SANJEEV AGRAWAL GLOBAL EDUCATIONAL (SAGE) UNIVERSITY, BHOPAL

Scheme & Syllabus

for

Bachelor of Technology CSE (Hons) –Cloud Computing

With iNurture

School of Advanced Computing
2021-22 Batch

Program Educational Objectives (PEOs)

PEO-1: To prepare graduates as leading professionals globally in government, academia, corporate and research organizations along with entrepreneurial pursuits

PEO-2: To prepare graduates with an ability to articulate and solve problems in the field of Computer Science and Engineering specially in Cloud Technology and Information Security..

PEO-3: To prepare the graduates with strong learning quotients having adaptability to the constantly changing technological environment

PEO-4: To prepare the graduates to lead and initiate ethically the professional and organizational goals in interdisciplinary team and obtain desired results.

PEO-5: To disseminate the ability to analyze the requirements, understand the technical specifications and design the innovative solutions by applying the principles of computing.

Program Outcomes (POs):

PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

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

PO-8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Curriculum Components

Components	Credits
Program Core (21 Courses)	**84**
Major Electives (11 Courses)	**43**
Minor Electives (04 Courses)	**8**
Ability & Skill Development (Ability Enhancement Courses) (03 Courses)	**6**
Ability & Skill Development (Skill Enhancement Courses) (04 Courses)	**8**
Project Based Learning (PBL)/MOOCs (08 courses)	**20**
Project (02 Courses)	**26**
Total	**195**

First Semester

Course Code	Course Title	Contact Hours per Week			Credits	ETE Duration (Hours)	Theory						Practical			GT
		L	T	P			MSE	ASG	TA	ATTD	ESE	Tot	CE	ESE	Tot	
UC20B101	Environmental Studies and Disaster Management	2	-	-	2	3	30	05	05	10	50	100				100
UC20B102	Communication Skills	2	-	-	2	3	30	05	05	10	50	100				100
IN21B103	Engineering Maths-I	4	-	-	4	3	30	05	05	10	50	100				100
IN21B104	Physics	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
IN21B105	Basic Electrical and Electronics Engineering	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
IN21B106	Programming for Problem Solving	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-I	Major Elective – I	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
PB20B101	Project Based Learning-I	-	-	4	2	2	-						50^	50	100	100
		Total			**26**											**1000**

L-Lecture, T-Tutorial, P-Practical, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, CE-Continuous Evaluation ,ESE-End Semester Exam, Tot-Total, GT-Grand Total, ^- 02 assessment by panel of Experts

Second Semester

Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration	Theory						Practical			
		L	T	P			MSE	ASG	TA	ATTD	ESE	Tot	CE	ESE	Tot	GT
UC20B202	Entrepreneurship Development	2	-	-	2	3	30	05	05	10	50	100				100
IN21B202	Engineering Drawing	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
IN21B203	Basic Mechanical and Civil Engineering	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
IN21B204	Engineering Maths-II	4	-	-	4	3	30	05	05	10	50	100				100
IN21B205	Programming Practice – II	-	-	4	2	2	-	-	-	-	-	-	20	30	50	50
Table-I	Major Elective – II	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-I	Major Elective – III	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
PB20B201	Project Based Learning-II	-	-	4	2	2	-						50^	50	100	100
	Total				26											950

L-Lecture, T-Tutorial, P-Practical, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, CE-Continuous Evaluation ,ESE-End Semester Exam, Tot-Total, GT-Grand Total, ^- 02 assessment by panel of Experts

			Third Semester												

		Contact Hours per Week			Credits	ESE Duration (Hours)	Theory						Practical			GT
Course Code	**Course Title**	**L**	**T**	**P**			**MSE**	**ASG**	**TA**	**ATTD**	**ESE**	**Tot**	**CE**	**ESE**	**Tot**	
UC20B302	Quantitative Aptitude-I	2	-	-	2	3	30	05	05	10	50	100	-	-	-	100
CC21B303	Operating System	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
CC21B304	Data Structure and Algorithms	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
CC21B305	Object Oriented Programming using Java	2	2	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-I	Major Elective -IV	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-I	Major Elective -V	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-II	Minor Elective-I	2	-	-	2	3	30	05	05	10	50	100	-	-	-	100
PB20B301	Project Based Learning-III	-	-	4	2	2	-						50^	50	100	100
	Total				**26**											**1050**

L-Lecture, T-Tutorial, P-Practical, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, CE-Continuous Evaluation ,ESE-End Semester Exam, Tot-Total, GT-Grand Total, ^- 02 assessment by panel of Experts

