE308	Lab: Web Technology	**P**	0	0	2	2	1		60	40	
						TOTAL	**15**	**1**	**6**	**22**	**19**				
List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC2123	YCCE Communication Aptitude Preparation (YCAP3)	**A**	3	0	0	3	0				
2	3	BSE	CSE	AU115	Latex	**A**	2	0	0	2	0				
FOURTH SEMESTER															
1	4	BS	GE/GE	22CSE401	Linear Algebra	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	4	HS	GE/HUM	22CSE402	Fundamentals of Management and Economics	T	3	0	0	3	3	30	20	50	3 Hrs
3	4	PC	CSE/CSE	22CSE403	Theory of Computation	T	3	1	0	4	4	30	20	50	3 Hrs
4	4	PC	CSE/CSE	22CSE404	Operating Systems	**T**	3	0	0	3	3	30	20	50	3 Hrs
5	4	PC	CSE/CSE	22CSE405	Lab:Operating Systems	**P**	0	0	2	2	1		60	40	
6	4	PC	CSE/CSE	22CSE406	Data Structures II	**T**	3	0	0	3	3	30	20	50	3 Hrs
7	4	PC	CSE/CSE	22CSE407	Lab: Data Structures II	**P**	0	0	2	2	1		60	40	
8	4	PC	CSE/CSE	22CSE408	Introduction to Data Analysis	**T**	3	0	0	3	3	30	20	50	3 Hrs
9	4	PC	CSE/CSE	22CSE409	Lab: Introduction to Data Analysis	**P**	0	0	2	2	1		60	40	
10	4	PC	CV/CSE	22CSE410	Environmental Sustainability, Pollution and Management	**T**	3	0	0	3	3	30	20	50	3 Hrs
						TOTAL	**21**	**1**	**6**	**28**	**25**				
List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	YCCE Communication Aptitude Prepartion (YCAP 4)	**A**	3	0	0	3	0				
2	4	BSE	CSE	MLC116	Ethics in IT	**A**	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	**1.00**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2022-23 Onwards

IV Semester

22CSE401– Linear Algebra

Course Outcome
Upon successful completion of the course the students will be able to 1. Solve systems of linear equations using rank of matrix. 2. Determine eigen values and eigen vectors and solve eigen value problems. 3. Explain the concepts of vector space and subspace, span and basis. 4. Apply principles of matrix algebra to linear transformations and inner product.

UNIT I: Vector Space	6
Vector Space, Subspace, Sum of Sub space, linear combination, Linear Span and basis, Spanning sets, Generators. **(Contemporary Issues related to Topic)**	
UNIT II: Linear Transformation	6
Linear transformation, Ranges and Kernel (null space) of linear transformation, Inverse of linear transformation, Algebra of linear transformation, Singular and non-singular linear transformation. **(Contemporary Issues related to Topic)**	
UNIT III: Matrix Algebra	7
Matrix Representation of linear transform, composition of Linear Transform and Matrix Multiplication, Matrix associated with linear Map, linear map associated with Matrix, Inevitability and Isomorphism's, the change of coordinate matrix. **(Contemporary Issues related to Topic)**	
UNIT IV: Elementary matrix operations	7
Matrix Representation of linear transform, composition of Linear Transform and Matrix Multiplication, Matrix associated with linear Map, linear map associated with Matrix, Inevitability and Isomorphism's, the change of coordinate matrix. **(Contemporary Issues related to Topic)**	
UNIT V: Diagonalization of matrix	7
Eigen Values and Eigen vectors, Linear dependence and independence of Eigen Vectors, Orthogonal Eigen vector, Diagonalization of matrix, Cayley-Hamilton Theorem and Sylvester's Theorem. **(Contemporary Issues related to Topic)**	
UNIT VI: Inner product Spaces	6
Inner product space and Norms, orthogonal vector, the Gram Schamidt orthogonalization Process, orthogonal compliment, Adjoint of Linear operator, Normal and self-adjoint operator, Unitary and orthogonal operator, Bilinear and Quadratic form. **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1.	Advance Engineering Mathematics, 9th Edition (September 2009), Kreyszig Wiley
2.	Higher Engineering Mathematics, 40th edition, (2010), B.S. Grewal, Khanna Publishers (2006)
3.	Advanced Engineering Mathematics, 8th revised edition, 2007, H.K. Dass, S.Chand and Company Limited
4.	Linear Algebra, Hoffman and Kunze , prentice Hall of India, New Delhi
5.	Linear Algebra and its Applications, GlbertStrang, Nelson Engineering (2007)

Reference Books	
1.	Mathematics for Engineers, 19th edition, (2007), Chandrika Prasad, JohnWiley & Sons
2.	Applied Mathematics for Engineers, 3rd edition, (1970), L.A. Pipes and Harville, McGraw Hill
3.	Matrix and Linear Algebra, K.B.Datta, prentice Hall of India, New Delhi
4.	A text book of Engineering Mathematics, Reprint 2008, N.P. Bali and Manish Goyal, Laxmi Prakashan

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/111106051
2.	https://archive.nptel.ac.in/courses/111/104/111104137/
3.	https://archive.nptel.ac.in/courses/111/106/111106135/

IV Semester

22CSE402– Fundamentals of Economics and management

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explain the Functions of Management and identify tools and techniques of Marketing of goods and services 2. Analyze the role of Financial Accountancy and Management in the Organization 3. Develop perspective about economy based on logical reasoning and estimate the economic outcomes. 4. Interprets comparative advantage of resources.

UNIT I: Principles of Management	7
Evolution of Management Thought: Scientific and Administrative Theory of Management, Definition and Concept of Management, Functions of Management: Planning, Organizing, Directing, Coordinating and Controlling, Motivational Theories, Concept of Leadership **(Contemporary Issues related to Topic)**	
UNIT II: Marketing Management	7
Marketing Management - Definition & scope, Selling & Modern Concepts of Marketing, Market Research, Customer Behaviors, Product Launching, Sales Promotion, Pricing, Channels of Distribution, Advertising, Market Segmentation, Marketing Mix, Positioning, Targeting **(Contemporary Issues related to Topic)**	
UNIT III: Financial Accountancy and Management	7
Definition & Functions of Finance department, Sources of finance, Types of capital, Types of Taxes, Introduction of Accountancy and its rules, Preparation of Books of Account- Jounal, Posting of transaction into ledger and preparation of trial balance, Introduction of trading account, profit and loss account and balance sheet **(Contemporary Issues related to Topic)**	
UNIT IV: Introduction to Economics and engineering Economy	6
Economics and engineering economy, Utility analysis- Cardinal, ordinal, Law of diminishing marginal utility, Laws of demand and supply, elasticity of demand, its measurement and application. **(Contemporary Issues related to Topic)**	
UNIT V: Engineering Production and Costs	6
Factors of Production: Land, Labour, Capital, Enterprise and their peculiarities, Concepts and types of costs, Law of Variable proportions (Law of diminishing marginal returns) and Return to Scale (Increasing, constant and decreasing), Economies and diseconomies of scale. Inflation: Meaning, types, causes and consequences, measures to control inflation, Concepts of deflation and Stagflation. **(Contemporary Issues related to Topic)**	

UNIT VI: Market structures - equilibrium output and price	6
Forms of market structures: Perfect competition, monopolistic competition, oligopoly, duopoly and monopoly, Demand and revenue curves for firm and industry in various forms of market structure, Total, average and marginal revenue curves, equilibrium of firms and industries under various forms of market structures, Price discrimination. **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

Text Books	
1.	Principles of Management, 9th edition, Harold Koontz Ramchandra, Tata McGrow hills
2.	Marketing Management: Planning, Implementation and Control, 3rd Edition, Ramaswamy V.S. and Namakumari S, Macmillian, Tata McGraw Hill
3.	Financial Services, 19th Edition, Khan M Y, Tata McGraw Hill
4.	Modern Economics, 13th Edition, H. L. Ahuja, S. Chand Publisher
5.	Modern Economic Theory, 3rd Edition, K. K. Devett,S. Chand Publisher
6.	Principle of Economics, 7th edition,Mankiw N. Gregory, Thomson

Reference Books	
1.	Foundations of Financial Markets and Institutions,3rd Edition, Fabozzi, Pretice Hall
2.	Fundamentals of Financial Instruments, 2nd Edition, Parameshwaran, Wiley India
3.	Marketing Management, 3rd Edition, Rajan Saxena, Tata McGraw Hill
4.	Advance Economic Theory, 17th Edition, H. L. Ahuja, S. Chand Publisher
5.	International Trade,12th Edition, M. L. Zingan, Vindra Publication
6.	Macro Economics, 11th Edition, M. L. Zingan, Vindra Publication
7.	Monitory Economics,M. L. Zingan, Himalaya Publisher
8.	Economics of Development and Planning,12th Edition,S. K. Misra and V. K. Puri,Himalaya Publishing House

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/110/105/110105075/

IV Semester

222CSE403– Theory of Computation

Course Outcome
1. Apply basic properties of formal languages and to design finite automata for regular expression and Regular Grammar. 2. Construct context free grammar for various languages. 3. Solve various problems of push down automata for context free language 4. Design Turing Machines for given any computational problem.

UNIT I:	7
Alphabet, Symbols, Sets, Strings, Language, Operations, Relations, Design of Finite State Machines, Acceptance of strings and languages, Non Deterministic Finite Automation, Deterministic Finite Automation, Equivalence between NFA and DFA, NFA with ε-transition, Minimization of FA. **(Contemporary Issues related to Topic)**	
UNIT II:	7
Regular Regular sets, Regular expressions, Manipulation of regular expressions, Equivalence between RE and FA. Pumping Lemma, closure properties of regular sets, Regular grammars, Right linear and left linear regular grammars, inter-conversion between LLG & RLG, Equivalence between regular grammar and F.A., Inter-conversion between RE and RG. **(Contemporary Issues related to Topic)**	
UNIT III:	7
Context free grammar, Derivation trees (Syntax tree and Parse tree), Ambiguous Grammar, Context Free Language (CFL), Normal Form of grammar: Chomsky Normal form, Greibach normal form. **(Contemporary Issues related to Topic)**	
UNIT IV:	6
Push down automata, definition, and model, acceptance of CFL by empty Stack and by final state, equivalence CFL and PDA, Inter-conversion, Closure of properties of CFL, DPDA & NDPDA. **(Contemporary Issues related to Topic)**	
UNIT V:	6
Turing machine, Definition, Model of TM, Design of Turing Machine, Computable functions, Recursive enumerable language, Recursive Language, Properties of Recursive enumerable language, Church‟s hypothesis, Chomsky hierarchy of language, Linear bounded automata and context sensitive language, Universal Turing Machine **(Contemporary Issues related to Topic)**	
UNIT VI:	6
Un-decidability Problems related to Recursive enumerable language and Turing Machine, post correspondence problem. Recursive function Theory –Basis functions and operations on them. Bounded minimization preemptive μ recursive function unbounded minimization and recursive function **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1.	Introduction to Automata Theory, Languages, and computation,3rd Edition,Hopcroft J.E., Rajeev Motwani, Jeffrey D. Ullman, Pearson Education
2.	Introduction to languages and the Theory of Computation, 3rd Edition,John C.Martin, Mc Graw Hill

Reference Books	
1.	Introduction to the Theory of Computation,2nd Edition,Michael Sipser, GALE CENGAGE Learning
2.	Theory of Computation, 1st Edition, Dr. O. G. Kakde , Laxmi Publication

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/Introcuction%20to%20Theory%20of%20computation%20by%20Micheal%20Sipser%20Ist%20Ed..pdf

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/106104028
2.	https://onlinecourses.nptel.ac.in/noc23_cs31/preview

IV Semester
222CSE404– Operating Systems

Course Outcome
After undergoing this course student will be able to
1. Understand the fundamental concepts in Operating Systems (OS) and understand how various hardware features support OS functionality. 2. Explain various OS mechanisms and policies for managing system resources. 3. Analyse algorithms and techniques for managing various OS resources in a multiprogramming and other environments. 4. Evaluate the performance of algorithms for managing various OS resources.

UNIT I: Introduction to OS	5
Evolution of OS, basic hardware support necessary for modern operating systems, Layered Structural of OS, process concept, process state transitions , Services provided by OS, system calls, privileged instructions, Dual mode of operation, I/O bound and CPU bound processes, concept of multiprogramming and multiprocessing. **(Contemporary Issues related to Topic)**	
UNIT II: Process management	7
process control block, process context switch, process versus threads, CPU scheduling, goals of scheduling, CPU scheduling algorithms, Algorithmic evaluation of CPU scheduling algorithms, multi-queue scheduling, multithreading **(Contemporary Issues related to Topic)**	
UNIT III: Interprocess communication and Synchronization	7
Operations on processes, Interprocess communication, process cooperation and synchronization, race condition, critical region, mutual exclusion and implementation, semaphores, classic problems of Synchronization using semaphores, other synchronization constructs. **(Contemporary Issues related to Topic)**	
UNIT IV: Memory management techniques	6
Contiguous allocation, static and dynamic partitioning, non-contiguous allocation, paging, translation look aside buffer (TLB) and overheads, segmentation. **(Contemporary Issues related to Topic)**	
UNIT V: Virtual memory	7
Demand paging, page replacement algorithms, thrashing, working set model. Deadlocks: necessary conditions, deadlock detection, deadlock avoidance, deadlock prevention, recovery from deadlock. **(Contemporary Issues related to Topic)**	

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UNIT VI: File systems	7
Introduction, Access methods, Directory Structure disk space management and space allocation strategies, disk arm scheduling strategies: FCFS, SSTF, SCAN, CSACN, LOOK, CLOOK, Selecting a disk scheduling algorithm. **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

Text Books	
1	Operating system Principles, 9th Edition, A. Silberchatz and P.Galvin, John Wiley & Sons Inc.
2.	Operating Systems Internals and Design Principles , William Staling, Pearson

Reference Books	
1	Operating Systems: A Design-Oriented Approach , Charles Crowley ,McGraw Hill
2.	Operating system concepts and Design, Milan MilenKovic ,Tata McGraw Hill

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/Operating%20System%20Concept%208thedition.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/Operating%20System.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/106/105/106105214/
2.	https://archive.nptel.ac.in/courses/106/102/106102132/

IV Semester
222CSE405– Lab.: Operating Systems

List of Experiment

Sr. No.	Experiments based on
1	Study of Window task manger(Exploring various tabs: application, processes, services, networking, performance)
2	Study of Advanced Linux shell commands (Process management, memory management, networking, etc.)
3	Write a program that illustrates the creation of child process using fork system call. Each child and parent Processes perform different task.
4	Write a multithreaded program to multiply two given matrices.
5	Simulate: a. Any preemptive CPU Scheduling Algorithm b. Any Non-preemptive CPU Scheduling Algorithm
6	Write a program to perform Inter-Process-Communication using shared memory or, pipes or message queues.
7	Write a program that solves two process Producer-Consumer problem with bounded buffer using semaphores. OR Write a program that gives a deadlock and starvation free solution to the Dining Philosohers problem using semaphores.
8	Simulate: a. First Fit(Static Memory allocation algorithm) and b. Worst Fit(Dynamic Memory allocation algorithm)
9	Simulate any one of the following page replacement algorithms: FIFO, LRU, Optimal
10	Write a program to simulate Banker's Deadlock avoidance algorithm.

IV Semester
222CSE406– Data Structures II

Course Outcome	
1.	Create and manipulate various data structures like linked list, disjoint sets, trees, graph for real world problem
2.	Apply appropriate data structure for implementation of real world applications
3.	Analyze the performance of operations performed on data structures.
4.	Design application by using data structures for real world problems.

UNIT I: Linked Lists	7
Singly-linked lists, doubly linked lists and circular linked lists. Operations on linked list: traversal, addition, deletion of nodes, list reversal, Applications of lists in polynomial representation, multi-precision arithmetic. Multi linked structures, implementation of priority queues. **(Contemporary Issues related to Topic)**	
UNIT II: Sets	6
Data structures for disjoint set representation and operations, sorting, searching **(Contemporary Issues related to Topic)**	
UNIT III: Binary Trees	7
Binary trees, binary trees- basic algorithms and various traversals. Binary Search Trees (BSTs) and insertion, deletion in BSTs. Heaps and heap sort **(Contemporary Issues related to Topic)**	
UNIT IV: Balanced trees	7
Height-balanced (AVL) trees, Splay tree, Red-black trees, Multi-way trees-B and B+ and applications **(Contemporary Issues related to Topic)**	
UNIT V: Multidimensional trees	6
Tries and Pattern matching algorithms **(Contemporary Issues related to Topic)**	
UNIT VI: Graphs Representation & traversals	6
Spanning trees, topological sort, shortest path algorithm, all-pairs shortest paths **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

TEXT BOOKS:	
1.	Data Structures and Program Design in C, Robert Kruse, G. L. Tondo andB. Leung ,PHI-EEE
2.	Fundamentals of Data Structures in C, Ellis Horowitz, Satraj Sahni and Susan, Anderson-Freed, W. H. Freeman and Company.
3	How to Solve it by Computer, R. G. Dromey, Pearson Education

Reference books:	
1.	Data Structures with C, Seymour Lipschutz, TMH

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/Book%20Fundamentals%20of%20Data%20Structure%20(1982)%20by%20Ellis%20Horowitz%20and%20Sartaj%20Sahni.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/Data%20Structures%20Succinctly%20Part%201.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/106102064
2.	https://archive.nptel.ac.in/courses/106/106/106106127/

IV Semester

222CSE407 Lab– Data Structures II

List of Experiment

Sr. No.	Experiments based on
1	Program/s based on operations on singly linked list
2	Program/s based on operations on doubly linked list
3	Program based on Binary trees- traversal
4	Programs based on Binary search tree
5	Programs based on Tries
6	Program based on Balanced trees
7	programs based on Graph operations - traversal

IV Semester

22CSE408– Introduction to Data Analysis

Course Outcomes
Upon successful completion of the course students will be able to: 1. Apply fundamental concepts of statistics and probability for data analysis. 2. Apply appropriate statistical methods on simple datasets. 3. Formulate and solve problems in a systematic manner. 4. Conduct investigation and Interpret output obtained from statistical analysis on datasets. 5. Obtain hands on experience with some popular software (like R)for analysis and visualization of data.

UNIT I: INTRODUCTION TO STATISTICS & PROBABILITY	7
The role of statistics. Grouping and displaying data. Measures of central tendency and dispersion, Basic terminology in probability, probability rules, Probabilities under conditions of statistical independence, probabilities under conditions of statistical dependence. **(Contemporary Issues related to Topic)**	
UNIT II: PROBABILITY DISTRIBUTION:	6
What is probability distribution, random variables, use of expected value in decision making, and various probability distributions :Binomial, Poisson, Uniform and Normal distributions. **(Contemporary Issues related to Topic)**	
UNIT III: SAMPLING DISTRIBUTION:	7
Introduction to sampling distributions, sampling distribution of mean and proportion, application of central limit theorem, sampling techniques. ESTIMATION THEORY: Estimation: Point and Interval estimates ,confidence intervals ,calculating interval estimates for population parameters of large sample and small samples, determining the sample size **(Contemporary Issues related to Topic)**	
UNIT IV: TESTING OF HYPOTHESIS	7
Introduction, null hypothesis, tests of hypothesis and significance, type I and type II errors, one tailed and two tailed tests, p-value one sample tests for means and proportions of large samples (z-test), one sample tests for means of small samples (t-test), Chi-square tests for goodness of fit. Analysis of variance. **(Contemporary Issues related to Topic)**	
UNIT V: NON-PARAMETRIC METHODS	6
Sign test for paired data. Rank sum test. Mann –Whitney U test and Kruskal Wallis H test. One sample run test, rank correlation. Kolmogorov-Smirnov –test. **(Contemporary Issues related to Topic)**	

UNIT VI: REGRESSION and CORRELATION	6
Estimation of regression line by least square method, linear regressions, Multivariate regression ,Correlation analysis, **(Contemporary Issues related to Topic)**	
Total Lectures	**39**

Text Books:	
1.	Introduction to probability and statistics for engineers and scientist, Sheldon M. Ross ,3rd Edition,Elsevier
2.	Statistics for Management, Richard I. Levin & David S. Rubin, 7th Edition, Pearson Education
3.	Probability and Statistics , Murray R. Spiegel, John J.Schiller, R AluSrinivasan, Third Edition, Mc Graw Hill education

Reference Book:	
1.	Practical Statistics for Data Scientists, 50 Essential Concepts, Peter Bruce & Andrew Bruce
2.	An Introduction to Statistical Learning with Applications in R, Gareth James, Daniela Witten, Trevor Hastie & Robert Tibshirani

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/COMPUTER%20SCIENCE/COMPUTER%20SCIENCE%20(E%20Series).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/The%20Art%20of%20R%20Programming.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc21_ma74/preview

IV Semester

22CSE409– Lab: Introduction to Data Analysis

List of Experiment

Sr. No.	Experiments based on
1.	Implement basic functionality of R
2.	Implement data import and export functionality in R
3.	Implement R functions to calculate basic statistics of data source
4.	Apply the visualization techniques in R to understand data
5.	Solve the problems using probability distributions in R
6.	Analyze the data using sampling technique
7.	Analyze the data to find out estimated value
8.	Analyze the data using hypothesis testing
9.	Implement integration of R and java using packages
10.	Case study on data analysis and visualization

IV SEMESTER

22CSE410 : Environmental Sustainability, Pollution and Management

Course Outcomes:
Upon successful completion of the course, the students will be able to The student will be able to 1. Gain insights into the efforts to safeguard the Earth's environment and resources. 2. Develop a critical understanding of the contemporary environmental issues of concern 3. Have an overview of pollution, climate change and national and global efforts to address adaptation and mitigation to changing environment through environmental management. 4. Learn about the major international treaties and our country's stand on and responses to the major international agreements.

Unit:1	**Environment, Natural Resources and Sustainable Development**	**6 Hours**
The man-environment interaction; Environmental Ethics and emergence of environmentalism; Overview of natural resources: Definition of resource; Classification of natural resources- biotic and abiotic, water, soil and mineral resources, renewable, and non-renewable energy resources; Introduction to sustainable development: Sustainable Development Goals (SDGs)- targets and indicators, challenges and strategies for SDGs		
Unit:2	**Environmental Issues, Conservation of Biodiversity and Ecosystems**	**6 Hours**
Environmental issues and scales: Land use and Land cover change, Global change; Biodiversity and its distribution, Ecosystems and ecosystem services, Threats to biodiversity and ecosystems, National and international policies for conservation.		
Unit:3	**Environmental Pollution and Health**	**7 Hours**
Understanding pollution: Production processes and generation of wastes, Air pollution, Water pollution, Soil pollution and solid waste, Noise pollution, Thermal and Radioactive pollution. Impact on human health		
Unit:4	**Climate Change: Impacts, Adaptation and Mitigation**	**7 Hours**
Understanding climate change, Impacts, vulnerability and adaptation to climate change, Mitigation of climate change		
Unit:5	**Environmental Management**	**7 Hours**
Environmental management system: ISO 14001, Concept of Circular Economy, Life cycle analysis; Cost-benefit analysis, Environmental audit and impact assessment; Waste Management and sustainability; Ecolabeling /Eco mark scheme		
Unit :6	**Environmental Treaties and Legislation**	**6 Hours**
Introduction to environmental laws and regulation, An overview of instruments of international cooperation, Major International Environmental Agreements, Major Indian Environmental Legislations, Major International organizations, and initiatives		
	Total Lecture	**39 Hours**

Text books	
1	Chiras, D. D and Reganold, J. P. (2010). Natural Resource Conservation: Management for a Sustainable Future.10th edition, Upper Saddle River, N. J. Benjamin/Cummins/Pearson
2	Rajagopalan, R. (2011). Environmental Studies: From Crisis to Cure. India: Oxford University Press
3	Krishnamurthy, K.V. (2003) Textbook of Biodiversity, Science Publishers, Plymouth, UK
4	Jackson, A. R., & Jackson, J. M. (2000). Environmental Science: The Natural Environment and Human Impact. Pearson Education
5	Pittock, Barrie (2009) Climate Change: The Science, Impacts and Solutions. 2nd Edition. Routledge.
6	Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2nd Edition. CRC Press
7	Kanchi Kohli and Manju Menon (2021) Development of Environment Laws in India, Cambridge University Press
Reference Books	
1	Headrick, Daniel R. (2020) Humans versus Nature- A Global Environmental History, Oxford University Press
2	Gilbert M. Masters and W. P. (2008). An Introduction to Environmental Engineering and Science, Ela Publisher (Pearson)
3	William P. Cunningham and Mary A. (2015). Cunningham Environmental Science: A global concern, Publisher (Mc-Graw Hill, USA)
4	Varghese, Anita, Oommen, Meera Anna, Paul, Mridula Mary, Nath, Snehlata (Editors) (2022) Conservation through Sustainable Use: Lessons from India. Routledge.
5	Central Pollution Control Board Web page for various pollution standards. https://cpcb.nic.in/ standards
6	Barnett, J. & S. O'Neill (2010). Maladaptation. Global Environmental Change—Human and Policy Dimensions 20: 211–213
7	Richard A. Marcantonio, Marc Lame (2022). Environmental Management: Concepts and Practical Skills. Cambridge University Press
8	Ministry of Environment, Forest and Climate Change (2019) A Handbook on International Environment Conventions & Programmes. https://moef.gov.in/wp- content/uploads/2020/02/ convention-V-16-CURVE-web.pdf

IV Semester
Audit Course
MLC2124 - YCCE Communication Aptitude Preparation (YCAP4)

IV Semester

Audit Course : MLC116- Ethics in IT

Course Outcomes
On completion of this course students will be able to CO1: Adapt the global ethical principles and modern ethical issues. CO2: Apprehend ethics in the business relationships and practices of IT. CO3: Implement trustworthy computing to manage risk and security vulnerabilities. CO4: Analyse concerns of privacy, privacy rights in information-gathering practices in IT.

UNIT I:	6
An overview of Ethics: Brief about ethics, Ethics in the Business World, Ethics in IT. Ethics for IT professionals and IT users: IT professionals: Changing Professional Services, Professional Relationships, Codes of Ethics, awareness of IT malpractices, IT Users: Common Ethical Issues for IT Users, Supporting the Ethical Practices of IT Users.	
UNIT II:	6
Introduction: IT security incidents, Types of Exploits, Types of Perpetrators, Laws for Prosecuting Computer Attacks, Implementing Trustworthy Computing, Risk and Vulnerability Assessment, Educating Employees, Contractors, and Part-Time Workers, Establishing a Security Policy Privacy: The right of Privacy, Privacy Protection and the Law, Key Privacy and Anonymity Issues Identity Theft, Consumer Profiling, Treating Consumer Data Responsibility, Workplace Monitoring Freedom of Expression: Defamation and Hate Speech, Key issues, Controlling Access to Information on the Internet, Anonymity on the Internet, Corporate Blogging, Pornography	
UNIT III:	6
Social Networking: Brief about Social Networking, Social Networking Ethical Issues: Cyber bullying, Cyber stalking, Encounters with Sexual Predators, Uploading of Inappropriate Material, Online Virtual Worlds: Crime in Virtual Worlds, Educational and Business Uses of Virtual Worlds. Ethics of IT Organization: Key Ethical Issues for Organizations, of Workers, Outsourcing, Whistle blowing, Code of Ethics and Professional Conduct.	
UNIT IV:	6
Malware, Medical Implants, Abusive Workplace Behaviour, Automated Active Response Weaponry, Malicious Inputs to Content Filters.	
Total Lectures	**24**

Text Books:	
1.	Ethics in Information Technology, George Reynolds, 5th Edition, Cengage learning
2.	Professional Ethics, R. Subramanian, Second Edition, OXFORD University Press

Reference Books:	
1.	An Introduction to Ethics, William Lillie,Allied Publishers
2.	Engineering Ethics, Charles b. Fleddermann, Prentice Hall
3.	Engineering Ethics &Human Values, M.Govindarajan, S.Natarajan & V.S.Senthilkumar, PHI Learning

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc19_hs35/preview

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

5th Semester

(Department of Computer Science and Engineering

B.Tech in Computer Science and Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Computer Science & Engineering)

B. Tech in Computer Science & Engineering)

SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC	CSE/CSE	22CSE501	Computer Networks	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	5	PC	CSE/CSE	22CSE502	Lab: Computer Networks	**P**	0	0	2	2	1		60	40	
3	5	PC	CSE/CSE	22CSE503	Database Management Systems	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	5	PC	CSE/CSE	22CSE504	Lab: Database Management Systems	**P**	0	0	2	2	1		60	40	
5	5	PC	CSE/CSE	22CSE505	Design & Analysis of Algorithms	**T**	3	1	0	4	4	30	20	50	3 Hrs
6	5	PC	CSE/CSE	22CSE506	Lab: Design & Analysis of Algorithms	**P**	0	0	2	2	1		60	40	
7	5	PE	CSE/CSE		**Professional Elective-I**	**T**	3	0	0	3	3	30	20	50	3 Hrs
8	5	PE	CSE/CSE		**Lab: Professional Elective-I**	**P**	0	0	2	2	1		60	40	
9	5	OE	CSE/CSE		**Open Elective - I**	**T**	3	0	0	3	3	30	20	50	3 Hrs
10	5	OE	CSE/CSE		**Open Elective - II**	**T**	3	0	0	3	3	30	20	50	3 Hrs
11	5	**STR**	CSE/CSE	22CSE507	**Industrial visit,Seminar & report**	**P**	**0**	**0**	**1**	**1**	**1**		60	40	
						TOTAL	**18**	**1**	**9**	**28**	**24**				

List of Professional Electives-I

1	5	PE-I	CSE/CSE	22CSE511	PE-I: Digital Image Processing
2	5	PE-I	CSE/CSE	22CSE512	PE-I: **Lab:** Digital Image Processing
3	5	PE-I	CSE/CSE	22CSE513	PE-I: Advanced Web Technologies
4	5	PE-I	CSE/CSE	22CSE514	PE-I: **Lab:** Advanced Web Technologies
5	5	PE-I	CSE/CSE	22CSE515	PE-I: Machine Learning
6	5	PE-I	CSE/CSE	22CSE516	PE-I: **Lab:** Machine learning
7	5	PE-I	CSE/CSE	22CSE517	PE-I: Mobile operating system
8	5	PE-I	CSE/CSE	22CSE518	PE-I: **Lab:** Mobile operating system

Open Elective-I

1	5	OE-I	CSE/CSE	22CSE531	OE I: Database System Essentials
2	5	OE-I	CSE/CSE	22CSE532	OE I: Programming with Python
3	5	OE-I	CSE/CSE	22CSE533	OE I: Introduction to Image Processing
4	5	OE-I	CSE/CSE	22CSE534	OE I: Essentials of IT

Open Elective-II

1	5	OE-II	CSE/CSE	22CSE551	OE II: Software Testing for Beginners
2	5	OE-II	CSE/CSE	22CSE552	OE II: Introduction to Web Technology
3	5	OE-II	CSE/CSE	22CSE553	OE II: Introduction to Cloud Computing
4	5	OE-II	CSE/CSE	22CSE554	OE II: Introduction to OS Concepts

List of Mandatory Learning Course (MLC)												
1	5	HS	T&P	MLC2125	**YCAP5:** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	0	
2	5	BSE	R&D	MLC125	Design thinking	**A**	2	0	0	2	0	

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.00
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2022-23 Onwards

V Semester
22CSE501 – Computer Networks

Course Outcome
1. Identify appropriate design issues and explain network reference model. 2. Select appropriate protocol at various layers for the given application. 3. Solve problems in the networking domain. 4. Analyze the performance of network using different tools 5. Design computer networks and sub-networks

Unit No.	Contents	Max. Hrs.
1	**Introduction to computer networks and Internet:**	5
Introduction to computer networks and Internet, The uses of computer networks, LAN's, MAN's, WAN's, Heterogeneous Networks Network Topologies, Physical Mediums, Concept of Network Protocols, design issues for layers. Layered Architecture: The OSI reference model. TCP/IP reference model, Comparison of OSI & TCP/IP reference models, Various Losses in the Internet, Brief History of Computer Network.		
2	**Application Layer:**	**7**
Basics of Socket Programming, Transport Layer Programming Interface(TCP, UDP) , Protocols: HTTP (Overview, Persistent and Non-Persistent, Message Format, Cookies, Cachess) , SMTP (Overview, Message Formats) , IMAP, POP, DNS; FTP; Telnet, SSH; Peer-to-Peer Applications, BitTorrent Protocol; Conte Distribution Networks;		
3	**Transport Layer:**	7
Relationship Between Transport and Network Layer, TCP and UDP; Multiplexing and Demultiplexing; Principles of Reliable Data Transfer; Go-Back-N and Selective Repeat; TCP: Segment Structure, Round Trip Time Estimation, Reliable Data Transfer, State Transitions, Flow Control, Congestion Control, UDP: Segment Structure		
4	**Network Layer, Subnets:**	7
Concept of IP Address, Netmask, Subnet; CIDR; Design of a LAN and WAN,r, Routers, Functions of a Router; Switching; Queueing: Causes, Delays; IPV4: Datagram Format, Fragmentation; Network Address Translation; IPv6 Introduction; Multicasting, , Routing algorithms: Link State, Distance Vector Routing; OSPF, BGP, RIP; Routing Policies		
5	**Link Layer:**	5
Review of fundamentals of link layer protocols; Error-Detection and -Correction Techniques Ethernet Switches, LANs, LinkLayer Switches, VLANs, Complete tracking of traversal of a packet over internet between two application, MAC		
6	**Transmission Impairments, Transmission Media:**	5

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Transmission Impairments, Transmission Media: Guided, unguided, Architecture of the Internet, Wireless LANs: IEEE 802.11, IEEE 802., The Public Switched Telephone Network, Switching: circuit, packet and message switching, Modems.	
Total Lectures	36

Text Books	
1	Computer Networking: A Top-Down Approach, Kurose and Ross, Pearson Publication
2	Computer Networks,Behrouz A. Forouzan,McGraw-Hill Publication
3	Computer Networks ,A.S. Tanenbaum, Pearson Publication

Reference Books	
1	Computer Networks A Systems Approach,ISBN: 9780123850591,Larry Peterson Bruce Davie, Elsevier
2	Data and computer Communication,ISBN-81- 297-0206-1,William Stallings,Pearson Education

V Semester
22CSE502 – Lab: Computer Networks

Sr. No.	List of Experiment
1	Study of Network Devices and Network cables.
2	Study of basic network command and Network configuration commands.
3	Create two Networks using star topology and add a resource (printer) to the network using CISCO Packet Tracer. Also show the transmission of packet from one host to other.
4	Configuring VLAN in a network using CISCO Packet Tracer.
5	Configure routers in a network using Static routing protocol in Cisco Packet Tracer and show transmission of packet from one network to another.
6	To implement Routing algorithm OSPF: Open Source Shortest Path First using Cisco Packet Tracer.
7	Use traffic monitoring tool Wire shark to observe network traffic with packet detail.
8	Case Study on Network at YCCE.
9	Advanced Practical: Study of NS2 tool.

V Semester

22CSE503 : Database Management Systems

Course Outcome
Upon successful completion of the course, the student will be able to: 1. Analyze & compare different levels of abstraction & data independence. 2 . Design Entity Relationship Diagram for any scenario. 3. Solve queries based on relational algebra & SQL. 4. Identify functional dependencies & normalize the database and apply ACID properties. 5. Analyze transaction management, various concurrency control protocols and crash recovery methods.

Unit No.	Contents	Max. Hrs.
1	**Introduction to Database Management System:**	5
General File System and Database system Concepts and Architecture, Data Models, Schemas and Instances, Abstraction & Different Levels of Data Abstraction, Data Independence: Logical & Physical Independence.		
2	**Entity-Relationship Model:**	**5**
Entities and Entity Sets, Relationships and Relationship Sets, Attributes, Mapping Constraints, Keys, Entity Relationship Diagram, Reducing E-R Diagrams to Tables, Generalization, Aggregation, Design of an E-R Database Scheme		
3	**SQL and Advanced SQL**	**6**
SQL: Data definition language (DDL), Data Manipulation Language (DML), Basic structure of SQL Queries, Set operations, Null Values, Nested subqueries, views, modification of database, transaction, Joins. **Advanced SQL:** SQL data types & schemas, Integrity Constraints, Domain Constraints, Assertions, triggers, Advanced SQL Features.		
4	**Relational Data Model:**	**7**
Structure of Relational Databases, **Relational Database Design**: Pitfalls in Relational Database Design, Functional Dependencies, Normalization using Functional Dependencies, Alternative Approaches to Database design. **Relational Algebra**: Structure of relational databases, Fundamental Relational-Algebra Operations, Additional relational algebra operations, extended relational algebra operations, modification of the databases		
5	**Data Storage and Querying & Transaction Management**	**7**
Data Storage and Querying: Storage and File Structure, Indexing and Hashing, Query Processing, query-evaluation. **Transaction Management**: ACID Properties, Implementation of ACID Properties, Database processes to support ACID Properties, Schedules, and Testing of Serializability.		

6	Concurrency Control & Crash Recovery	6
Concurrency Control: Lock-based Protocols, Timestamp Based Protocols, Validation Techniques, Multiple Granularity, Multi version Timestamp Protocol, Transaction isolation levels, Read consistency. **Crash Recovery**: Failure Classification, Log Based Recovery, Buffer Management, Checkpoints, Shadow Paging.		
Total Lectures		**36**

Text Books	
1	Database System Concepts,Korth, Silberschatz, sudarshan ,McGraw-Hill publication
2	Fundamentals of Database Systems, Elmasri, Navathe & Gupta,Pearson Education.

Reference Books	
1	SQL & PL / SQL for Oracle 11g Black Book Kindle Edition,3rd Edition, Dr. P.S. Deshpande, Dreamtech Press
2	Database Systems, 3rd Edition,Connolly, Begg , Pearson Education
3	Database Systems, 6th Edition,S. K. Singh,Pearson Education

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs04/preview
2	https://onlinecourses.nptel.ac.in/noc22_cs80/preview

V Semester
22CSE504– Lab.: Database Management Systems

Sr. No.	List of Experiment
1	Creating a schema -To implement different basic Data Definition Language (DDL) & Data Manipulation Language(DML) Commands in SQL.
2	To design an ER Diagram.
3	1. Answer each of the following questions. The questions are based on the following relational schema: Emp(*eid:* integer, *ename:* string, *age:* integer, *salary:* real) Works(*eid:* integer, *did:* integer, *pcttime:* integer) Dept(*did:* integer, *dname:* string, *budget:* real, *managerid:* integer) a. Give an example of a foreign key constraint that involves the Dept relation. What are the options for enforcing this constraint when a user attempts to delete a Dept tuple? b. Write the SQL statements required to create the preceding relations, including appropriate versions of all primary and foreign key integrity constraints. c. Define the Dept relation in SQL so that every department is guaranteed to have a manager. d. Write an SQL statement to add John Doe as an employee with *eid* = 101, *age* = 32 and *salary* = 15, 000. e. Write an SQL statement to give every employee a 10 percent raise. f. Write an SQL statement to delete the Toy department.
4	Given a schema , apply BETWEEN…AND, NOT BETWEEN, IN, NOT IN, IS NULL, IS NOT NULL clause on created database.
5	Given a schema , implement aggregate function & grouping commands.
6	Given a schema , implement basic set operations in SQL
7	Write the following queries in SQL for the following schema. Suppliers(sid: integer, sname: string, address: string) Parts(pid: integer, pname: string, color: string) Catalog(sid: integer, pid: integer, cost: real) 1. Find the pnames of parts for which there is some supplier. 2. Find the snames of suppliers who supply every part. 3. Find the snames of suppliers who supply every red part. 4. Find the pnames of parts supplied by Acme Widget Suppliers and by no one else. 5. Find the sids of suppliers who supply a red part and a green part. 6. Find the sids of suppliers who charge more for some part than the average cost of that part (averaged over all the suppliers who supply that part). 7. For each part, find the sname of the supplier who charges the most for that part. 8. Find the sids of suppliers who supply only red parts.

8	To create and manipulate various database object of table using views.
9	To implement Transaction Control Language (TCL) commands.
10	To display file database connectivity using JDBC.
11	Write a program in PL/SQL to check given number is even or odd

V Semester

22CSE505 - Design & Analysis of Algorithms

Course Outcome
After completion of the course, student will be able to: **CO1 :** Remember the concepts of algorithms, **CO2 :** Understand time requirements of an algorithm and mathematical techniques used in analysis of algorithms. **CO3 :** Analyze the Complexities of different algorithms for a wide variety of foundational problems occurring in computer science applications. **CO4 :** Apply the knowledge of different algorithms with discussions on complexity. **CO5 :** Evaluate the knowledge of algorithms with Complexity and NP-completeness.

Unit No.	Contents	Max. Hrs.
Unit 1: Introduction to Mathematical foundations		6
Mathematical foundations, summation of arithmetic and geometric series, Σn, Σn2, bound summations using integration, Analysis of algorithms, analyzing control structures, worst case and average case analysis, Asymptotic notations, Analysis of sorting algorithms such as selection sort, insertion sort, bubble sort, heap sort, external Sorting, lower bound proof.		
Unit 2: Recursive Relation		7
Recursive functions and recurrence relations, solutions of recurrence relations using technique of characteristic equation and generating functions, elementary and advanced data structures with operations on them and their time complexity, Amortized analysis.		
Unit 3: Divide and conquer, Greedy method		7
Divide and conquer basic strategy, binary search, quick sort, merge sort, Fast Fourier Transform etc. Greedy method –basic strategy, application to job sequencing with deadlines problem, minimum cost spanning trees, single source shortest path etc.		
Unit 4: Dynamic Programming		6
Dynamic Programming basic strategy, multistage graphs, all pair shortest path, single source shortest paths, optimal binary search trees, traveling salesman problem, Matrix Chain Multiplication, Longest Common Subsequent.		