Fourth Semester

Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Theory						Practical			
		L	T	P			MSE	ASG	TA	ATTD	ESE	Tot	CE	ESE	Tot	GT
UC20B402	Quantitative Aptitude-II	2	-	-	2	3	30	05	05	10	50	100				100
CC21B403	Discrete Mathematics	3	-	-	3	3	30	05	05	10	50	100				100
CC21B404	Computer Networks	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
CC21B405	Database Management System	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
CC21B406	Computer Organization and Architecture	3	-	-	3	3	30	05	05	10	50	100	-	-	-	100
Table-I	Major Elective -VI	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-II	Minor Elective – II	2	-	-	2	3	30	05	05	10	50	100				100
PB20B401	Project Based Learning-IV	-	-	4	2	2							50^	50	100	100
	Total				24											950

L-Lecture, T-Tutorial, P-Practical, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, CE-Continuous Evaluation ,ESE-End Semester Exam, Tot-Total, GT-Grand Total, ^- 02 assessment by panel of Experts

Course Code	Course Title	Contact Hours per Week L	T	P	Credits	ESE Duration (Hours)	Theory MSE	ASG	TA	ATTD	ESE	Tot	Practical CE	ESE	Tot	GT
							Fifth Semester									
UC20B501	Introduction to Management and Leadership	2	-	-	2	3	30	05	05	10	50	100				100
CC21B502	Web Technologies	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
CC21B503	Principles of Virtualization	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
CC21B504	Theory of Computation	3	2	-	4	3	30	05	05	10	50	100	-	-	-	100
CC21B505	Linux Administration	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-I	Major Elective –VII	3	-	-	3	3	30	05	05	10	50	100	-	-	-	100
Table-II	Minor Elective – III	2	-	-	2	3	30	05	05	10	50	100	-	-	-	100
PB20B501	Project Based Learning-V	-	-	4	2	2	-						50^	50	100	100
	Total				25											950

L-Lecture, T-Tutorial, P-Practical, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, CE-Continuous Evaluation ,ESE-End Semester Exam, Tot-Total, GT-Grand Total, ^- 02 assessment by panel of Experts

Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration	Theory						Practical			GT
		L	T	P			MSE	ASG	TA	ATTD	ESE	Tot	CE	ESE	Tot	
UC20B601	Social and Professional Ethics	2	-	-	2	3	30	05	05	10	50	100				100
CC21B602	Cloud Web Services	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
CC21B603	Containerization using Dockers	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-I	Major Elective – VIII	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-I	Major Elective – IX	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-II	Minor Elective – IV	2	-	-	2	3	30	05	05	10	50	100				100
PB20B601	Project Based Learning-VI	-	-	4	2	2	-						50^	50	100	100
	Total				22											900

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Course Code	Course Title	Contact Hours Per Week			Credits	ESE Duration (Hours)	Theory						Practical			GT
		L	T	P			MSE	ASG	TA	ATTD	ESE	Tot	CE	ESE	Tot	GT
CC21B701	Server Side Scripting	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-I	Major Elective – X	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
Table-I	Major Elective – XI	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
CC21B702	Summer Internship/Project-I	-	-	24	12	2	-						200^	200	400	400
		Total			24											850

Seventh Semester

L-Lecture, T-Tutorial, P-Practical, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, CE-Continuous Evaluation ,ESE-EndSemester Exam, Tot-Total, GT-Grand Total, ^- 02 assessment by panel of Experts

								Eighth Semester										
Course Code	Course Title	Contact Hours per Week			Credits	ETE Duration (Hours)	Theory						Practical			GT
		L	T	P			MSE	ASG	TA	ATTD	ESE	Tot	CE	ESE	Tot	
PB20B801	MOOC-1	-	-	8	4	2	30	05	05	10	50	100				100
PB20B802	MOOC-2	-	-	8	4	2	30	05	05	10	50	100				100
CC21B803	Project-II	-	-	28	14	2	-						300^	200	500	500
		Total			22											700

L-Lecture, T-Tutorial, P-Practical, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, CE-Continuous Evaluation ,ESE-End Semester Exam, Tot-Total, GT-Grand Total, ^- 02 assessment by panel of Experts

Distribution of credits across all components

SEM	Prog. Core	Major Electives	Minor Electives	Ability & Skill Development		Project Based Learning (PBL)/ MOOCs	Project	Total Credit
				Ability Enhancement Courses	Skill Enhancement Courses			
I.	16	4	-	2	2	2	-	**26**
II.	14	8	-	2	-	2	-	**26**
III.	12	8	2	2	-	2	-	**26**
IV.	14	4	2	-	2	2	-	**24**
V.	16	3	2	-	2	2	-	**25**
VI.	8	8	2	-	2	2	-	**22**
VII.	4	6	-	-	-	-	12	**24**
VIII.	-	-	-	-	-	8	14	**22**
Total	**84**	**43**	**8**	**6**	**8**	**20**	**26**	**195**