Unit 5: Backtracking	6
Basic Traversal and Search Techniques, breadth first search, connected components, Backtracking basic strategy, 8 – Queen"s problem, graph colouring, Hamiltonian cycles etc.	
Unit 6: Introduction to P and NP	6
NP-hard and NP-complete problems basic concepts, non-deterministic algorithms, NP-hard and NP-complete, Cook"s Theorem, decision and optimization problems, polynomial reduction.	

Text Books	
1	Algorithm Design, Klienberg and Tardos, Pearson
2	Computer Algorithms, Horowitz, Sahani, Rajsekharan, Galgotia Publications Pvt. Ltd.
3	Introduction to Algorithms, Thomas H. Cormen, Prentice Hall of India.

	Reference Books
1	Fundamentals of Algorithms,Brassard and Bratley,Prentice Hall

	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1.	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Technology/
	MOOCs Links and additional reading, learning, video material
1	https://archive.nptel.ac.in/courses/106/101/106101060/
2	https://archive.nptel.ac.in/courses/106/101/106101060/

V Semester
22CSE506 – Lab.: Design & Analysis of Algorithms

Sr. No.	List of Experiment
1	To Compute and Analyze its time complexity of various sorting algorithm. • Bubble sort • Insertion sort • Selection Sort
2	To implement and compute time complexity of given problem using Divide and Conquer algorithm. • Merge sort • Quick sort • Binary Search
3	To implement and compute time complexity of Job sequencing problem using Greedy Method for different number of inputs.
4	To implement and compute time complexity of Knapsack Problem using Greedy Method for different number of inputs.
5	To implement and compute time complexity of Dijikstra Problem using Greedy programming for different number of inputs.
6	To implement the given problem using minimum cost spanning trees. • Kruskal Algorithm • Prim Algorithm
7	To implement and compute time complexity of All Pair Shortest Path using dynamic programming for different number of inputs.
8	To implement and compute time complexity of Travelling Salesman Problem using dynamic programming for different number of inputs.
9	To implement and compute time complexity of 8 Queens's problem using backtracking for different number of inputs.
10	To implement and compute time complexity of Graph coloring problem using backtracking for different number of inputs.

V Semester

22CSE511 – PE I: Digital Image Processing

Course Outcome
1. Describe Basic relationships between pixels. 2. Compare various image enhancement techniques in spatial domain and frequency domain. 3. Illustrate different image compression techniques to understand the advantage of image compression 4. Demonstrate the applications of similarity based and dissimilarity-based approaches for image segmentation. 5. Interpret various representation techniques

Unit No.	Contents	Max. rs.
1	**Introduction:** Fundamental Steps in Image Processing, Elements of DIP systems, Elements of Visual Perception, Fundamentals of Image processing, A Simple Image Model, Sampling and Quantization, Some Basic Relationships between Pixels.	5
2	**Image Enhancement in the Spatial Domain:** Introduction to Spatial and Frequency methods, Basic Gray Level Transformations, Histogram Equalization, Image Subtraction, Image Averaging, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.	6
3	**Transforms:** Introduction to the Fourier Transform, Discrete Fourier Transformation, Fourier Properties, 2DFT, inverse Fourier transform, **Image Enhancement in the frequency Domain:** Filtering in the Frequency Domain, Correspondence between Filtering in the Spatial and Frequency Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency-Domain Filters, Homomorphic Filtering.	7
4	**Image Compression:** Fundamentals of Image compression, coding redundancy, spatial and temporal redundancy, Measuring Image Information, Fidelity criteria, Image compression models, Basic compression methods, Huffman coding, arithmetic coding, LZW coding, run length coding.	6
5	**Image Segmentation**: Point Detection, Line Detection, Edge Detection, Gradient Operator, Edge Linking and Boundary Detection, Thresholding, Region-oriented Segmentation.	6

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6	**Image Representation:** Chain Codes, Polygonal Approximations, Signatures, Boundary Segments, Skeleton of a Region. Description: Boundary Descriptors, Shape Numbers, Regional Descriptors, Topological Descriptors. Introduction to color image processing: RGB and HSI color models.	6
Total Lectures		**36**

Text books:	
1	Digital Image Processing, 3rd edition 2007, Rafael C. Gonzalez and Richard, E. Woods, Prentice Hall
2	Digital Image Processing, S Jayaraman, Tata McGraw Hill
Reference books:	
1	Fundamentals of Digital Image Processing, A K Jain, Prentice Hall, 1988
2	Image Processing Principles & Applications, TinkuAcharya&Ajoy K. Ray, Willey Inter-Science

V Semester
22CSE512 – PE I: Lab: Digital Image Processing

Sr. No.	List of Experiment
1	1. Write a program in MATLAB for following Point processing techniques in spatial domain a. Negation of an image b. Thresholding of an image c. Contrast Stretching of an image
2	. Write a Program in MATLAB to Create a Histogram of a given Image OR *https://cse19-iiith.vlabs.ac.in/objective.php?exp=histo*
3	Write a program in MATLAB to perform following smoothing operations on an image a. Average filter b. Ordered Statistics filter
4	. Write a program in MATLAB to sharp an image using Laplacian mask.
5	. Write a program in MATLAB to segment an image using multilevel thresholding OR *https://cse19-iiith.vlabs.ac.in/objective.php?exp=segment*
6	. Write a program in MATLAB to apply split and merge algorithm on a given image.
7	Write a program in MATLAB to find the code chain of a given image.
8	Write a program in MATLAB to find Euler number of image a given image.
9	Write a program using OpenCV tool to detect the object present in an image.
10	Write a program using OpenCV tool to detect and track the object present in video.

V Semester

22CSE513 –PE I: Advanced Web Technologies

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Understand fundamental concepts of Web Services. 2. Design modern interactive web pages using HTML5, CSS3, Javascript. 3. Develop advanced client side programming. 4. Develop fast, flexible, and scalable backend applications using nodejs and mongoDB.		
Unit:1	**Introduction to Web Technology**	**6 Hours**
Client, Servers and Communication, Internet Protocols (HTTP,FTP, SMTP),WWW.Web Basics: Web Browsers, Web Servers, Tier Technology and its types, Static and Dynamic Web Page. Client side and Server side Scripting.		
Unit:2	**HTML5,CSS3**	**7 Hours**
HTML5: Structure of an HTML Program, Basic HTML Tags (Headings, Paragraph, Division, Text formatting, Image, Anchors), HTML Lists (Ordered Lists, Unordered Lists, Description Lists), HTML Links (href attribute, target attribute), HTML colors, Table handling in HTML, HTML Layout Elements, HTML class and id Attribute, HTML Forms, HTML Responsive Web Design. CSS3: Inline, Internal, External, CSS3 selectors, CSS3- Colors, Backgrounds, Borders, Text, Font, List, CSS3 Box Model, CSS3 Navigation Bar (Vertical, Horizontal), Introduction to Bootstrap.		
Unit:3	**Client Side Scripting with JavaScript**	**7 Hours**
Introduction to JavaScript, Variables and Data Types, Operators and Expressions in JavaScript, Functions In JavaScript, Arrays, Loops and control statement, RegExp, Dialog Boxes, JavaScript Events. Event Handling and Form Validation, Error Handling, Handling Cookies, XML, JSON. Introduction to Web Frameworks- React JS, Angular JS.		
Unit:4	**Advanced Client side programming**	**6 Hours**
WebSockets, Server-Sent Event (SSE), WebRTC, Web Graphics, Canvas, WebGL, WebWorkers, SVG. Libraries: Modernizr, Polyfills, Polymer.		
Unit:5	**Introduction to Node.js**	**6 Hours**
Introduction, Modules, HTTP Module, File System Module, URL Module, NPM, Events, Upload Files.		
Unit :6	**Node.js and Database Connectivity with MongoDB**	**6 Hours**
Introduction to MongoDB, Creating a Database, Create Collection, Insert, Find, Delete, Update, Node.js Connection with MongoDB.		
Total Lecture Hours		**38 Hours**

Textbooks	
1	HTML & CSS: The Complete Reference,Fifth Edition, Thomas A. Powell
2	Web Technologies: Html, Javascript, Php, Java, Jsp, Asp.Net, Xml And Ajax, Black Book , Kogent Learning Solutions Inc., Dreamtech Press
Reference Books	
1	Pro HTML5 with CSS, JavaScript, and Multimedia., Mark J. Collins
2	Web Development with MongoDB and Node., Bruno Joseph D'mello
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/book%20details/CSE.aspx
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-5409-3
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.swayam2.ac.in/nou20_cs05/preview

V Semester

22CSE514–Lab PE I: Advanced Web Technologies

Sr. No.	Experiments based on
1	Write a HTML code to create single page website using Layout Elements
2	Write a HTML code to create responsive website using <meta> tags.
3	Create a JavaScript Calculator using the JavaScript, HTML and CSS programming languages.
4	Creating Image Slider Using JavaScript, HTML, And CSS
5	Write JavaScript code to validate the following fields of the Registration form. First Name: Last Name: Password: Email ID: Mobile Number: Address:
6	Write a script which creates and retrieves Cookies information
7	Create a web page which shows the use of Canvas & SVG
8	Creating the MongoDB Database in Robo 3T GUI
9	Create a simple "Hello, World!" server using Node.js and Express.
10	Create a RESTful API that performs CRUD operations on a database

V Semester

22CSE515– PE I: Machine Learning

Course Outcomes:		
After undergoing the course, student will be able to: 1. Understand various supervised machine learning algorithms 2. Understand various unsupervised machine learning algorithms 3. apply supervised and unsupervised learning on the given set of samples and design the model to accomplish the given task. 4. understand various performance evaluation measures for supervised and unsupervised learning		
Unit:1	**Introduction to machine learning**	**6 Hours**
Overview of Machine Learning, Types of Machine Learning: Supervised, Unsupervised, Reinforcement learning, Classification, Regression, Supervised and Unsupervised Learning, Learning Associations, Machine Learning Workflow, Examples of Machine Learning Applications.		
Unit:2	**Supervised Learning-1**	**6 Hours**
Linear and polynomial regression, classification with k-Nearest Neighbours, Naive Bayes Classifiers, Decision Trees, Generalization, logistic regression, bias and variance, Overfitting, and Underfitting		
Unit:3	**Supervised Learning-2**	**6 Hours**
Random forests, Kernelized Support Vector Machines, Uncertainty in Multiclass Classification, feature engineering and selection, evaluation metrics for supervised learning		
Unit:4	**Unsupervised Learning**	**6 Hours**
k-Means Clustering , Choosing the Number of Clusters, Semi-Supervised Learning , Introduction to Principle Component Analysis, evaluation metrics for unsupervised learning		
Unit:5	**Design and Analysis of Machine Learning Experiments**	**6 Hours**
Factors, Response, and Strategy of Experimentation, Randomization, Hypothesis testing, Replication, and Blocking, Guidelines for Machine Learning Experiments , Cross-Validation and Resampling Methods, K-Fold Cross-Validation, Comparing Two Classification Algorithms.		
Unit :6	**Advances in Machine Learning**	**6 Hours**
Introduction to learning using Neural networks, types of artificial neuron and activation functions, Feedforward vs. Recurrent networks, multi-layer feedforward networks, Introduction to deep learning, deep learning frameworks.		
	Total Lecture Hours	**36 Hours**

Textbooks	
1	Introduction to Machine Learning", Ethem Alpaydin, The MIT Press, second edition
2	Deep learning:Ian Goodfellow, Yoshua Bengio, and Aaron Courville, Deep Learning (http://www.deeplearningbook.org/)
Reference Books	
1	Machine Learning", Tom Mitchell, McGraw-Hill Science/Engineering/Math, 1997
2	Introduction to Machine Learning with Python, A Guide for Data Scientists Andreas C. Müller and Sarah Guido ORIELLY
3	Christopher M. Bishop, Pattern Recognition and Machine Learning. http://research.microsoft.com/enus/um/people/cmbishop/prml/.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/60.Introduction_to_Machine_Learning_-_2e_-_Ethem_Alpaydin.pdf
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs24/preview
2	https://onlinecourses.nptel.ac.in/noc21_cs85/preview

V Semester
22CSE516– Lab: Machine Learning

Sr. No.	Experiments based on
1	a) Linear regression using linear least squares fit method b) Linear regression with Ordinary least squares method using ML Library
2	a) Implementing linear classifier using Linear discriminant function b) Implementing polynomial regression
3	Program for Classification using KNN algorithm
4	Implementing KNN for regression
5	Implementing Naïve Bayes Classifier
6	Decision Trees using Scikit-learn
7	Implementing SVM Classifier
8	Implementing K-means clustering
9	Dimensionality reduction using Principal Component Analysis
10	Implementing a feed forward Neural Network based estimation using Scikit learn
11	Experiment on classification using Pre-trained deep network

V Semester

22CSE517 – PE I: Mobile Operating System

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand the basics of mobile programming. 2. Apply mobile programming concepts. 3. Design user interfaces. 4. Design mobile database. 5. Analyse inter – application communication.

Unit No.	Contents	Max. Hrs.
1	**Introduction to Mobile Programming** Mobility Technology Trends, Mobile Ecosystem Overview, Mobile Devices Overview, Mobile Development, Methodology, Wireless Networks Overview, Proximity Technologies.	5
2	**Introduction to Android** Android Overview, Basic building blocks, Introduction to Activities/Fragments, Introduction to Services, broadcast receivers, content providers, Android Application Structure, Source Files, Resources, Assets, Manifest, Basic IDE Operation (Android Studio), Project Creation and Handling (App Creation through Wizard), Running App on AVD and Device, DDMS and Debugging, Layout Overview, Linear Layout, Relative Layout, Frame Layout, Widgets (UI Controls) Overview, Text View, Image View, button.	6
3	**User Interface Designing** Notifications, Toast, Dialog, Listview and Adapter, View Re-usability, Spinner, Complex View, Android Component overview, Intent Resolution, Activity Stack, Launch Modes , Activity Flags, Service Overview, Service Lifecycle, Service Usage and Applicability, Message Binder.	6
4	**Data Management** Data Storage Overview, Persistant v/s Local, Shared Preferences, Internal Storage, SQLite Data Base, Thread, process overview, Async Task, Loaders, Handlers, Intent and Intent Filters, Broadcast receiver Overview, Manifest Registration vs Component Registration, Unregistration, SMS, Boot, Network	6

	etc., Action Bar and Context Menu.	
5	**Inter - Application Communication** Inter app communication requirement overview, Intents Based, Gallery, Camera, SMS App, Contacts, Content provider Overview ,Need and Usage, Content Provider structure, URI Permissions, Views, triggers, Network communication basics, Connecting to server/ request creation, Response Formats XML/JSON, Rest / Web Services.	6
6	**Advanced User Interface Designing** Style and Themes, View and layout animation, Localization, Orientation and Config Change Handling, Handling multiple resolution devices, Device and Tablet consideration, Support Library, Application Signing, Application Distribution, Application Publishing, Google Play, Query solving topics, Recycling view adapter, SQLite DB, Drawer, Tab Layout (view Pager 2), http request using retrofit, Navigation Drawer, Android Application Architecture and Unit Testing, Introduction to Jetpack, Introduction to Daggers, Introduction to AndroidX	7
	Total Lecture Hours	**36**

Reference Books				
SN	**Title**	**Edition**	**Authors**	**Publisher**
1	Programming the Mobile Web, 2nd ed., 2013, Maximiliano Firtman, O'Reilly Media, Inc.			

Text Books				
SN	**Title**	**Edition**	**Authors**	**Publisher**
1	Mobile Design and Development,2009,Brian Fling,O'Reilly Media, Inc			
2	Android Programming: The Big Nerd Ranch Guide,2nd edition, 2015,Bill Phillips, Chris Stewart, Brian Hardy, and Kristin Marsicano, Big Nerd Ranch LLC			

V Semester

22CSE518 PE I: Mobile Operating System Lab

Sr. No.	Experiments based on
1	Study of Mobile Apps Architecture.
2	Installation of Android Studio.
3	Modification to Android Manifest File.
4	Develop an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.
5	Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. on clicking the submit button, print all the data below the Submit Button (use any layout).
6	Design an android application to create page using Intent and one Button and pass the Values from one Activity to second Activity.
7	Design an android application Send SMS using Intent.
8	Develop an application to demonstrate fragment manager.
9	Create a user registration application that stores the user details in a database table.
10	Design & Develop an application based on inter application communication.

V Semester

22CSE531 – OE I: Database System Essentials

Course Outcome
Upon successful completion of the course the students will be able to 1. Understand the basics concepts of Database System and its modelling, compare SQL and NoSQL databases. 2. Solve queries based on SQL and procedures using PL-SQL, & Analyse data dependencies & normalization. 3. Understand Query Processing and evaluate queries. 4. Understand ACID Properties and database system Architecture.

Unit No.	Contents	Max. Hrs.
Unit:1	**Database System Essentials:**	6 Hours
Purpose of Database systems, Example of Database Applications, Basic Terminologies, Data Models, Entity−Relationship Model, Relational Model.		
Unit:2	**Relational Databases:**	7 Hours
Introduction, SQL, DDL, DML, DCL, Database Integrity and Security, Relational−Database Design, Object−Oriented Databases, Object−Relational Databases, database constraints, functional dependencies and normalization.		
Unit:3	**Data Storage and Querying:**	6 Hours
Storage and File Structure, Indexing and Hashing, Data Retrieval, Query Processing, data-access techniques, query-evaluation		
Unit:4	**Transaction Management:**	6 Hours
Introduction, transaction atomicity, consistency, isolation, and durability, concurrency control, serializability, locking, time stamping. Deadlock issues.		
Unit:5	**Database System Architecture:**	6 Hours
Centralized systems, client–server systems, parallel and distributed architectures, and network types		
Unit :6	**PL-SQL and No SQL:**	6 Hours
Introduction to Pl-SQL, Block Structure: Variables, Decision Structures & Loops, Basic Pl-SQL programming. Overview of NoSQL Databases, SQL Vs NO SQL, Types of NoSQL Database		
	Total Lectures Hours	36 Hours

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Text Books	
1	Database System Concepts, 7th Edition, Silberschatz–Korth–Sudarshan, McGraw–Hill, 2019

Reference Books	
1	Fundamentals of Database Systems, 5th Edition, Elmasri, Navathe & Gupta, Pearson Education
2	Database Systems, 5th Edition, S. K. Singh, Pearson Education

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs04/preview
2	https://onlinecourses.nptel.ac.in/noc22_cs80/preview

V Semester
22CSE532– OE I: Programming with Python

Course Outcome
Upon successful completion of the course the students will be able to : 1. Understand the basic data types, built in data structures, control statements and loops and write simple programs in Python. 2. Apply the concepts of functions modules and packages and write programs using them. 3. Design and develop classes in Python.

Unit No.	Contents	Max. Hrs.
Unit:1	**Introduction to Python**: Build-in Data types & variables, arithmetic operators, assignment statement, print & input function, relational and logical operators, if, if – else & nested if- else statements, writing simple programs.	7 Hours
Unit:2	**Data Structures:** Built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays. Programs based on the built in data structures	6 Hours
Unit:3	**Looping: Loop statements:** For, while, continue and break statements, list comprehension. Bitwise operators, Real world problem solving based on loops.	6 Hours
Unit:4	**Functions:** Library functions in Python standard library, user defined Functions, returning values, local & global variables , global statement, doc strings for functions, developing useful functions, Modules and Packages, import statement.	6 Hours
Unit:5	**Introduction to Object oriented programming in Python:** Features of object oriented programming, Python Object and Classes: defining classes, member variables, doc strings for classes, Private members, Operator Overloading, inheritance and polymorphism.	7 Hours
Unit	**Application Development:** Developing applications using libraries and packages, File handling, Exception handling, developing applications using Python	5 Hours
	Total Lectures Hours	37 Hours

Text Books	
SN	**Title**
1	Learn Python Programming, Third Edition, Fabrizio Romano, Heinrich Kruger, PACKT Publishing

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Reference Books	
SN	**Title**
1	Introduction to Computation and Programming Using Python,Second Edition, John V. Guttag, PHI EEE (MIT Press)

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc20_cs70/preview
2	https://onlinecourses.nptel.ac.in/noc20_cs83/preview

V Semester
22CSE533 – OE I: Introduction to Image Processing

Course Outcome
Upon successful completion of the course the students will be able to CO1: Understand basic principles of image processing. CO2: Analyze images using processing algorithms/Techniques. CO3: Apply the concepts to implements basic image processing algorithms/operations.

Unit No.	Contents	Max. Hrs.
Unit:1	Fundamentals of Image Processing: Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships between Pixels, Linear and Nonlinear Operations.	6 Hours
Unit:2	Image Transformations: Image Enhancement in the Spatial Domain: Basic Grey Level Transformations, Histogram Processing, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.	7 Hours
Unit:3	Image Processing: Color Image Processing: Color Fundamentals, Color Models, Pseudocolor Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Color Segmentation	6 Hours
Unit:4	Image Segmentation :Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, Segmentation by Morphological Watersheds	6 Hours
Unit:5	Image Compression: Image Compression: Fundamentals, Some Basic Compression Methods -Run Length Coding, Huffman Coding, Arithmetic Coding, Bit Plane Coding, Block Truncation Coding. JPEG Compression.	6 Hours
Unit :6	Morphological Image Processing: Morphological Image Processing: Preliminaries, Erosion and Dilation, Opening and Closing, Hit or Miss Transformation, Some Basic Morphological Algorithms, Grey Scale Morphology.	6 Hours
	Total Lectures Hours	37 Hours

Text Books	
1	Digital Image Processing, (DIP/3e), 3rd edition, Gonzalez and Woods, Prentice Hall - 2008

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

	Reference Books
1	Digital Image Processing, Kenneth R Castleman, Pearson Education
2	Fundamentals of Digital image Processing, Anil Jain.K, Prentice Hall of India

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Technology/19-2016_Book_DigitalImageProcessing.pdf
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs04/preview
2	https://onlinecourses.nptel.ac.in/noc22_cs80/preview

V Semester

22CSE534 – OE I: Essentials of IT

Course Outcomes
Upon successful completion of the course, the student will be able to: 1. Develop algorithm and write pseudo code for a given problem statement. 2. Construct Entity-Relationship Model and design RDBMS for a given problem statement. 3. Design static and dynamic web pages using HTML and Javascript and write simple programs in Javascript. 4. Apply software engineering concepts in any software project implementation.

Unit No.	**Contents**	**Max. Hrs.**
Unit:1	Programming fundamentals of Java: problem solving skills, Algorithm – representation using pseudo code, algorithm properties. Programming in java-programming constructs in JAVA, control structures type casting, SDLC overview and need for Object oriented approach, object oriented concepts, introduction to UML.	8 Hours
Unit:2	OO fundamentals – Java Implementation: OO fundamentals, coding standards, reference variables and objects in memory, methods, „this" reference. Data structures: data structures, linear data structures, non- linear data structures.	8 Hours
Unit:3	Data base basics- data storage, need for DBMS, functions of DBMS, data perspectives in DBMS, types of data models, relational model and keys, Database Design – Database life cycle, Data requirements, logical design – ER modeling, converting ER model to relational schema, functional dependency, normalization.	8 Hours
Unit:4	SQL – need for SQL, types of SQL statements, data types in SQL, SELECT statement with various operators, single row and multi row functions, group by and having clauses.	8 Hours
Unit:5	Introduction to web technologies: Computer Networks, HTML tags and CSS, Implementation of Java Scripts, Operators and control structures, function and dialog boxes, DOM element.	8 Hours
Unit:6	Software Engineering – Basics, SE models and approaches, Requirement developing activities, software design and construction, software testing, introduction to user experience, Project categories and project management phases, software quality.	8 Hours
	Total Lectures Hours	48Hours

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Java: The complete reference,Herbert Schildt, McGraw-Hill
2	Database System Concepts, Silberschatcz, Korth, Sudarshan, McGraw-Hill Education
3	Software Engineering: A Practitioner's Approach, Roger Pressman, McGraw Hill Higher Education

Reference Books

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc20_cs58/preview
2	https://onlinecourses.nptel.ac.in/noc21_cs65/preview
3	https://onlinecourses.nptel.ac.in/noc21_cs04/preview

V Semester
22CSE551 – OE II: Software Testing for Beginners

Course Outcome
Upon successful completion of this course, the student will be able to: 1. Formulate problem by following Software testing life cycle. 2. Design Manual Test cases for Software Project. 3. Demonstrate utilization of testing automation though testing tool.

Unit No.	Contents	Max. Hrs.
1	**Software Testing Basics:** Basic concepts of Testing: Need of Testing, Basic concepts-errors, faults, defects, failures, objective of testing, central issue in testing, Testing activities, V-Model, Sources of information for test cases, Monitoring and Measuring Test Execution, Test tools and Automation, Limitation of Testing.	6
2	**Unit Testing:** Unit Testing: Concepts of Unit Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation Testing, Debugging, Tools for Unit Testing.	6
3	**Control Flow Testing:** Control Flow Testing: Outline of Control Flow Testing, Control Flow Graphs, Path in Control Flow Graph, Path selection criteria, All path coverage criteria, Statement coverage, Path coverage.	7
4	**Integration Testing:** Data Flow and System Integration Testing: Introduction Data flow testing, Data flow graph, Data flow testing criteria, Fundamentals of System Integration: Types of interfaces and interface errors, System integration testing, Software and Hardware integration.	7
5	**System Testing:** System Testing: Taxonomy of system test, Basic Test, Functionality test, Robustness test, Performance test, Scalability test, Stress test, Load and Stability test, Reliability test, Regression test, Documentation Test.	6
6	**Test Cases:** Test Design: Test cases, Necessity of test case documentation, Test case design methods, Functional specification-based test case design, Use case bases, application based test case design, level of test execution.	6
	Total Lectures Hours	38Hours

Text Books	
S.No	**Title**
1	Software Testing and Quality Assurance**,** Kshirsagar Naik and PriyadarshiniTripathi**,** Wiley Publication
2	Software Testing Principles, Techniques and Tools, M.G. Limaye, McGraw Hills

Reference Books	
1	Foundations of Software Testing, Aditya P. Mathur, Pearson Education
2	Software Testing Tools, Dr. K. V. K. K. Prasad, Dream Tech

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs13/preview
2	https://onlinecourses.nptel.ac.in/noc19_cs71/preview

V Semester

22CSE552 – OE II: Introduction to Web Technology

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Design Web pages using HTML5 2. Build an interactive website with CSS3 3. Develop basic programming skills using JavaScript 4. Create XML documents and Schemas.

Unit No.	Contents	Max. Hrs.
Unit:1	**Introduction to internet:** Overview of Internet, Intranet, WWW, Internet Protocols (HTTP, FTP, SMTP), Email, broadband.	6 Hours
Unit:2	**Introduction to HTML5:** Web server, Web Client/Browser, Structure of an HTML Program, Basic HTML Tags(Headings, Paragraph, Division, Text formatting, Image, Anchors), HTML Lists (Ordered Lists, Unordered Lists, Description Lists), HTML Attributes, HTML Links (Href Attribute, Target Attribute).	6 Hours
Unit:3	**Table handling in HTML and Creating Forms:** Table handling in HTML: width and border attribute, CELLPADDING attribute, CELLSPACING attribute, COLSPAN and ROWSPAN attributes, background color attribute, HTML Forms: Elements to Capturing Form Data, Properties of Form Elements, HTML Layout Elements(Semantic Elements), HTML style attribute, HTML class and id attribute.	6 Hours
Unit:4	**Cascading Style Sheets (CSS3):** Introduction to CSS, Differences between CSS3 and earlier CSS specifications, CSS Syntax, CSS selectors, Inserting CSS: Inline, Internal, External, CSS properties: Background, Text, Font, Border, Margin, Padding, List, Dimension, and Classification.	6 Hours
Unit:5	**Java Script:** Introduction to Java Script, Functions of Javascript, Variables and Data Types, Operators, Loops and control statement: if Statement, if...else Statement, else if Statement, JavaScript Switch Statement, JavaScript Functions, JavaScript Loops: for loop, while loop, do...while loop, Dialog Boxes, JavaScript Events.	6 Hours
Unit :6	**Introduction to XML:** What is XML?, Features of XML, XML Syntax and Structure Rules(Start tags, End tags, Empty elements, XML tag attributes),XML Document Type Declaration(DTD, Internal DTD's, External DTD's.	6 Hours
	Total Lectures Hours	36

Text Books	
S No	**Title**
1	Web Technologies Black Book: HTML, JavaScript, PHP, Java, JSP, XML and AJAX Kogent Learning Solutions Inc.

Reference Books	
S No	**Title**
1	HTML & CSS: The Complete Reference,Fifth Edition, Thomas A. Powell,The McGraw-Hill Companies, Inc
2	Web Technologies, Ivan Bayross, BPB Publication

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/106105084
2	https://www.youtube.com/watch?v=uUhOEj4z8Fo
3	https://www.youtube.com/watch?v=mU6anWqZJcc

V Semester

22CSE553 – OE II: Introduction to Cloud Computing

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand Cloud Computing Models. 2. Apply Cloud Concepts &Technologies. 3. Analyse Cloud Services & Platforms 4. Use MapReduce to process Big Data on Apache Hadoop.

Unit No.	Contents	Max. Hrs.
Unit:1	**Introduction to Cloud Computing:** Definition of Cloud Computing, Characteristics of Cloud Computing, Cloud Models (Service & Deployment), Cloud Services Examples (IaaS, PaaS, SaaS), Cloud-based Services and Applications (Cloud computing for Healthcare, Manufacturing Industry and Education).	6 Hours
Unit:2	**Cloud Concepts &Technologies:** Virtualization, Load balancing, Scalability & Elasticity, Monitoring, Identity & Access Management, Service Level Agreements	6 Hours
Unit:3	**Cloud Services & Platforms:** Compute Services (Amazon Elastic Compute Cloud, Google Compute Engine, Windows Azure Virtual Machines), Storage Services (Amazon Simple Storage services, Google Cloud Storage, Windows Azure Storage), Database Services (Amazon Relational Data Store, Google Cloud SQL, Windows Azure SQL Database), Application Services (Application Runtimes & Frameworks) Identity & Access Management Services (Amazon Identity & Access Management, Windows Azure Active Directory), Open Source Private Cloud Software (CloudStack, Eucalyptus, OpenStack).	6 Hours
Unit:4	**Hadoop & MapReduce:** Apache Hadoop, Hadoop MapReduce Job Execution, NameNode, Secondary NameNode, JobTracker, TaskTracker, DataNode, MapReduce Job Execution Workflow, Hadoop Schedulers, Hadoop Cluster Setup.	6 Hours
Unit:5	**Cloud Application Design:** Design Considerations for Cloud Applications, Scalability, Reliability & Availability, Security, IaaS, SaaS Services for Cloud Applications.	6 Hours
Unit :6	**Cloud Security:** Introduction, CSA Cloud Security Architecture, Authentication, Single Sign On (SSO), Authorization.	6 Hours

Text Books	
1	CLOUD COMPUTING A Hands -on Approach, Arshdeep Bahga & Vijay Madisetti,Wiley Publication

Reference Books	
1	CLOUD COMPUTING,Michael Miller, PEARSON PUBLICATION
2	Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance,Tim Mather, Subra Kumaraswamy, and Shahed Latif, O'Reilly
3	Cloud Computing Bible, Barrie Sosinsky, John Wiley & Sons

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs14/preview
2	https://www.simplilearn.com/

V Semester
22CSE554 – OE II: Introduction to OS Concepts

Course Outcomes:
Upon successful completion of the course, the student will be able to: 1. Use LINUX operating system. 2. Write Shell scripts

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction: History of Linux and Unix, Linux Overview, Linux releases, open linux.	7 Hours
Unit:2	Linux Commands and Filters : Mkdir, CD, rmdir, pwd, ls, who, whoami, cat, more, fail, head, concept of, mv, chmod, grep,wc, comm., split, sort, diff, kill, write, wall, merge, mail, news	6 Hours
Unit:3	Shell: The command line special characters and file arguments, standard input/output and redirection, pipes, redirecting and piping with standard errors, shell scripts, jobs.	6 Hours
Unit:4	Linux file Structure: Linux files, file structure, listing displaying and printing files, managing directories, file and directory operations.	6 Hours
Unit:5	Vi Editor: Vi editing commands advanced Vi editing commands, line editing commands, options in Vi	6 Hours
Unit :6	System Administration: System management, managing users, installing and managing devices, floppy disk management, file system administration, backups	7 Hours

Text Books	
1	Linux – The Complete Reference Tata **,** Richard Peterson**,** McGraw Hill, New Delhi
2	Linux – Install and Configuration Black Book, Die Annleblanc and Issac Yates**,** IDG Books India Private Ltd.,
3	Unleashed Linux **,** Tech Media Publishers

Reference Books	
1	Linux Pocket Guide,Daniel J.Barrett,O'Reilly Media
2	The Linux Command Line, William Shotts, No Starch Press
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs88/preview#:~:text=Operating%20System%20Fundamentals%201%20Course%20layout%20Week%201%3A,is%20free%20to%20enroll%20and%20 learn%20from.%20
2	https://onlinecourses.nptel.ac.in/noc21_cs72/preview

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

V Semester
22CSE507: Industrial visit, Seminar & report

V Semester
Audit Course
MLC2125 : YCAP5: YCCE Communication Aptitude Preparation

V Semester
Audit Course
MLC125 : YCAP5: Design thinking

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

6th Semester

(Department of Computer Science and Engineering

B.Tech in Computer Science and Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Computer Science & Engineering)

B. Tech in Computer Science & Engineering)

SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	CSE/CSE	22CSE601	Language Processor	**T**	3	0	0	4	4	30	20	50	3 Hrs
2	6	PC	CSE/CSE	22CSE602	Lab: Language Processor	**P**	0	0	2	2	1		60	40	
3	6	PC	CSE/CSE	22CSE603	Cloud Computing	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	6	PC	CSE/CSE	22CSE604	Software Engineering	**T**	3	0	0	3	3	30	20	50	3 Hrs
5	6	PC	CSE/CSE	22CSE605	Lab: Software Engineering	**P**	0	0	2	2	1		60	40	
6	6	PE	CSE/CSE		**Professional Elective-II**	**T**	3	0	0	3	3	30	20	50	3 Hrs
7	6	PE	CSE/CSE		**Lab: Professional Elective-II**	**P**	0	0	2	2	1		60	40	
8	6	OE	CSE/CSE		**Open Elective - III**	**T**	3	0	0	3	3	30	20	50	3 Hrs
9	6	OE	CSE/CSE		**Open Elective - IV**	**T**	3	0	0	3	3	30	20	50	3 Hrs
10	6	PR	CSE/CSE	22CSE606	PROJECT PHASE 1	**P**	0	0	4	4	2		60	40	
						TOTAL	**18**	**0**	**10**	**29**	**24**				

List of Professional Electives-II

1	6	PE-II	CSE/CSE	22CSE611	PE-II: Business Intelligence
2	6	PE-II	CSE/CSE	22CSE612	PE-II: **Lab:** Business Intelligence
3	6	PE-II	CSE/CSE	22CSE613	PE-II: Internet of Things
4	6	PE-II	CSE/CSE	22CSE614	PE-II: **Lab:** Internet of Things
5	6	PE-II	CSE/CSE	22CSE615	PE-II: Neural Network and applications
6	6	PE-II	CSE/CSE	22CSE616	PE-II: **Lab :** Neural Network and applications
7	6	PE-II	CSE/CSE	22CSE617	PE-II: Augmented and Virtual Reality
8	6	PE-II	CSE/CSE	22CSE618	PE-II: **Lab:** Augmented and Virtual Reality

Open Elective-III

1	6	OE-III	CSE/CSE	22CSE631	OE III: Database System Essentials
2	6	OE-III	CSE/CSE	22CSE632	OE III: Programming with Python
3	6	OE-III	CSE/CSE	22CSE633	OE III: Introduction to Image Processing
4	7	OE-III	CSE/CSE	22CSE634	OEIII: Essentials of IT

Open Elective-IV

1	6	OE-IV	CSE/CSE	22CSE651	OE IV: Software Testing for Beginners
2	6	OE-IV	CSE/CSE	22CSE652	OE IV: Introduction to Web Technology
3	6	OE-IV	CSE/CSE	22CSE653	OE IV: Introduction to Cloud Computing
4	6	OE-IV	CSE/CSE	22CSE654	OE IV: Introduction to OS Concepts

List of Mandatory Learning Course (MLC)

1	6	HS	T&P	MLC2126	YCAP6 : YCCE Communication Aptitude Preparation	**A**	3	0	0	3	0	

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.00
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2022-23 Onwards

VI Semester
22CSE601 – Language Processor

Course Outcome
Upon successful completion of the course, the student will be able to: 1. Understand basic concepts of compiler design, Lexical analysis process and apply the knowledge of LEX/Flex tool. 2. Explain the role of a syntax analyzer and distinguish between different types of parsers, design and implement a parser using a YACC tool. 3. Apply the knowledge of Syntax directed translation to create intermediate code generation 4. Demonstrate the use of a symbol table throughout compilation. 5. Apply various code optimizing transformations and code generation techniques.

Unit No.	Contents	Max Hrs.
1	**Introduction:**	6
Introduction to Compilation Process, Compilers & Translators, Phase structure of Compiler, Design of Lexical Analysis.		
2	**CFG, LL(1):**	7
Specifying Syntactic Structure of Programming Language using Context Free Grammars, The role of Parser, Top-down Parsing, Bottom Up Parsing, Predictive Parsers, Recursive Decent Parser.		
3	**Parser:**	7
Construction of efficient LR Parsers (SLR, CLR & LALR), Canonical Collection of set of items and construction of Parsing table, Implementation of LR Parsing table.		
4	**Syntax Directed Translation:**	6
Intermediate Code, Postfix notation, Parse tree and Syntax Trees, Three address codes, quadruples, triples, Translation of Arithmetic Expression, Boolean expressions, Control Statements. Array references, Procedure Calls, Declarations, Case Statements, Use of Compiler writing tools (Lex/ Flex, Yacc / Biason).		
5	**Symbol Tables:**	6
Contents, Representing scope information. Error detection and Recovery: Error handling, Lexical-phase, Syntactic phase and semantic phase.		
6	**Code Optimization & Code Generation:**	7
Introduction to Code Optimization, The principle sources of optimization, Loop optimization, The DAG representation, Introductory Data Flow analysis, Introduction to Code Generation: Object programs, Problems in Code Generation, Register allocation and assignment, Code generation from DAG, Peephole optimization.		
	Total Lectures	**39**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Compilers Principles, Techniques & Tools, 2nd Edition, Alfred V. Aho, Jeffrey D. Ullman & Ravi Sethi, Pearson Education
2	Principles of Compiler Design, Alfred V. Aho, Jeffrey D. Ullman, Narosa Publishing House

Reference Books	
1	Compiler Design,Dr. O.G. Kakde, Laxmi Publication
2	Introduction to Compiling Techniques: First Course Using ANSI C, Lex and Yacc,J. P. Bennett, McGraw-Hill Publication

VI Semester
22CSE602 – Lab: Language Processor

Sr. No.	List of Experiment
1	Implement a Lexical Analyzer using FLEX and develop: A. Program For converting all small case letters to UPPER case letters and Vice-Versa. B. Program to count the words, spaces, and lines in a given input file.
2	Study the LEX/Flex and YACC/Bison tool and Develop: A. LEX program to eliminate comment lines (Single and Multiple) in a text(C program) file and copy the resulting program into a separate file. B. YACC program to recognize valid identifier, operators and keywords in the given text (C program) file.
3	A. Develop a LEX program to recognize valid arithmetic expression. Identifiers in the expression could be only integers and operators could be + and *. Count the identifiers & operators present and print them separately. B. Develop a YACC program to evaluate arithmetic expression involving operators: +, -, *, and /.
4	Develop, Implement and execute a program using YACC tool to recognize all strings ending with b preceded by n a's using the grammar a n b (note: input n value), also create DFA of given grammar using JFLAP
5	Develop a program to find FIRST and FOLLOW of all variables. Write a suitable data structure to store a context fee grammar. Prerequisite is to eliminate left recursion from the grammar before storing
6	Design and Simulate Predictive / LL (1) Parsing Table using JFLAP for the grammar rules: A→ aBa, B→bB .
7	Design and Simulate SLR(1) parsing using JFLAP for the grammar rules: E→ E+T | T, T→ T*F | F, F → (E) | id and parse the sentence: id + id * id.
8	Develop a program for intermediate code generator to generate three address code using LEX & YACC.

VI Semester
22CSE603 –Cloud Computing

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Explain software and hardware support for enterprise and cloud computing. 2. Perform data modelling for enterprise and cloud knowledge bases. 3. Design enterprise and cloud software applications. 4. Implement and run distributed and cloud applications. 5. Ensure security and privacy in enterprise and cloud application while implementing cloud applications methodologies.		
Unit:1	**Introduction to Cloud Computing**	**6 Hours**
Defining Cloud Computing; Cloud Types and different models-The NIST model, The Cloud Cube Model, Deployment models, Service models; Examining the Characteristics of Cloud Computing; Benefits of cloud computing; Disadvantages of cloud computing; Assessing the Role of Open Standards.		
Unit:2	**Cloud Architecture, Services and Applications**	**6 Hours**
Exploring the Cloud Computing Stack, Connecting to the Cloud, Infrastructure as a Service, Platform as a Service, Saas Vs. Paas, Using PaaS Application Frame works, Software as a Service, Identity as a Service, Compliance as a Service.		
Unit:3	**Abstraction and Virtualization**	**6 Hours**
Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hypervisors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context.		
Unit:4	**Exploring Cloud Infrastructures**	**6 Hours**
Managing the Cloud-Administrating the Clouds, Management responsibilities, Lifecycle management Cloud Management Products, Emerging Cloud Management Standards, Understanding Service Oriented Architecture- Introducing Service Oriented Architecture.		
Unit:5	**Managing & Securing the Cloud**	**6 Hours**
Administrating the Clouds, Cloud Management Products, Emerging Cloud Management Standards, Securing the Cloud, Securing Data, the security boundary, Security service boundary, Security mapping, Brokered cloud storage access, Establishing Identity and Presence.		

Unit :6	Advance Clouds and Case Studies	6 Hours
Cloud Computing Cost Analysis, basic, Selecting an IaaS Provider, Capacity Planning and Disaster, Recovery in Cloud Computing, AWS Cloud architectural principles, basic/core characteristics of deploying and operating in the AWS Cloud, the key services on the AWS Platform and their common use cases, Define the billing, account management, and pricing models, Introduction to Amazon EC2. Case Studies: Microsoft Azure, Dropbox.		
Total Lecture Hours		**36 Hours**

Textbooks	
1	Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Michael Miller, Springer
2	Cloud Computing (Principles and Paradigms), Edited by Rajkumar Buyya, James Broberg, Andrzej Goscinski, John Wiley & Sons, Inc., Rajkumar Buyya, James Broberg, Andrzej Goscinski, A John Wiley & Sons, Inc. Publication
Reference Books	
1	Mastering cloud computing, Rajkumar buyya, Christian vecchiola, S Thamarai Selvi, Tata Mc-Graw Hill Education Private Limited
2	Cloud Computing a Practical Approach, Anthony T .Velte, Toby J. Velte, Robert Elsenpeter, Tata Mc-Graw-HILL
3	Cloud computing bible, Barrie sosinsky, Wiley publishing
4	https://cloud.google.com/appengine/docs https://www.chef.io/solutions/cloud-management/ https://aws.amazon.com/documentation https://dev.twitter.com/overview/documentation https://developers.facebook.com/ https://www.cloudfoundry.org/ https://puppet.com/blog/implement-a-message-queue-your-cloud-applicati
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/DTEL%20Material/7.Information%20Technology/DTEL%20PPTs/18.CC%20PPT_ADG.pdf
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs14/preview
2	https://nptel.ac.in/courses/106105167

VI Semester
22CSE604 – Software Engineering

Course Outcome
Upon successful completion of the course, the student will be able to: 1. Choose appropriate software engineering process model, requirement engineering principles and software designing fundamentals for a given project. 2. Select appropriate testing strategy and apply testing principles for testing a given application. 3. Apply basics of software configuration management, version control and change control in software development. 4. Evaluate cost estimation, effort and severity of software risk for given application. 5. Perform basic operations on Sub-version for software version control.

UNIT I:	6
Introduction to Software Engineering, A Generic View of process, Process models: Water fall Model, RAD Model, Prototyping Model, Component Development Model, Agile Model, Requirement Engineering: Requirement Engineering Task Initialization Eliciting Requirement, Developing Use Case, Analysis Model, Negotiation, Validation.	
UNIT II:	6
Building the Analysis mode: Requirement Analysis, Analysis Modeling Approaches, Data Modeling Concept, Object Oriented Analysis, Types of Modeling, Design Engineering: Design Concept, Design Model.	
UNIT III:	7
Testing Strategies : Strategic Approach, Strategic issues, Strategies for conventional Software, Strategies for Object Oriented Software, Validation Testing, Testing Tactics: White-Box Testing, Basis Path testing: Flow Graph Notation, Independent Program Paths, Control Structure Testing, Black Box Testing, Introduction to object oriented testing.	
UNIT IV:	7
Configuration Management: Base lines, Software Configuration items, The SCM Process, Identification of Objects in the Software Configuration, Version Control, Change Control, Configuration Audit, Status Reporting, SCM Standards.	
UNIT V:	7
Project Management, Metrics for Process and Projects, Project Estimation, Risk Management: Reactive vs. Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection.	

UNIT VI:	6
Advanced Topics in Software Engineering: Re engineering Computer aided software engineering, Open source SE tools introduction, Example-Subversion: Overview, Typical subversion usage and work flow.	
Total Lectures	**39**

Text Books

1.Software Engineering–A Practitioner's Approach , 6th Edition, Roger S. Pressman,McGraw Hill
2.Software Engineering, 9th Edition, Ian Sommerville, Pearson

Reference Books

1.Object Oriented Software Engineering, 6th Edition, Leth Bridge, TATA McGraw Hill

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/45.Object_Oriented_Software_Engineering__Practical_Software_Development_using_UML_and_Java%20hal%2056.pdf
2	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/17.2017_Book_Concise%20Guide%20to%20SE.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/106/105/106105182/

VI Semester
22CSE605 – Lab.: Software Engineering

Sr. No.	List of Experiment
1	Introduction to Software Engineering fundamentals, UML and RATIONAL ROSE Interface.
2	To study and create Software Requirement Specification document for given case study.
3	To study and draw UML Use Case diagram for the given case study.
4	To study and draw UML Class diagram for given Case Study.
5	To study and draw UML Activity diagram for given Case Study.
6	To study and draw UML Sequence Diagram for given Case Study.
7	To study and draw State Diagram for given Case Study.
8	Write a Program to find out the Estimation (cost and effort) by using COCOMO model.
9	To Perform Manual and Automated testing using CASE tool for given Case Study.
10	To Study and execute Version Control using Subversion

VI Semester

22CSE611 – PE II: Business Intelligence

Course Outcome
After completion of the course Students will be able to : ➢ Assemble BI as a Process, identify its application in various domains and functional area, its roles and responsibilities. ➢ Identify functions of building blocks in N_tier BI ecosystem ➢ Identify different stages in Lifecycle of a BI project. ➢ Differentiate between traditional BI and self-service BI (PO1-2) 1. Apply SQL as a universal language for BI (PO2-3) 2. Model a business scenario; identify the metrics, indicators, various dimensions, and aggregation strategies and make recommendations to achieve the business goal (PO3-3) 3. Obtain hands on experience with some popular BI software for analysis, reporting, visualization of results (PO1-2, PO2-2,PO3-2,PO5-3)

Unit No.	Contents	Max. Hrs.
1	**Introduction to Business Intelligence :**	8
What is business intelligence, why do we need BI, EIS,MIS,DSS& BI, information pyramid-data, information, Knowledge & intelligence. Basis For operational, tactical & strategic decision making , OLTP vs. OLAP, Requirement gathering in BI through business question BI in various domains and functional area		
2	**SQL the universal language for Business Intelligence :**	7
Introduction to RDBMS, Language for retrieving data from a database,various clauses in a SQL retrieving data from multiple tables- joins filtering, sorting & grouping datasets, Introduction to DDL & DML statements, various built- in functions in SQL,Use of sub- queries,data dictionary and dynamic SQL.		
3	**Principles of Dimensional modeling:**	7
Foundation for fact based decision making, star and snowflake schema, Pros& cons of the star/snowflake schema dimensional model, Slowly changing dimension tables, Fact-less fact strategy, Time dimension.		
4	**Business Intelligence system architecture:**	6
Need for enterprise class business intelligence infrastructure, The BI ecosystem, Building blocks of a n- tier BI system-servers & communication protocols ,The central repository-metadata, Information consumption user interfaces-desktop vs. web vs. Mobile. Open architecture, Scalability, performance in BI-in memory analytics.		

5	**BI Project Lifecycle :**	6
Typical BI project lifecycle, Requirements gathering & analysis-functional & non- functional requirements, reports and dashboards design- mock – up and storyboarding, Testing in a BI project, BI project deployment, Post production support, Applications of BI, BI best practices		
6	**Self-service Analytics :**	6
What is Self-service Analytics, What are the use cases of self-service analytics, Business Paradigm vs IT paradigm and the Paradigm Shift with self-service analytics, Challenges of Self-service Analytics. Introduction to MicroStrategy Desktop – Overview		
	Total Lectures	39

Text Books	
1	Data Warehousing ETL toolkit, Indian edition, Ralph Kimball and Margy Ross, wiley
2	Fundamentals of Business Analytics, R.N.Prasad, Seema Acharya, wiley
3	Business Intelligence: The Savvy Manager's Guide, David Loshin

Reference Books	
1	Data Warehousing in the real world A practical guide for building Decision Support System , Sam Anahory, Dennis Murray, PEARSON

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1. http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/26.Business%20Intelligence_%20The%20Sav%20-%20David%20Loshin_1391.pdf	
2. http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/book%20details/CSD.aspx	
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_mg65/preview
2	h https://nptel.ac.in/courses/110107092

VI Semester

22CSE612 – PE II: Lab: Business Intelligence

Sr. No.	Name of Practical
1	Exploring HR schema of Oracle, Implementation of queries based on range, relational operators, sorting, and concatenation.
2	Implementation of queries based on character matching, aggregate functions, set operations
3	Implementation of queries based on Joins (joining 2 or more tables), sub queries.
4	a. Design a multidimensional data cube for given data Using EXCEL b. Perform OLAP- slicing operation on it
5	Creation Of Dashboard Using EXCEL
6	Exploring Tableau OR/ MICROSTRATEGY ANALYTIC DESKTOP (MSTR) : Installation tool, Importing Data from file, Data Wrangling (Editing Data).
7	Visualization Of Data Using different visualizations in Tableau/ MSTR analytic desktop, Filtering data, and delivering Insights from data
8	Create reports and Dashboard with defined insights /requirements in Tableau/MSTR analytic desktop. (Sample Data to be provided)

VI Semester
22CSE613 – PE II: Internet of Things

Course Outcome
1. Develop various IOT environments 2. Demonstrate IOT architecture and its enabling technologies 3. Analyze IOT environments using various communication technologies 4. Apply various IOT enabling technologies for creation of IOT environments

Unit No.	Contents	Max. Hrs.
1	**Introduction :**	6
Concepts behind the Internet of Things, Characteristics of IoT, IoT enabling technologies, IoT Communication Model, IoT architecture, Applications of IoT, Transducers, Sensors, Sensor classes, Sensor types, Actuators and its types.		
2	**IOT Protocols**:	7
Application layer: MQTT, COAP, XMPP, AMQP, Network Layer: IPv4, IPv6, 6LoWPAN, IoT Communication protocols: IEEE802.15.4, ZigBee, Wireless HART, Zwave, Bluetooth, NFC, RFID.		
3	**Wireless Sensor networks**:	6
Components of sensor nodes, Node Behavior in WSNs, Applications, WSN Coverage, OGDC algorithm, Stationary and Mobile Wireless Sensor Networks.		
4	**Cloud Computing:**	6
Recent Trends in Computing, Characteristics, Components of Cloud Computing, Service Models, Deployment Models, Service Management, Cloud Security, IoT Data analytics, Case studies, Middleware for IoT		
5	**Machine to Machine Communication:**	6
Node types, IP and Non IP based M2M network Interoperability in Internet of Things: Current Challenges in IoT, Interoperability, Types of Interoperability		
6	**Software-Defined Networking**:	6
Current Network to SDN, SDN Architecture, Challenges, OpenFlow Protocol, APIs in SDN, Controller Placement, Recent Advances of SDN in IoT, Industrial internet of things, Case studies		
	Total Lectures	37

Text Books	
1	Internet of Things: A Hands-On Approach, Arsheep Bahga, Vijay Madisetti, Universities Press
Reference Books	
1	Introduction to IOT, S.Misra , A. Mukherjee, A.Roy , Cambridge university press

VI Semester
22CSE614 – PE II: Lab: Internet of Things

Sr. No.	List of Experiment
1	To study IoT Kit
2	Design a sketch for running of LED's
3	Design a sketch to monitor state of switch by establishing serial communication between Arduino and computer
4	Design a sketch to read analog value of potentiometer by establishing serial communication between arduino and computer
5	Design a sketch for blinking LED's without using delay
6	Design a sketch to develop switch based binary LED counter. Also observe output on serial monitor
7	Design a sketch to create a simple digital clock using LCD display
8	Design a sketch to make use of EEPROM to control devices(LED)
9	To log data of temperature sensor over internet and monitor it from anywhere in the world
10	Use of ESP-32

VI Semester

22CSE615 – PE II: Neural Network and Applications

Course Outcome
Upon successful completion of the course the students will be able to CO 1: understand the basic concepts, underlying mathematics, and differences between Networks CO 2: Apply popular neural network algorithms for solving classification and regression problems CO 3: Identify and Analyse various ways of selecting suitable model parameters for different neural network algorithms. CO 4: Design multi-layer feed-forward neural networks and CNNs using deep learning concepts

Unit No.	Contents	Max. Hrs.
1	**Introduction to Biological and Artificial Neural Networks:**	6
Biological Neurons, General Artificial Neuron Model, MP Neuron, Perceptrons, Neural Network learning Rules, types of neural networks, feedforward vs recurrent neural networks		
2	**Perceptrons and Machine Learning Basics:**	6
Single Discrete Perceptron algorithm, linear machine and minimum distance classification, gradient descent and Single Continuous Perceptron algorithm Machine learning basics: supervised vs unsupervised learning, various Machine learning tasks like classification, regression, machine Translation, Anomaly detection, etc. Capacity, Overfitting and Underfitting, bias and variance.		
3	**Multilayer Perceptrons and Backpropagation Algorithm**	6
Multilayer Perceptrons (MLPs), Representation Power of MLPs, Feed forward Neural Networks, Backpropagation, algorithm, Momentum Based Gradient Descent (GD), Nesterov Accelerated GD, Stochastic GD, AdaGrad, RMSProp, Adam, Applications of MLPs for classification and regression,Performance measures		
4	**Regularization:**	5
L1, L2 Regularization, Early stopping, Dataset augmentation, Parameter sharing and tying, Injecting noise at input, any other recent topics.		
5	**Introduction to Deep Networks:**	6
History of deep learning, Types of deep networks, Introduction to Convolutional Neural Networks, LeNet, Alex Net, ZF-Net, VGGNet, GoogLeNet, ResNet, Transfer learning using CNNs, comparison of shallow and deep networks.		
6	**Autoencoders:**	5
Auto encoders, Regularization in auto encoders, Denoising auto encoders, Sparse auto encoders, Contractive auto encoders.		
	Total Lectures	37

Text Books	
1	Deep Learning, Ian Goodfellow, Yoshua Bengio, Aaron Courville, MIT Press
2	Introduction to artificial neural system, Jacek M. Zurada
Reference Books	
1	Deep learning with python, Francois Chollet, Manning
2	Pattern Recognition and Machine Learning, Christopher Bishop, Springer
3	Neural Networks: A Systematic Introduction, Raul Rojas, Springer
4	Deep Learning, Amit Das, Saptarshi Goswami, Prabir Mitra, Amlan Chakrabarti, Pearson

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	Deep Learning – Prof. Mitesh Khapra (IIT Ropar), Swayam Course https://onlinecourses.nptel.ac.in/noc22_cs124/preview
2	Neural Networks and Deep Learning, Andrew Ng https://www.coursera.org/learn/neural-networks-deep-learning#syllabus

VI Semester

22CSE616 – PE II: LAB: Neural Network and Applications

Sr. No.	List of Experiment
1	Design and Implement 3-input gates using Mc Culloch Pit's Model of a neuron.
2	Find the weights for 3-input NAND gate using Single Discrete Perceptron Training Algorithm
3	Implement a Linear Machine using discrete perceptron to classify binary image patterns.
4	Implementing a classifier using feed forward Neural Network using Scikit learn
5	Implementing a feed forward Neural Network based regression using Scikit learn
6	Experiment on classification using Pre-trained deep network
7	Comparing Shallow and Deep Networks(CNN) for digit classification using MNIST dataset
8	Developing a real-world application using CNN.

VI Semester

22CSE617– PE II: Augmented and Virtual Reality

Course Outcome
Upon completion of the course the students will be able to 1. Understand the basic concepts of Virtual and Augmented Reality 2. Identify the differences in AR/VR concepts and technologies 3. Understand the fundamental concepts relating to Virtual Reality such as presence, immersion, and engagement 4. Evaluate usability of AR/VR applications and critique their use of AR/VR capabilities 5. Design and prototype effective AR/VR applications using UNITY platform for business, industry, non-profit and government organizations

Unit No.	Contents	Max Hrs.
1	**Introduction to Augmented Reality (AR)**	6
	Definition and Scope, A Brief History of Augmented Reality ,Displays (Multimodal Displays, Spatial Display Model, and Visual Displays), Strong vs Weak AR, Applications of AR, Challenges in AR	
2	**Introduction to Virtual Reality (VR)**	6
	Definition and Scope, Types of VR, Characteristics of VR, Basic VR environments, Limitations of VR environments, Immersion Vs Presence, Key hardware requirements for VR	
3	**Interaction design for AR/VR environments**	6
	Interaction design process, Identifying user needs, AR/VR design considerations, Typical AR/VR Interface Metaphors, Affordances in AR/VR, Human Information Processing.	
4	**AR/VR and UNITY**	7
	Design for Perception and cognition, User experience(UX) guidelines for AR/VR UX challenges for AR/VR, Prototyping for AR/VR, Evaluation of the developed AR/VR prototype. Unity Overview: Windows, Interface, Navigation, Terminology, Game Objects, Hierarchy, Parenting Objects	
5	**Introduction to UNITY**	6
	Asset Store, Importing Plug-ins, Creating a Terrain, Materials, Colors, Transparency Introduction to Monobehaviors: Awake, Start, Update	
6	**Introduction to Vuforia and Physics in UNITY**	7
	Vuforia Overview: Interface, Navigation, Terminology, Image Targeting, Custom Images Overview of Physics in Unity, Introduction to Scripting: Terminology, Creating Objects, Accessing Components, Debugging, Lists, Loops	
	Total Lectures	**38**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Sherman, W. R., & Craig, A. B. (2003). Understanding virtual reality. San Francisco, CA: Morgan Kauffman.
2	Schmalstieg, D., & Hollerer, T. (2016). Augmented reality: principles and practice. Addison-Wesley Professional.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1. http://lavalle.pl/vr/book.html
MOOCs Links and additional reading, learning, video material
1. https://nptel.ac.in/courses/106/106/106106138/
2.https://www.coursera.org/learn/introduction-virtual-reality
3.https://www.udemy.com/course/fundamentals-of-augmented-reality-virtual-reality-101-ar-vr/

VI Semester

22CSE618 – PE II: LAB: Augmented and Virtual Reality

Sr. No	List of practical
1	Creating and Managing Unity projects Install the Unity Editor for the first time Create and manage projects in the Unity Hub
2	Unity Editor Essentials Identify and use essential features of the Unity Editor. Create and Manage Scenes Navigate in 3D space in the Scene view Navigate in 2D space in the Scene view
3	Real-time Industry Essentials Understand Unity's history and role within the industries that rely on real-time creation. Describe the real-time production cycle
4	Scene Building Essentials Identify the default elements in a new Scene Create GameObjects Manipulate GameObjects Work with components and Scripts Change the appearance of GameObjects Implement basic physics for GameObjects
5	Publishing Create and share a basic build
6	Level 1 Job Preparation Prepare yourself for the job search

VI Semester
22CSE631 – OE III: Database System Essentials

Course Outcome
Upon successful completion of the course the students will be able to 1. Understand the basics concepts of Database System and its modelling, compare SQL and NoSQL databases. 2. Solve queries based on SQL and procedures using PL-SQL, & Analyse data dependencies & normalization. 3. Understand Query Processing and evaluate queries. 4. Understand ACID Properties and database system Architecture.

Unit No.	Contents	Max. Hrs.
Unit:1	**Database System Essentials**:	6 Hours
Purpose of Database systems, Example of Database Applications, Basic Terminologies, Data Models, Entity−Relationship Model, Relational Model.		
Unit:2	**Relational Databases:**	7 Hours
Introduction, SQL, DDL, DML, DCL, Database Integrity and Security, Relational−Database Design, Object−Oriented Databases, Object−Relational Databases, database constraints, functional dependencies and normalization.		
Unit:3	**Data Storage and Querying:**	6 Hours
Storage and File Structure, Indexing and Hashing, Data Retrieval, Query Processing, data-access techniques, query-evaluation		
Unit:4	**Transaction Management**:	6 Hours
Introduction, transaction atomicity, consistency, isolation, and durability, concurrency control, serializability, locking, time stamping. Deadlock issues.		
Unit:5	**Database System Architecture**:	6 Hours
Centralized systems, client–server systems, parallel and distributed architectures, and network types		
Unit :6	**PL-SQL and No SQL:**	6 Hours
Introduction to Pl-SQL, Block Structure: Variables, Decision Structures & Loops, Basic Pl-SQL programming. Overview of NoSQL Databases, SQL Vs NO SQL, Types of NoSQL Database		
	Total Lectures	36

Text Books	
1	Database System Concepts, 7th Edition, Silberschatz–Korth–Sudarshan, McGraw–Hill, 2019

Reference Books	
1	Fundamentals of Database Systems, 5th Edition, Elmasri, Navathe & Gupta, Pearson Education
2	Database Systems, 5th Edition, S. K. Singh, Pearson Education

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs04/preview
2	https://onlinecourses.nptel.ac.in/noc22_cs80/preview

VI Semester
22CSE632– OE III: Programming with Python

Course Outcome
Upon successful completion of the course the students will be able to : 1. Understand the basic data types, built in data structures, control statements and loops and write simple programs in Python. 2. Apply the concepts of functions modules and packages and write programs using them. 3. Design and develop classes in Python.

Unit No.	Contents	Max. Hrs.
Unit:1	**Introduction to Python**: Build-in Data types & variables, arithmetic operators, assignment statement, print & input function, relational and logical operators, if, if – else & nested if- else statements, writing simple programs.	7 Hours
Unit:2	**Data Structures:** Built in data structures: Lists, Dictionaries, Tuples, Sets, and Arrays. Programs based on the built in data structures	6 Hours
Unit:3	**Looping: Loop statements:** For, while, continue and break statements, list comprehension. Bitwise operators, Real world problem solving based on loops.	6 Hours
Unit:4	**Functions:** Library functions in Python standard library, user defined Functions, returning values, local & global variables , global statement, doc strings for functions, developing useful functions, Modules and Packages, import statement.	6 Hours
Unit:5	**Introduction to Object oriented programming in Python:** Features of object oriented programming, Python Object and Classes: defining classes, member variables, doc strings for classes, Private members, Operator Overloading, inheritance and polymorphism.	7 Hours
Unit :6	**Application Development:** Developing applications using libraries and packages, File handling, Exception handling, developing applications using Python	5 Hours

Text Books	
SN	**Title**
1	Learn Python Programming, Third Edition, Fabrizio Romano, Heinrich Kruger PACKT Publishing

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Reference Books	
SN	**Title**
1	Introduction to Computation and Programming Using Python,Second Edition, John V. Guttag PHI EEE (MIT Press)

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc20_cs70/preview
2	https://onlinecourses.nptel.ac.in/noc20_cs83/preview

VI Semester

22CSE633– OE I: Introduction to Image Processing

Course Outcome
Upon successful completion of the course the students will be able to CO1: Understand basic principles of image processing. CO2: Analyze images using processing algorithms/Techniques. CO3: Apply the concepts to implements basic image processing algorithms/operations.

Unit No.	Contents	Max. Hrs.
Unit:1	Fundamentals of Image Processing: Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships between Pixels, Linear and Nonlinear Operations.	6 Hours
Unit:2	Image Transformations: Image Enhancement in the Spatial Domain: Basic Grey Level Transformations, Histogram Processing, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.	7 Hours
Unit:3	Image Processing: Color Image Processing: Color Fundamentals, Color Models, Pseudocolor Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Color Segmentation	6 Hours
Unit:4	Image Segmentation :Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, Segmentation by Morphological Watersheds	6 Hours
Unit:5	Image Compression: Image Compression: Fundamentals, Some Basic Compression Methods -Run Length Coding, Huffman Coding, Arithmetic Coding, Bit Plane Coding, Block Truncation Coding. JPEG Compression.	6 Hours
Unit :6	Morphological Image Processing: Morphological Image Processing: Preliminaries, Erosion and Dilation, Opening and Closing, Hit or Miss Transformation, Some Basic Morphological Algorithms, Grey Scale Morphology.	6 Hours

Text Books	
1	Digital Image Processing, (DIP/3e), 3rd edition, Gonzalez and Woods, Prentice Hall - 2008

Reference Books	
1	Digital Image Processing, Kenneth R Castleman, Pearson Education
2	Fundamentals of Digital image Processing, Anil Jain.K, Prentice Hall of India

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Technology/19-2016_Book_DigitalImageProcessing.pdf
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs04/preview
2	https://onlinecourses.nptel.ac.in/noc22_cs80/preview

VI Semester
22CSE634– OE I: Essentials of IT

Course Outcomes

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

1. Develop algorithm and write pseudo code for a given problem statement.
2. Construct Entity-Relationship Model and design RDBMS for a given problem statement.
3. Design static and dynamic web pages using HTML and Javascript and write simple programs in Javascript.
4. Apply software engineering concepts in any software project implementation.

Unit No.	Contents	Max. Hrs.
Unit:1	Programming fundamentals of Java: problem solving skills, Algorithm – representation using pseudo code, algorithm properties. Programming in java- programming constructs in JAVA, control structures type casting, SDLC overview and need for Object oriented approach, object oriented concepts, introduction to UML.	8 Hours
Unit:2	OO fundamentals – Java Implementation: OO fundamentals, coding standards, reference variables and objects in memory, methods, „this" reference. Data structures: data structures, linear data structures, non- linear data structures.	8 Hours
Unit:3	Data base basics- data storage, need for DBMS, functions of DBMS, data perspectives in DBMS, types of data models, relational model and keys, Database Design – Database life cycle, Data requirements, logical design – ER modeling, converting ER model to relational schema, functional dependency, normalization.	8 Hours
Unit:4	SQL – need for SQL, types of SQL statements, data types in SQL, SELECT statement with various operators, single row and multi row functions, group by and having clauses.	8 Hours
Unit:5	Introduction to web technologies: Computer Networks, HTML tags and CSS, Implementation of Java Scripts, Operators and control structures, function and dialog boxes, DOM element.	8 Hours
Unit:6	Software Engineering – Basics, SE models and approaches, Requirement developing activities, software design and construction, software testing, introduction to user experience, Project categories and project management phases, software quality.	8 Hours

Text Books	
1	Java: The complete reference,Herbert Schildt, McGraw-Hill
2	Database System Concepts, Silberschatcz, Korth, Sudarshan, McGraw-Hill Education
3	Software Engineering: A Practitioner's Approach, Roger Pressman, McGraw Hill Higher Education

Reference Books

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc20_cs58/preview
2	https://onlinecourses.nptel.ac.in/noc21_cs65/preview
3	https://onlinecourses.nptel.ac.in/noc21_cs04/preview

VI Semester

22CSE651 – OE IV: Software Testing for Beginners

Course Outcome
Upon successful completion of this course, the student will be able to: 1. Formulate problem by following Software testing life cycle. 2. Design Manual Test cases for Software Project. 3. Demonstrate utilization of testing automation though testing tool.

Unit No.	Contents	Max. Hrs.
1	**Software Testing Basics:** Basic concepts of Testing: Need of Testing, Basic concepts- errors, faults, defects, failures, objective of testing, central issue in testing, Testing activities, V-Model, Sources of information for test cases, Monitoring and Measuring Test Execution, Test tools and Automation, Limitation of Testing.	6
2	**Unit Testing:** Unit Testing: Concepts of Unit Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation Testing, Debugging, Tools for Unit Testing.	6
3	**Control Flow Testing:** Control Flow Testing: Outline of Control Flow Testing, Control Flow Graphs, Path in Control Flow Graph, Path selection criteria, All path coverage criteria, Statement coverage, Path coverage.	7
4	**Integration Testing:** Data Flow and System Integration Testing: Introduction Data flow testing, Data flow graph, Data flow testing criteria, Fundamentals of System Integration: Types of interfaces and interface errors, System integration testing, Software and Hardware integration.	7
5	**System Testing:** System Testing: Taxonomy of system test, Basic Test, Functionality test, Robustness test, Performance test, Scalability test, Stress test, Load and Stability test, Reliability test, Regression test, Documentation Test.	6
6	**Test Cases:** Test Design: Test cases, Necessity of test case documentation, Test case design methods, Functional specification-based test case design, Use case bases, application based test case design, level of test execution.	6

Text Books	
S.No	**Title**
1	Software Testing and Quality Assurance, Kshirsagar Naik and PriyadarshiniTripathi, Wiley Publication
2	Software Testing Principles, Techniques and Tools, M.G. Limaye, McGraw Hills

Reference Books	
S.No	**Title**
1	Foundations of Software Testing, Aditya P. Mathur, Pearson Education
2	Software Testing Tools, Dr. K. V. K. K. Prasad, Dream Tech

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs13/preview
2	https://onlinecourses.nptel.ac.in/noc19_cs71/preview

VI Semester

22CSE652 – OE IV: Introduction to Web Technology

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Design Web pages using HTML5 2. Build an interactive website with CSS3 3. Develop basic programming skills using JavaScript 4. Create XML documents and Schemas.

Unit No.	Contents	Max. Hrs.
Unit:1	**Introduction to internet:** Overview of Internet, Intranet, WWW, Internet Protocols (HTTP, FTP, SMTP), Email, broadband.	6 Hours
Unit:2	**Introduction to HTML5:** Web server, Web Client/Browser, Structure of an HTML Program, Basic HTML Tags(Headings, Paragraph, Division, Text formatting, Image, Anchors), HTML Lists (Ordered Lists, Unordered Lists, Description Lists), HTML Attributes, HTML Links (Href Attribute, Target Attribute).	6 Hours
Unit:3	**Table handling in HTML and Creating Forms:** Table handling in HTML: width and border attribute, CELLPADDING attribute, CELLSPACING attribute, COLSPAN and ROWSPAN attributes, background color attribute, HTML Forms: Elements to Capturing Form Data, Properties of Form Elements, HTML Layout Elements(Semantic Elements), HTML style attribute, HTML class and id attribute.	6 Hours
Unit:4	**Cascading Style Sheets (CSS3):** Introduction to CSS, Differences between CSS3 and earlier CSS specifications, CSS Syntax, CSS selectors, Inserting CSS: Inline, Internal, External, CSS properties: Background, Text, Font, Border, Margin, Padding, List, Dimension, and Classification.	6 Hours
Unit:5	**Java Script:** Introduction to Java Script, Functions of Javascript, Variables and Data Types, Operators, Loops and control statement: if Statement, if...else Statement, else if Statement, JavaScript Switch Statement, JavaScript Functions, JavaScript Loops: for loop, while loop, do...while loop, Dialog Boxes, JavaScript Events.	6 Hours
Unit :6	**Introduction to XML:** What is XML?, Features of XML, XML Syntax and Structure Rules(Start tags, End tags, Empty elements, XML tag attributes),XML Document Type Declaration(DTD, Internal DTD's, External DTD's.	6 Hours

Text Books	
S No	**Title**
1	Web Technologies Black Book: HTML, JavaScript, PHP, Java, JSP, XML and AJAX Kogent Learning Solutions Inc.

Reference Books	
S No	**Title**
1	HTML & CSS: The Complete Reference**,**Fifth Edition**,** Thomas A. Powell**,**The McGraw-Hill Companies, Inc
2	Web Technologies, Ivan Bayross, BPB Publication

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/106105084
2	https://www.youtube.com/watch?v=uUhOEj4z8Fo
3	https://www.youtube.com/watch?v=mU6anWqZJcc

VI Semester

22CSE653 – OE II: Introduction to Cloud Computing

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand Cloud Computing Models. 2. Apply Cloud Concepts &Technologies. 3. Analyse Cloud Services & Platforms 4. Use MapReduce to process Big Data on Apache Hadoop.

Unit No.	Contents	Max. Hrs.
Unit:1	**Introduction to Cloud Computing:** Definition of Cloud Computing, Characteristics of Cloud Computing, Cloud Models (Service & Deployment), Cloud Services Examples (IaaS, PaaS, SaaS), Cloud-based Services and Applications (Cloud computing for Healthcare, Manufacturing Industry and Education).	6 Hours
Unit:2	**Cloud Concepts &Technologies:** Virtualization, Load balancing, Scalability & Elasticity, Monitoring, Identity & Access Management, Service Level Agreements	6 Hours
Unit:3	**Cloud Services & Platforms:** Compute Services (Amazon Elastic Compute Cloud, Google Compute Engine, Windows Azure Virtual Machines), Storage Services (Amazon Simple Storage services, Google Cloud Storage, Windows Azure Storage), Database Services (Amazon Relational Data Store, Google Cloud SQL, Windows Azure SQL Database), Application Services (Application Runtimes & Frameworks) Identity & Access Management Services (Amazon Identity & Access Management, Windows Azure Active Directory), Open Source Private Cloud Software (Cloud Stack, Eucalyptus, OpenStack).	6 Hours
Unit:4	**Hadoop & MapReduce:** Apache Hadoop, Hadoop MapReduce Job Execution, NameNode, Secondary NameNode, JobTracker, TaskTracker, DataNode, MapReduce Job Execution Workflow, Hadoop Schedulers, Hadoop Cluster Setup.	6 Hours
Unit:5	**Cloud Application Design:** Design Considerations for Cloud Applications, Scalability, Reliability & Availability, Security, IaaS, SaaS Services for Cloud Applications.	6 Hours
Unit :6	**Cloud Security:** Introduction, CSA Cloud Security Architecture, Authentication, Single Sign On (SSO), Authorization.	6 Hours

Text Books	
1	CLOUD COMPUTING A Hands -on Approach, Arshdeep Bahga & Vijay Madisetti,Wiley Publication

Reference Books	
1	CLOUD COMPUTING,Michael Miller, PEARSON PUBLICATION
2	Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance,Tim Mather, Subra Kumaraswamy, and Shahed Latif, O'Reilly
3	Cloud Computing Bible, Barrie Sosinsky, John Wiley & Sons

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs14/preview
2	https://www.simplilearn.com/

VI Semester
22CSE654 – OE II: Introduction to OS Concepts

Course Outcomes:
Upon successful completion of the course, the student will be able to: 1. Use LINUX operating system. 2. Write Shell scripts

Unit No.	Contents	Max. Hrs.
Unit:1	Introduction: History of Linux and Unix, Linux Overview, Linux releases, open linux.	7 Hours
Unit:2	Linux Commands and Filters : Mkdir, CD, rmdir, pwd, ls, who, whoami, cat, more, fail, head, concept of, mv, chmod, grep,wc, comm., split, sort, diff, kill, write, wall, merge, mail, news	6 Hours
Unit:3	Shell: The command line special characters and file arguments, standard input/output and redirection, pipes, redirecting and piping with standard errors, shell scripts, jobs.	6 Hours
Unit:4	Linux file Structure: Linux files, file structure, listing displaying and printing files, managing directories, file and directory operations.	6 Hours
Unit:5	Vi Editor: Vi editing commands advanced Vi editing commands, line editing commands, options in Vi	6 Hours
Unit :6	System Administration: System management, managing users, installing and managing devices, floppy disk management, file system administration, backups	7 Hours

Text Books	
1	Linux – The Complete Reference Tata **,** Richard Peterson**,** McGraw Hill, New Delhi
2	Linux – Install and Configuration Black Book, Die Annleblanc and Issac Yates**,** IDG Books India Private Ltd.,
3	Unleashed Linux **,** Tech Media Publishers

Reference Books	
1	Linux Pocket Guide,Daniel J.Barrett,O'Reilly Media
2	The Linux Command Line, William Shotts, No Starch Press

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs88/preview#:~:text=Operating%20System%20Fundamentals%201%20Course%20layout%20Week%201%3A,is%20free%20to%20enroll%20and%20learn%20from.%20
2	https://onlinecourses.nptel.ac.in/noc21_cs72/preview

VI Semester
Audit Course
MLC2126 – YCAP6 : YCCE Communication Aptitude Preparation

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

7th & 8th Semester

(Department of Computer Science and Engineering

B.Tech in Computer Science and Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Computer Science & Engineering)

B. Tech in Computer Science & Engineering)

SoE No. 22CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SEVENTH SEMESTER															
1	7	PC	CSE/CSE	22CSE701	Cryptography and Network Security	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	7	PC	CSE/CSE	22CSE702	Lab: Cryptography and Network Security	**P**	0	0	2	2	1		60	40	
3	7	PC	CSE/CSE	22CSE703	Artificial Intelligence	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	7	PC	CSE/CSE	22CSE704	Lab: Artificial Intelligence	**T**	0	0	2	2	1	30	20	50	3 Hrs
5	7	PE	CSE/CSE		**Professional Elective-III**	**T**	3	0	0	3	3	30	20	50	3 Hrs
6	7	PE	CSE/CSE		**Professional Elective-IV**	**T**	3	0	0	3	3	30	20	50	3 Hrs
7	7	PE	CSE/CSE		**Lab:Professional Elective-IV**	**P**	0	0	2	2	1		60	40	
8	7	PE	CSE/CSE		**Professional Elective-V**	**T**	3	0	0	3	3	30	20	50	3 Hrs
9	7	STR	CSE/CSE	22CSE705	Project Phase-II	**P**	0	0	10	10	5		60	40	
10	7	STR	CSE/CSE	22CSE706	Campus Recruitment Training (CRT)	**P**	0	0	0	0	2		100		
						TOTAL	**15**	**0**	**16**	**31**	**25**				

List of Professional Electives-III

1	7	PE-III	CSE/CSE	22CSE711	PE-III : Advanced computer architecture
2	7	PE-III	CSE/CSE	22CSE712	PE-III : Adhoc Wireless Network
3	7	PE-III	CSE/CSE	22CSE713	PE-III : Big data Analytics
4	7	PE-III	CSE/CSE	22CSE714	PE-III : Deep learning

List of Professional Electives-IV

1	7	PE-IV	CSE/CSE	22CSE731	PE IV: Cyber Forensic (industry aligned)
2	7	PE-IV	CSE/CSE	22CSE732	PE IV: **Lab:** Cyber Forensic
3	7	PE-IV	CSE/CSE	22CSE733	PE IV: Natural Language Processing
4	7	PE-IV	CSE/CSE	22CSE734	PE IV: **Lab:** Natural Language Processing
5	7	PE-IV	CSE/CSE	22CSE735	PE IV: Parallel Programming
6	7	PE-IV	CSE/CSE	22CSE736	PE IV: **Lab:** Parallel Programming
7	7	PE-IV	CSE/CSE	22CSE737	PE IV: Data mining
8	7	PE-IV	CSE	22CSE738	PE IV: **Lab:** Data mining

List of Professional Electives-V

1	7	PE-V	CSE/CSE	22CSE751	PE V: Information Retrival System
2	7	PE-V	CSE/CSE	22CSE752	PE V: Distributed System
3	7	PE-V	CSE/CSE	22CSE753	PE V: Human Computer Interaction
4	7	PE-V	CSE/CSE	22CSE754	PE V: Real Time System

Eighth Semester															
1	**8**	**STR**	CSE/CSE	22CSE801	Internship- Training Seminar & Report	**P**	0	0	12	12	3		60	40	
2	**8**	**STR**	CSE/CSE	22CSE802	Extra Curricular Activity Evaluation	**P**	0	0	0	0	2		100		
						TOTAL EIGHTH SEM	**0**	**0**	**12**	**12**	**5**				
						GRAND TOTAL	**121**	**5**	**75**	**202**	**166**				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA = for Practical : MSPA will be 15 marks each**

		June 2022	**1.00**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2022-23 Onwards

Semester VII

22CSE701: Cryptography and Network Security

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Understand the security threats aimed at computer network and describe various security mechanisms and services to counter them. 2. Study cryptographic mathematics to solve network security problems. 3. Study of various cryptographic algorithms 4. Understand different security protocols at various layers of network model		
Unit:1	**Introduction to cryptography**	**6 Hours**
Introduction: Security goals, cryptographic attacks, Services and mechanism, techniques. Mathematics of cryptography: Integer arithmetic, modular arithmetic, matrices, linear congruence. Mathematics of symmetric key cryptography: Algebraic structure, GF(2^n) Fields.		
Unit:2	**Ciphers**	**6 Hours**
Traditional symmetric key ciphers: Introduction, substitution ciphers, Transposition ciphers, stream and block ciphers. Introduction to modern symmetric-key ciphers: Modern block ciphers, modern stream ciphers.		
Unit:3	**Encipherment**	**7 Hours**
DES, AES, Encipherment using modern symmetric key ciphers: Use of modern block ciphers, use of stream ciphers: RC4. Mathematics of asymmetric key cryptography: Primes, primality testing, factorization, Chinese remainder theorem, Quadratic congruence, Exponentiation and logarithms. Asymmetric key cryptography: RSA, ElGamal, Diffie Helman- key Exchange.		
Unit:4	**Integrity and Authentication**	**7 Hours**
Message integrity and authentication: Message integrity, Random oracle model, message authentication. Cryptographic hash functions: Introduction, Description of MD hash family, Whirlpool, SHA-512. Digital signature: Comparison, process, services, attacks on digital signature, Digital signature schemes. Entity authentication: Introduction, passwords, Challenge-Response, Zero knowledge, Biometric. Key management: Symmetric key distribution, Kerberos, symmetric key agreement, Public key distribution.		
Unit:5	**Security**	**7 Hours**
Security at application layer : E-mail, PGP, S/MIME. Security at transport layer: SSL architecture, four protocols, SSL message formats, Transport layer security. Security at network layer IPSec : Two modes, two security protocols, security association, security policy, Internet key exchange, ISAKMP		
Unit :6	**Trusted Systems**	**6 Hours**
System security: Description of the system, Users, Trust and trusted systems, Buffer overflow and malicious software, malicious programs, worms, viruses, Intrusion detection systems, Firewalls: Definitions, construction and working principles		
Total Lecture Hours		**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks	
1	Cryptography and Network Security, by Behrouz A.Forouzan, and Debdeep Mukhopadhyay, McGraw-Hill Publication.,2nd Edition.
Reference Books	
1	Cryptography and Network Security by Atul Kahate, fourth edition, McGraw-Hill Publication.
2	Cryptography And Network Security Principles And Practice ,Fifth Edition, WILLIAM STALLINGS
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/39.Guide%20to%20computer%20network%20security.pdf
2	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/11.2010_Book_UnderstandingCryptography.pdf
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs16/preview
2	https://onlinecourses.nptel.ac.in/noc22_cs03/preview

Semester VII

22CSE702: Lab-Cryptography and Network Security

Sr. No.	List of Experiment
1	Implement the following substitution techniques a) Caesar Cipher b) Playfair Cipher c) Hill Cipher
2	Implement the following transposition techniques i) Rail fence ii) row & Column Transformation
3	Implement DES algorithm for practical applications.
4	Implement AES algorithm for practical applications.
5	Implement RSA Algorithm
6	Implement the Diffie-Hellman Key Exchange algorithm for a given problem.
7	Calculate the message digest of a text using the SHA-1 algorithm.
8	Implement the SIGNATURE SCHEME – Digital Signature Standard.
9	Demonstrate intrusion detection system (ids) using any tool eg. Snort or any other s/w
10	Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG)

Semester VII

22CSE703: Artificial Intelligence

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Understand and apply suitable Intelligent agents for various AI applications 2. Build smart system using different informed search / uninformed search or heuristic approaches 3. Solve various constraint satisfaction problem and game playing techniques. 4. Implement ideas underlying modern logical inference systems to solve AI problems. 5. To understand the knowledge representation and under uncertainty.		
Unit:1	**Introduction to AI**	**6 Hours**
Introduction to Artificial Intelligence, History of Artificial Intelligence, Strong AI Weak AI, Task domain of AI, Intelligent Agents, Agents and Environments, Good Behavior: Concept of Rationality, Nature of Environments, Structure of Agents.		
Unit:2	**Search Techniques**	**7 Hours**
Solving Problems by Searching, Problem-Solving Agents, Example Problems, Search Algorithms, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions, Search in Complex Environments, Local Search and Optimization Problems.		
Unit:3	**Adversarial Search**	**7 Hours**
Game Theory, Optimal Decisions in Games, The Mini-Max algorithm, Alpha–Beta Pruning, Partially Observable Games, Limitations of Game Search Algorithms, Constraint Satisfaction Problems (CSP), Constraint Propagation: Inference in CSPs, Backtracking Search for CSPs.		
Unit:4	**Knowledge Representation**	**6 Hours**
Knowledge Based Agents, Logic, Propositional Logic: Inference, Equivalence, Validity and Satisfiability, Resolution, Forward and Backward Chaining, First Order Logic: Models for first order logic, Symbols and Interpretations, complex sentences, Quantifiers, Inference in FOL, Unification, Forward Chaining, Backward Chaining, Resolution.		
Unit:5	**Planning**	**6 Hours**
Planning, Language of planning problems, Algorithm for planning as state-space search, Planning graph, Planning and acting in the real world-Time, Schedules and Resources, Hierarchical planning, Planning and acting in Nondeterministic Domains.		

Unit :6	Uncertainty	7 Hours
Uncertainty, Handing uncertain knowledge, rational decisions, basics of probability, axioms of probability, inference using full joint distributions, independence, Baye's Rule and conditional independence, Bayesian networks, Semantics of Bayesian networks, Exact inference in Bayesian Networks.		
Total Lecture Hours		**39 Hours**

Textbooks	
1	Artificial Intelligence A Modern Approach, Stuart Russell,Peter Norvig, Pearson
2	Artificial Intelligence, Third edition, by E. Richand K. Knight and S. Nair, McGraw Hill
Reference Books	
1	Introduction to Artificial Intelligence and Expert System, D. W. Patterson, PHI
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_ge20/preview
2	https://onlinecourses.nptel.ac.in/noc22_cs67/preview

Semester VII

22CSE704: Lab-Artificial Intelligence

Sr. No.	Experiments based on
1	To implement 8-puzzle problem using uniformed searching technique: Depth First Search
2	To implement Missionaries and cannibal Problem using uniformed searching technique: Breath First Search
3	To implement Heuristic (Steepest Ascent) Search for Tic-Tac-Toe game problem.
4	To implement Min-Max Algorithm for game solving.
5	To implement Best First Search for Travelling Salesman Problem.
6	To implement A* Algorithm for Travelling Salesman Problem and compare it with Best First Search.
7	To implement 8 Queens Problem.
8	To implement Resolution theorem (Negation).
9	To implement Naïve Bayes Classifiers.
10	To implement and demonstrate Bayesian network using pgmpy.

Semester VII

22CSE711- PE-III: Advanced computer architecture

Course Outcome
Upon completion of this course, the students should be able to: 1. Identify the limitations of ILP 2. Discuss the issues related to multiprocessing and suggest solutions 3. Point out the salient features of different multicore architectures and how they exploit parallelism. 4. Discuss the various techniques used for optimising the cache performance 5. Design hierarchal memory system 6. Point out how data level parallelism is exploited in architectures

UNIT I: BASIC STRUCTURE OF A COMPUTER SYSTEM	5
Functional Units , Basic Operational Concepts , Performance , Instructions: Language of the Computer ,Operations, Operands , Instruction representation , Logical operations , decision making , MIPS Addressing.	
UNIT II: COMPUTER DESIGN AND ILP	6
Fundamentals of Computer Design , Measuring and Reporting Performance , Instruction Level Parallelism and its Exploitation , Concepts and Challenges ,Exposing ILP , Advanced Branch Prediction , Dynamic Scheduling , Hardware-Based Speculation , Exploiting ILP , Instruction Delivery and Speculation ,Limitations of ILP , Multithreading	
UNIT III: MEMORY HIERARCHY DESIGN	6
Introduction , Optimizations of Cache Performance , Memory Technology and Optimizations –,Protection: Virtual Memory and Virtual Machines , Design of Memory Hierarchies , Case Studies.	
UNIT IV: MULTIPROCESSOR ISSUES	7
Introduction- Centralized, Symmetric and Distributed Shared Memory Architectures ,Cache Coherence Issues , Performance Issues , Synchronization , Models of Memory Consistency , Case Study- Interconnection Networks – Buses, Crossbar and Multi,stage Interconnection Networks	
UNIT V: MULTICORE ARCHITECTURES	7
Homogeneous and Heterogeneous Multi-core Architectures , Intel Multicore Architectures , SUN CMP architecture ,IBM Cell Architecture. Introduction to Warehouse-scale computersArchitectures-,Physical Infrastructure and Costs, Cloud Computing ,Case Study- Google Warehouse,Scale Computer.	

UNIT VI: VECTOR, SIMD AND GPU ARCHITECTURES	6
Introduction,Vector Architecture , SIMD Extensions for Multimedia , Graphics Processing Units , Case Studies ,GPGPU Computing , Detecting and Enhancing Loop Level Parallelism,Case Studies.	
Total Lectures	**45**

Text Books
1. Computer Organization and Design: The Hardware/Software Interface" by David A. Patterson and John L. Hennessy
2. "Computer Architecture: A Quantitative Approach" by John L. Hennessy and David A. Patterson
3. Advanced Computer Architecture: Parallelism, Scalability, Programmability" by Kai Hwang and Naresh Jotwani

Reference Books
1. Darryl Gove, ―Multicore Application Programming: For Windows, Linux, and Oracle Solaris‖, Pearson, 2011
2. David B. Kirk, Wen-mei W. Hwu, ―Programming Massively Parallel Processors‖, Morgan Kauffman, 2010

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://drive.google.com/file/d/0B2ocTDj7zqFKbHNNbUI0eDVzTUU/view?pli=1&resourcekey=0-jMIuMorP1ZPNGL7fyPpCzA

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc25_cs01/preview

Semester VII

22CSE712 - PE III: Adhoc Wireless Network

Course Outcomes:

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

1. Identify the characteristics and features of Adhoc Networks.
2. Understand the concepts & be able to design MAC protocols for Ad Hoc networks
3. Implement protocols / Carry out simulation of routing protocols of Adhoc Networks
4. Interpret the flow control in transport layer of Ad Hoc Networks
5. Analyze security principles for routing of Ad Hoc Networks

Unit:1	**Introduction**	**7 Hours**
INTRODUCTION: Introduction to ad-hoc networks – definition, characteristics features, applications. Characteristics of wireless channel, ad-hoc mobility models: indoor and outdoor models.		
Unit:2	**MAC Protocols**	**7 Hours**
MAC Protocols: Design issues, goals and classification. Contention based protocols – with reservation, scheduling algorithms, protocols using directional antennas. IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN.		
Unit:3	**Routing**	**7 Hours**
Routing Protocols: Design issues, goals and classification. Proactive Vs reactive routing, unicast routing algorithms, Multicast routing algorithms, hybrid routing algorithm, energy aware routing algorithm, hierarchical routing, QoS aware routing.		
Unit:4	**Transport Layer**	**6 Hours**
Transport Layer: Issues in designing – Transport layer classification, adhoc transport protocols. Security issues in adhoc networks: issues and challenges, network security attacks, secure routing protocols.		
Unit:5	**Cross layer Design**	**6 Hours**
Cross layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, cross layer cautionary perspective. Integration of adhoc with Mobile IP networks.		
Unit :6	**Security**	**6 Hours**
Security in wireless Ad hoc wireless Networks, Network security requirements, Issues & challenges in security provisioning, Leadership.		
Total Lecture Hours		**39 Hours**

Textbooks	
1	Ad Hoc Wireless Networks: Architectures and Protocols, 2004, C. Siva Ram Murthy and B. S. Manoj, Prentice Hall
2	Ad hoc Networking, 2000, Charles E. Perkins, Addison – Wesley.
Reference Books	
1	Protocols and Architectures for Wireless Sensor Networks, H. Karl and A. Willig. John, Wiley & Sons
2	Wireless Sensor Networks: Technology, Protocols, and Applications, K. Sohraby, D. Minoli, and T. Znati. John, Wiley & Sons
3	Wireless Sensor Networks, C. S. Raghavendra, K. M. Sivalingam, and T. Znati, Springer Verlag
4	Wireless Sensor Networks: Architectures and Protocols, E. H. Callaway, Jr. AUERBACH
5	Networking Wireless Sensors, B. Krishnamachari, Cambridge University Press
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/106/105/106105160/
2	https://onlinecourses-archive.nptel.ac.in/noc18_cs09/preview

Semester VII

22CSE713 - PE III: Big data Analytics

Course Outcomes:

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

1. **Understand** fundamentals of big data, issues in big data management, big data analytics and its associated applications in intelligent business and scientific computing
2. **Apply** machine Learning algorithms for real world data, to provide analytics
3. **Demonstrate** the Map Reduce programming model to process the big data along with Hadoop tools
4. **Illustrate** the concepts of NoSQL using MongoDB and Cassandra for BigData.

Unit:1	**Introduction to Big Data**	**5 Hours**

Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured, Sources of data, working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, big data environment terminologies, Big Data Analysis Life Cycle.

Unit:2	**Big data analytics and Analytical methods**	**8 Hours**

Overview of business intelligence, Characteristics and need of big data analytics, Classification of analytics, Challenges to big data analytics. Analytical operations: Associations rules- Apriori algorithm, classifications- decision trees, naïve bayes clustering- K means.

Unit:3	**Hadoop foundation for analytics**	**6 Hours**

Features, key advantages of Hadoop , key aspects of Hadoop, versions of Hadoop , Hadoop ecosystem ,and Components, HDFS, HBase, Hadoop Technology Stack: Hive, Pig, Zookeeper, Swoop, oozie, flume, etc. Hadoop distributions, Hadoop vs SQL

Unit:4	**MapReduce and YARN framework**	**6 Hours**

Introduction to MapReduce, Processing data with MapReduce, map reduce example, Introduction to YARN, YARN architecture , Data serialization and common serialization formats, Big data serialization formats.

Unit:5	**NoSQL Databases**	**5 Hours**

Introduction to NoSQL, advantages of NoSQL, SQL vs NoSQL, types of NoSQL databases- Schema-less Models‖: Increasing Flexibility for Data Manipulation-KeyValue Stores- Document Stores - Tabular Stores - Object Data Stores - Graph Databases , Hive -- Sharding –- Hbase

Unit :6	**Introduction to MongoDB key features**	**6 Hours**

Introduction to MongoDB key features, data types in MongoDB, MongoDB Query Language.: update remove, insert methods, MongoDB through the JavaScript's Shell, Creating and Querying through Indexes, Document searching, Constructing queries on Databases, documents

Total Lecture Hours	**36 Hours**

Textbooks	
1	Big Data and Analytics ,Seema Acharya, Subhashini Chhellappan , Willey 2nd edition
2	Professional Hadoop Solutions, Boris lublinsky, Kevin T.Smith, Alexey Yakubovich ,Wiley ISBN: 978-1-118-61193-7 September 2013
3	Understanding Big data , Chris Eaton,Dirk derooset al. , McGraw Hill
4	BIG Data and Analytics ,Sima Acharya, Subhashini Chhellappan , Willey
Reference Books	
1	MongoDB in Action , Kyle Banker, Piter Bakkum, Shaun Verch, Dream tech Press
2	Big Data Analytics with R and Hadoop , Vignesh Prajapati, Packet Publishing
3	Tom White, HADOOP: The definitive Guide, O Reilly, 2012
4	Learning Spark: Lightning-Fast Big Data Analysis Paperback , Holden Karau
MOOCs Links and additional reading, learning, video material	
1. https://onlinecourses.nptel.ac.in/noc20_cs92/preview	

Semester VII

22CSE714 - PE III: Deep Learning

Course Outcome
At the end of the course, the students should be able to precisely state 1. the classical algorithms, models, and theories in the area. 2. Students should be able to identify appropriate algorithm given a practical task. 3. Students should also be able to implement and solve the tasks using deep learning techniques.

Unit No.	Contents	Max Hrs.
1	**Introduction:**	6
Basics: Linear Algebra Primer, Vector Calculus Review, Brief review of concepts from Linear Algebra and Vector Calculus, Probability.		
2	**Basics of ML and DL**	6
Perceptron, Neural network, deep feed forward networks. Optimization techniques for deep networks: back propagation, gradient descend, sampling techniques. Regularization, dropout		
3	**Model-1**	7
Model 1: Convolutional neural network: 1-D CNN, 2-D CNN, Convolutional networks with different applications in Computer Vision.		
4	**Model-2**	6
Model 2: Recurrent networks, Long Short Term Memory networks with application in time series and natural language processing.		
5	**Model-3**	7
Model -3: Auto encoders, variational auto encoders with application in representation learning.		
6	**Model-4**	7
Model -4: Generative adversarial networks, Bayesian deep learning.		
	Total Lectures	39

Text Books	
1	Deep Learning. Ian Goodfellow and Yoshua Bengio and Aaron Courville. MIT Press. 2016. ISBN-13 : 978-0262035613.

Reference Books	
1	Pattern Recognition and Machine Learning. Christopher Bishop. Springer. 2006. ISBN-13 978-0-387-31073-2.
2	Deep Learning with Python. Francois Chollet. Publisher: Manning Publications; 1 edition. ISBN-13: 978-1617294433
3	Hands-On Machine Learning with Scikit-Learn and TensorFlow. Aurélien Géron. Publisher: O'Reilly Media; 1 edition. ISBN-13: 978-1491962299.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
https://github.com/janishar/mit-deep-learning-book-pdf/blob/master/complete-book-bookmarked-pdf/deeplearningbook.pdf
MOOCs Links and additional reading, learning, video material
1. https://nptel.ac.in/courses/106106184
2.https://onlinecourses.nptel.ac.in/noc23_ee87/preview

Semester VII

22CSE731- PE IV: Cyber Forensic

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Investigate hardware parts of a computer system for evidences 2. Use different tools for data acquisition and duplication for forensic study 3. Securely store data and evidence collected 4. Create report of forensic investigation made		
Unit:1	**Introduction**	**6 Hours**
Types of Cyber Crime, Security Attacks, Overview of computer forensics in today's world, computer hardware basics, Computer forensics investigation process, understanding hard disks and file systems, Types of computer forensics.		
Unit:2	**Computer Forensic**	**6 Hours**
Computer forensic: Data acquisition and duplication, defeating anti-forensics techniques, operating system forensics, Log analysis and event viewer, File auditing, identifying rogue machines, Malware forensic Database forensic.		
Unit:3	**IT Fraud**	**6 Hours**
IT fraud, Recovery of deleted files, Live Data collection and investigating Linux environment. Password recovery (tools like John the ripper, L0phtcrack, and THC-Hydra), email crimes.		
Unit:4	**Network Forensics**	**6 Hours**
Network forensics, investigating web attacks, Gathering Tools to create a response toolkit. Hidden files and unauthorized access points. Analyzing network traffic, Sniffers Hardware forensic tools like Port scanning and vulnerability assessment tools like Nmap, Netscan etc.		
Unit:5	**Mobile Forensics**	**6 Hours**
Mobile Forensics, Live Data collection and investigating on android, ios, windows environment, Investigating report generation, investigation process, acquisition types, tools, report generation		
Unit :6	**Case Studies**	**6 Hours**
Forensics report writing and presentation, Case studies		
Total Lecture Hours		**36 Hours**

Textbooks	
1	Incident Response & Computer Forensics, Second, Mandia, K., Prosise, C., Pepe, M., Tata-McGraw Hill
2	Guide to Computer Forensics and Investigations, Bill Nelson, Amelia Phillips, Frank Enfinger, and Chris Steuart, Thomson Learning
Reference Books	
1	File System Forensic Analysis, Brian Carrier, Wesley
2	Digital Evidence and Computer Crime, Eoghan Casey, Academic Press
3	Windows Forensic Analysis DVD Toolkit (Book with DVD-ROM), Harlan Carvey, Syngress Publication
4	EnCE: The Official EnCase Certified Examiner Study Guide, Steve Bunting, Sybex Publication
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Technology/41-Introductory%20Computer%20%20Forensics.pdf
MOOCs Links and additional reading, learning, video material	
1	Cyber Security and Cyber Forensics (cdac.in)
2	https://onlinecourses.swayam2.ac.in/cec20_lb06/preview

Semester VII

22CSE732- Lab: PE IV: Cyber Forensic

Exp. No	Name of Experiment /Problem Statement
1	Study Practical on Cyber-crime and generation of Hash values on file system
2	Perform data accusation and imaging on digital evidence.
3	Perform recovery and data carving on digital evidence.
4	Explore and analyses tools on Email analysis an investigation.
5	Password recovery tools, from RAR, DOC, PDF, windows password.
6	Mobile forensics SIM analysis.
7	Mobile data Analysis.
8	Vulnerability Analysis on Windows.
9	Report and Evidence Submission using tools.
10	Innovation

Semester VII

22CSE733 - PE IV: Natural Language Processing

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Model linguistic phenomena with formal grammars. 2. Design, implement and test algorithms for NLP problems 3. Apply NLP techniques to design real world NLP applications 4.Develop useful systems for language processing and related tasks involving text processing		
Unit:1	**Introduction to NLP**	**5 Hours**
Introduction, History of NLP, Generic NLP system, levels of NLP , Knowledge in language processing , Ambiguity in Natural language, stages in NLP, challenges of NLP, Applications of NLP.		
Unit:2	**Morphology**	**8 Hours**
Morphology fundamentals, Morphological Diversity of Indian Languages, Morphology Paradigms, Shallow Parsing, Named Entities, Maximum Entropy Models, Random Fields. Word Level Analysis, Morphology analysis –survey of English and Indian language Morphology, Inflectional morphology & Derivational morphology, Lemmatization, Regular expression, finite automata, finite state transducers (FST) ,Morphological parsing with FST , Lexicon free FST Porter stemmer. N –Grams- N-gram language model, N-gram for spelling correction.		
Unit:3	**Parsing**	**7 Hours**
Theories of Parsing, Parsing Algorithms; Robust and Scalable Parsing on Noisy Text as in Web documents, Hybrid of Rule Based and Probabilistic Parsing; Scope Ambiguity and Attachment Ambiguity resolution, Dependency Parsing, Distributional Semantics.		
Unit:4	**Semantic & Lexical Analysis**	**8 Hours**
Meaning : Lexical Knowledge Networks, Wordnet Theory, Indian Language Wordnets and Multilingual Dictionaries, Semantic Roles, Word Sense Disambiguation, WSD and Multilinguality Semantic Analysis: Lexical Semantics, Attachment for fragment of English- sentences, noun phrases, Verb phrases, prepositional phrases, Relations among lexemes & their senses –Homonymy, Polysemy, Synonymy, Hyponymy, Robust Word Sense Disambiguation (WSD), Dictionary based approach.		
Unit:5	**NLP Operations**	**7 Hours**
Information Extraction, Relation Extraction, Text Summarization, Text Classification, Entity Linking, Syntax and Grammar Analysis		

Unit :6	NLP Applications	7 Hours
Natural language Processing applications (preferably for Indian regional languages) : Sentiment Analysis, Text Entailment, Robust and Scalable Machine Translation, Question Answering in Multilingual Setting, Cross Lingual Information Retrieval (CLIR).		
Total Lecture Hours		**Hours**

Textbooks	
1	Jurafsky, Daniel, and James H. Martin, Speech and Language Processing:An Introduction to Natural Language Processing, Speech Recognition, and Computational Linguistics, PrenticeHall, 2000.
2	Christopher D. Manning and HinrichSchütze, Foundations of Statistical Natural Language Processing. Cambridge, MIT Press, 1999.
3	Speech and Language Processing: An Introduction to Natural Language Processing by Dan Jurafsky and James Martin,3rd Edition, Pearson Publication
Reference Books	
1	James Allen, Natural Language Understanding, Benjamin/Cummings, 2ed, 1995.
2	Eugene Charniak, Statistical Language Learning, MIT Press, 1996.
3	Martin Atkinson, David Britain, Harald Clahsen, Andrew Redford, Linguistics, Cambridge University Press, 1999.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/54.NLP_Language_processing_jurafsky_BOOK.pdf
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/106101007
2	https://onlinecourses.nptel.ac.in/noc22_cs98/preview

Semester VII

22CSE734 – Lab: PE IV: Natural Language Processing

Sr.No	Experiments based on
01	Program should be based on Natural Language Understanding (Lexical Ambiguity, Syntactical Ambiguity, Referential Ambiguity)
02	Study and understand the BERT Model
03	Perform a program based on Errors Detection and Corrections
04	Program should be based on Sentence Framing
05	Perform a program based on Part-of-Speech (POS) Tagging
06	Perform a program based on Lexical Semantics
07	Perform a program based on Dependency Parsing
08	Perform a program based on NLP Applications

Semester VII

22CSE735-PE IV: Parallel Programming

Course Outcomes:

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

1. Identify areas where parallel computing is applicable
2. Implement parallel version of different algorithms using thread programming and openMp
3. Find the speedup factor by Analyzing parallel programs
4. Develop real life applications using parallel programming

Unit:1	Introduction to Parallel Programming	6 Hours

Motivating Parallelism , Applications, Parallel Programming Platforms: Implicit Parallelism: Limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication Costs in Parallel Machines, Routing Mechanisms for Interconnection Networks, Impact of Process Processor Mapping and Mapping Techniques

Unit:2	Principles of Parallel Algorithm Design	7 Hours

: Preliminaries Decomposition Techniques, Characteristics of Tasks and Interactions, Mapping Techniques for Load Balancing, Methods for Containing Interaction Overheads, Parallel Algorithm Models, Basic Communication operations: One to All Broadcast and All to One Reduction, All to All Broadcast and Reduction, All Reduce and Prefix Sum Operations, Scatter and gather, All to All Personalized Communication, Circular Shift, Improving the Speed of Some Communication Operations.

Unit:3	Analytical Modelling of Parallel Programs	7 Hours

Performance Metrics for Parallel Systems, The Effect of Granularity on Performance, Scalability of Parallel Systems, Minimum Execution Time and Minimum Cost Optimal Execution Time, Asymptotic Analysis of Parallel Programs, Other Scalability Metrics.

Unit:4	Programming Shared Address Space Platforms	6 Hours

Programming Using the Message Passing Paradigm: Principles of Message Passing Programming, The Building Blocks: Send and Receive Operations , MPI: the Message Passing Interface, Topologies and Embedding, Overlapping Communication with Computation, Collective Communication and Computation Operations, Groups and Communicators.

Unit:5	Threads and OpenMP	6 Hours

Thread Basics, Why Threads? OpenMP: a Standard for Directive Based Parallel Programming, Dense Matrix Algorithms: Matrix Vector Multiplication, Matrix Multiplication, Issues in Sorting on Parallel Computers, Bubble Sort and its Variants

Unit :6	**Dynamic Programming**	**6 Hours**
Overview of Dynamic Programming, Serial Monadic DP Formulations, Monadic DP Formulations, The Longest Common Subsequence Problem, Serial Polyadic DP Formulations, All Pairs Shortest Paths Algorithm.		
Total Lecture Hours		**38 Hours**

Textbooks	
1	Introduction to Parallel Computing, Ananth Grama, Pearson Education
2	Fundamentals of Parallel Processing Harry F. Jordan, Gita Alaghband Pearson Education
Reference Books	
1	Parallel Programming, Michael Allen, Barry Wilkinson Pearson Education
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/106/102/106102163/
2	https://nptel.ac.in/courses/106102114

Semester VII

22CSE736-Lab- PE IV: Parallel Programming

Sr.No.	Experiment based on
1	Introduction to Parallel Programming
2	Principles of Parallel Algorithm Design
3	Analytical Modelling of Parallel Programs
4	Minimum Execution Time
5	Shared Address Space Platforms
6	Computation Operations
7	Threads
8	OpenMP
9	Dynamic Programming
10	The Longest Common Subsequence Problem

Semester VII

22CSE737-PE IV: Data Mining

Course Outcomes:
Upon successful completion of the course the students will be able to CO-1: Define and explain fundamental concepts in data mining CO-2 Apply various data mining techniques, including decision trees, neural networks, clustering algorithms, and association rule mining algorithms. CO-3: Evaluate and validate the results of data mining models, considering factors like accuracy, precision, recall, and F1-score. CO-4: Apply data mining techniques to real-world datasets and scenarios, solving practical problems and making informed decisions. CO-5- Gain practical experience using data mining tools such as WEKA, R or other relevant software.

Unit:1	**Introduction to Data Mining**	6 Hrs
Data mining definitions & task, data mining on what kind of data ,Knowledge Discovery vs. Data mining, DBMS vs. Data Mining, Data mining functionalities, data mining task primitives , Major issues in data mining , applications of data mining.		
Unit:2	**Association Rule Mining**	7 Hrs
Frequent itemsets, closed itemsets, and association rules, frequent pattern mining, applications of Association Rule mining, The Apriori algorithm for finding frequent itemset using candidate generation, generating association rules from frequent itemsets, Improving effieciency of Apriori , FP- growth algorithm.		
Unit:3	**Classification and prediction**	7 Hrs
What is classification , prediction., Issues regarding Classification and prediction, Decision tree construction principle, Decision tree construction algorithms ID3, C4.5, Classification using decision tree Induction, Bayes classifier ,K- nearest Neighbour , prediction using Linear regression, Logistic regression		
Unit:4	**Cluster Analysis**	7 Hrs

What is cluster analysis, its applications, clustering paradigms, Partioning algorithms: K-means,K-medoids, Hierarchial clustering: Agglomerative and Divisive hierarchical clustering, DBSCAN algorithm ,Outlier Detection,		
Unit:5	**Web Mining**	7Hrs
Introduction, web content mining, web structure mining, web usage mining, mining multimedia data on web.		
Unit :6	**Text mining**	7Hrs
Text data analysis and Information retrieval, Unstructured texts, text mining approaches, episode rule discovery for texts, Hierarchy of categories, text clustering		

Text books	
1.	Data Mining: Concepts and Techniques, Pei, Han and Kamber, Elsevier, 2011
2.	Introduction to Data Mining, Tan, Steinbach and Vipin Kumar, Pearson Education, 2016
Reference Books	
1.	Data mining methods and models second reprint,2007 Daniel Larose Wiley Interscience
2.	Data mining techniques 2nd edition Arun Pujari University press,(India) 2010
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-3-319-14142-8
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9781118950951
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs06/preview
2.	

Semester VII

22CSE738-Lab-PE IV: Data mining

(Practical's based on above Syllabus)

Semester VII

22CSE751- PE V: Information Retrieval System

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Understand different Information retrieval models. 2. Know about evaluation methods of the information retrieval model. 3. Know the challenges associated with each topic		
Unit:1	**Introduction to Information retrieval**	**7 Hours**
Introduction to Information retrieval: Information retrieval process, Indexing, Information retrieval model, Boolean retrieval model Dictionary and Postings: Tokenization, Stop words, Stemming, Inverted, index, Skip pointers, Phrase queries		
Unit:2	**Tolerant Retrieval**	**7 Hours**
Tolerant Retrieval : Wild card queries, Permuterm index, Bigram index, Spelling correction, Edit distance, Jaccard coefficient, Soundex **Term Weighting and Vector Space Model:** Wild card queries, Permuterm index, Bigram index, Spelling correction, Edit distance, Jaccard coefficient, Soundex.		
Unit:3	**Evaluation**	**7 Hours**
Evaluation: Precision, Recall, F-measure, E-measure, Normalized recall, Evaluation problems **Latent Semantic Indexing**: Eigen vectors, Singular value decomposition, Low rank approximation, Problems with Lexical Semantics.		
Unit:4	**Query Expansion**	**6 Hours**
Query Expansion : Relevance feedback, Rocchio algorithm, Probabilistic relevance feedback, Query Expansion and its types, Query drift **Probabilistic Information Retrieval**: Probabilistic relevance feedback, Probability ranking principle, Binary Independence Model, Bayesian network for text retrieval		
Unit:5	**XML Indexing and Search**	**6 Hours**
XML Indexing and Search: Data vs. Text-centric XML, Text-Centric XML retrieval, Structural terms.		
Unit :6	**Web Information Retrieval**	**6 Hours**
Web Information Retrieval Hypertext, web crawling, search engines, ranking, link analysis, PageRank, HITS.		
Total Lecture Hours		**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks	
1	Introduction to Information Retrieval , Christopher D. Manning, Raghavan and Schutze, Cambridge University Press,2008
Reference Books	
1	Natural Language Processing And Information Retrieval, Tanveer Siddiqui and U. S. Tiwary, Oxford Higher Education,2008
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://cse.iitkgp.ac.in/~pabitra/course/ir06/ir06.html
2	https://cse.iitk.ac.in/pages/CS657.html

Semester VII

22CSE752- PE V: Distributed System

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Identify the advantages and challenges in designing distributed algorithms for different primitives like mutual exclusion, deadlock detection, agreement, etc. 2. Design and develop distributed programs using sockets and RPC/RMI. 3. Differentiate between different types of faults and fault handling techniques in order to implement fault tolerant systems. 4. Analyze different algorithms and techniques for the design and development of distributed systems subject to specific design and performance constrain

Unit:1	Characterization of Distributed Systems	6 Hours
Architecture of Distributed Systems: Characteristics of Distributed System, Motivation, challenges /Issues in the design & development of Distributed System. System Models: Architecture Model, System Architecture, Types of Architectural Model: Client server model, Search engine, Proxy server & caches, Variation on client server model: mobile code, mobile agents. Fundamental Models: Interaction model, failure model, Security model. Distributed Objects & Distributed file System: Inter-process communication, Sockets, middle ware, Group communication, and Remote procedure calls. CORBA, RMI, Distributed file system, Name services, Directory services, File Service types, download/upload model, File sharing semantics, session semantics, Server design: stateless & stateful server, Cache update policies.		

Unit:2	Theoretical Foundations	6 Hours
Inherent limitations of distributed systems, Timing issues, clock synchronization, Network time protocol, Lamport's logical clocks, Vector clocks, Casual ordering of messages, Global state, Cuts of Distributed computation, Termination detection.		

Unit:3	Distributed Mutual Exclusion	6 Hours
Leader election: Chang Robert Ring based leader election algorithm, Bully algorithm. Classification of mutual exclusion algorithms, Requirements and performance measures of mutual exclusion algorithms, Non Token Based Algorithms: Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm.Token Based Algorithms: SuzukiKasami's Algorithm, Raymond's Algorithm, Comparative performance analysis		

Unit:4	Distributed Deadlock Detection	8 Hours
Resource vs Communication deadlocks, graph theoretic model, deadlock prevention, avoidance, detection, Issues in deadlock detection and resolution, Centralized deadlock detection algorithms, distributed deadlock detection algorithms		

Unit:5	**Agreement Protocols**	**8 Hours**
Synchronous vs. asynchronous computations, model of process failures, authenticated vs. non-authenticated messages. A classification of Agreement problems, Solutions to Byzantine Agreement problem, Applicatons of Agreement algorithms.		
Unit :6	**Failure recovery and Fault Tolerance**	**7 Hours**
Classification of failures. Backward and forward error recovery, Basic approaches of backward error recovery, recovery in concurrent systems, consistent set of checkpoints, synchronous check pointing and recovery, asynchronous check pointing and recovery. Fault Tolerance: Atomic actions and committing, commit protocols, non-blocking commit protocols, Voting protocols, Dynamic voting protocols, Dynamic Vote Reassignment Protocols		
Total Lecture Hours		**36 Hours**

Textbooks	
1	Advanced Concepts In Operating Systems: Distributed, Multiprocessor and Database Operating Systems Mukesh Singhal and Niranjan G. Shivaratri McGraw Hill
2	Distributed Operating Systems Concepts and Design, G Coulouris, Jean Dollimore, Tim Kindberg Addison Wesley
Reference Books	
1	Distributed Algorithms, Nancy Lynch ,Morgan Kaufman
2	Modern Operating Systems , Andrew S. Tanenbaum, Pearson Education
3	Distributed Operating Systems: Concepts and Design, Pradeep K. Sinha, Prentice-Hall of India
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Technology/45-Operating%20System%20Concepts%20(%20PDFDrive%20).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/Operating%20System%20Concept%208thedition.pdf
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs87/preview

Semester VII

22CSE753- PE V: Human Computer Interaction

Course Outcomes:		
Upon successful completion of the course the students will be able to 1) Understand the basics of Human Computer Interaction. 2) Demonstrate the Understanding of Interaction between human and computer Components using screen designing concepts. 3) Apply the knowledge of human and computer components for interaction. 4) Evaluate System using different tools and techniques.		
Unit:1	**Introduction**	**7 Hours**
The human: Human memory, Thinking reasoning and problem solving, Individual differences, Psychology and the design of interactive systems ,Interaction and paradigms: Models of interaction, Frame work and HCI, Ergonomics, Interaction styles, Elements of the WIMP(windows, icons, menus, pointers) interface, interactivity, The context of the interaction, paradigms for interaction.		
Unit:2	**Interaction Design**	**7 Hours**
Interaction Design: What is interaction design, Good and poor design, The process of design, User focus, Scenarios, Navigation design, Understanding the problem space, Conceptualizing the design space, Theories, models and frameworks, Screen design and layout, Interaction and prototyping.		
Unit:3	**HCI**	**6 Hours**
HCI in software process and Design rules: The software life cycle, Usability engineering, Iterative design and prototyping, Design rationale, Principles to support usability, Standards, Guidelines, Golden rules and heuristics, HCI patterns.		
Unit:4	**Implementation and Evaluation**	**7 Hours**
Implementation supports and Evaluation techniques: Elements of windowing system, Programming application, Using toolkits, User interface management systems, What is evaluation? Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, choosing evaluation methods, analytical evaluation.		
Unit:5	**Universal Design**	**6 Hours**
Universal Design and User Support: Universal design principles, Multi-modal interaction, Design for diversity, Requirements of user support, Approach to user support, Adaptive help systems, Design user support systems.		

Unit :6	Cognitive Models	6 Hours
Cognitive Models and Distributed Cognition: Goal and task hierarchies, Linguistics models, Challenges of display-based systems, Physical models, Cognitive architectures, Scientific Foundation, Description, Case Study.		
Total Lecture Hours		**39 Hours**
Textbooks		
1	Human - Computer Interaction, Alan Dix, Janet Fincay, Gregory D. Abowd and Russell Bealg, Pearson Education, 2003.	
2	Designing the user interface, Ben Shneiderman, Pearson Education Asia, 2004	
Reference Books		
1	Interaction Design, Preece and Rogers, Sharp, Wiley-India, 2008.	
2	The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech, 2009	
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]		
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/25.BOOK1-Human_computer_interaction.pdf	
MOOCs Links and additional reading, learning, video material		
1	https://onlinecourses.nptel.ac.in/noc19_cs86/preview	

Semester VII

22CSE754- PE V: Real Time System

Course Outcomes:		
Upon successful completion of the course the students will be able to 1.Clearly differentiate the different issues that arise in designing soft and hard real-time, concurrent, reactive, safety-critical and embedded systems. 2.Explain the various concepts of time that arise in real-time systems. 3.Describe the design and implementation of systems that support real-time applications. Justify and critique facilities provided by real-time operating systems and networks. 4.Design, construct and analyze a small, concurrent, reactive, real-time system. 5.Select and use appropriate engineering techniques, and explain the effect of your design decisions on the behavior of the system.		
Unit:1	**Basic Real- Time Concepts, Computer Hardware, Language Issues**	**6 Hours**
Basic component Architecture, Real Time Design Issues, Input- Output, Other Devices Language Features, Survey of Commonly Used Programming Languages, Code Generation.		
Unit:2	**Software life cycle, Real Time Specification and Design Techniques**	**6 Hours**
software life cycle, Non-temporal Transition in the software life cycle, Spiral model, Natural languages, Mathematical Specification, Flow Charts, Structure Charts, Pseudocode and programmable Design Languages,		
Unit:3	**Intertask Communication and Synchronization, Real Time memory Management, SystemPerformance Analysis and Optimization**	**6 Hours**
Buffering Data, Mail boxes Critical Region, Semaphores, Event Flags and Signals, Deadlock, Process Stack Management, Dynamic Allocation, Static Schemes, Response Time Calculation, Interrupt Latency, Scheduling NP Complete, Relocating Response Times And time Loading, Analysis of Memory Requirements, Reducing Memory Loading, I/O Performance.		
Unit:4	**Queuing Models, Reliability, Testing, And Fault Tolerance, Multiprocessing Systems**	**6 Hours**
Basic Buffer size Calculation, Classical Queuing Theory, Little's Law, Faults, Failures ,bugs AND effects. Reliability, Testing, Fault Tolerence, Classification of Architectures, Distributed Systems, Non Von Neumann Architectures.		
Unit:5	**Hardware/ Software Integration, Real Time Applications**	**6 Hours**
Goals of Real Time System Integration, Tools, Methodology, Real Time Systems As Complex System, First Real Time Application Real Time Databases, Real time Image Processing Real Time UNIX, building Real Time Applications with Real Time Programming Languages.		
Total Lecture Hours		**36 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks	
1	Real Time System, Jane W.S.Liu
2	Real Time Systems Design and Analysis by Phillip A. Laplante,PHI
Reference Books	
1	Hard Real Time Computing Systems Predictable Scheduling Algorithms and applications by GiorgioC. Buttazzo
2	Real Time Design Patterns: Robust Scalable Architecture for Real Time System by BrucePowel Douglass
3	Real Time System: Scheduling, Analysis and Verification by Albert M.K. Change
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/53.Book-Liu-%20Real%20Time%20Systems.pdf
2	
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_cs98/preview

VII Semester

22CSE705– Project Phase-II

VII Semester

22CSE706– Campus Recruitment Training (CRT)

VIII SEMESTER

22CSE801– Internship - training / Seminar & Report

VIII SEMESTER

22CSE802- Extra-Curricular Activity Evaluation

COURSE OBJECTIVES	COURSE OUTCOME
1. To organize co-curricular activities to make competitive spirit, cooperation, leadership, diligence, punctuality, team spirits. 2. To develop creative talent, self-confidence, sense of achievement. 3. To be able to design process on environmental, social, political, ethical, health and safety. 4. To develop broad education to understand the impact of engineering solution in a global economic, environmental, society.	1. An ability to work initially as well as part of team to achieve set goals. 2. An ability to work to serve society and for betterment of society. 3. An ability to communicate with people at large.
Mapped Program Outcomes : 1,2,3,45,6,7,9,10,11	

Due credits will be given to the students based on their performance and involvement in different extra and co-curricular activities conducted within the college or by other organizations/ institutions. Due credit will also be given to the student if they are successful in different competitive examinations conducted by different organizations. The guidelines as given in academic regulations will be followed for evaluation.