Table -I
List of Major Electives

for Major Elective-I		
Major Elective-I		
SN	Course Code	Course Name
1.	CC21B101	Introduction to Cloud Technology
2.	IO21B102	Introduction to Computational Thinking
Major Elective - II		
SN	Course Code	Course Name
1.	CC21B206	Linux and Shell Programming
2.	CC21B207	C# Programming
Major Elective -III		
SN	Course Code	Course Name
1.	CC21B210	Introduction to Information Security
2.	CC21B211	Analog and Digital Communication
Major Elective -IV		
SN	Course Code	Course Name
1.	CC21B307	Design and Analysis of Algorithms
2.	CC21B308	Information Theory & Coding
Major Elective -V		
SN	Course Code	Course Name
1.	CC21B309	Fundamental of storage and Data Centre
2.	CC21B310	Cloud Migration
Major Elective -VI		
SN	Course Code	Course Name
1.	CC21B408	Python Programming
2.	CC21B409	Cloud Scripting using PaaS
Major Elective -VII		
SN	Course Code	Course Name
1.	CC21B506	High Performance Computing
2.	CC21B507	Cloud Deployment and Management
Major Elective -VIII		
SN	Course Code	Course Name
1.	CC21B605	Cloud Security
2.	CC21B606	Installation & Configuration of Server
Major Elective -IX		
SN	Course Code	Course Name
1.	CC21B607	Windows Administration
3.	CC21B608	Ethical Hacking
Major Elective -X		
SN	Course Code	Course Name
1.	CC21B704	Infrastructure solutions on cloud
3.	CC21B705	Infrastructure Automation
Major Elective -XI		
SN	Course Code	

1.	CC21B706	IT Service Frameworks- ITIL
2.	CC21B707	IT Governance and Risk Management

Table II

List of Minor Electives

Students of all Undergraduate programs are required to study one minor elective in each of the semesters from 3rd to 6th. They may choose any one of the following courses (**excluding the courses offered by the parent departments, if not stated otherwise).**

S.No	Name of School	Minor Elective offered	Minor Specialization	Code	Course
1	**School of Languages & Culture**	**2**	English Literature	LC21B309	Popular Literature
				LC21B409	Travel Writing
				LC21B509	Literature and Cinema
				LC21B609	War Literature
			Hindi Literature	LC21B319	हिंदी में व्यवहारिक अनुवाद
				LC21B419	भाषा शिक्षण
				LC21B519	हिंदी की मौलिक और लोकसाहित्य परंपरा
				LC21B619	लोकनाट्य
2	**School of Engineering & Technology**	**4**	Digital Marketing	ET21B309	Web Development Fundamentals
				ET21B409	Introduction to Digital Marketing
				ET21B509	Search Engine Optimization and Social Media Marketing
				ET21B609	Web Analytics
			Data Analytics	ET21B319	Data Analytics Fundamentals
				ET21B419	Business Analytics
				ET21B519	R Programming
				ET21B619	Data Visualization
			Web Designing	ET21B329	Web Designing Fundamentals
				ET21B429	Dynamic Website with Javascript
				ET21B529	Introduction to XML
				ET21B629	Web Application Development

				ET21B339	Core Java
				ET21B439	Advanced Java
			Programming	ET21B539	Python Programming
				ET21B629	Web Application Development
3	**School of Arts Humanities and Social Sciences**	**4**	Applied Sociology	AH21B309	Basic Concept of Sociology
				AH21B409	Indian Society
				AH21B509	Social Problems in India
				AH21B609	Social Change and Social Control
			History	AH21B319	History of India from the Earliest Times to 1200 AD
				AH21B419	Western World (Mid 15th Century to 1870)
				AH21B519	History of India (1200 to 1739AD)
				AH21B619	Main Currents of World History (from 1871to 2001AD)
			Public Administration	AH21B329	Introduction to Public Administration
				AH21B429	Indian Constitution and Government
				AH21B529	Public Personal Administration
				AH21B629	Comparative Public Administration
			Psychology	AH21B329	Basic Psychology
				AH21B429	Psychopathology
				AH21B529	Biopsychology
				AH21B629	Organizational Psychology
			Physics	SS21B309	Basic Instrumentation Skills

4	**School of Sciences**	**4**		SS21B409	Electrical Circuit Network Skills
				SS21B509	Digital, Analog and Instrumentation
				SS21B609	Elements of Modern Physics
			Biology	SS21B319	Introductory Biology
				SS21B419	Genetics and Society
				SS21B519	Biotechnology
				SS21B619	Bioinformatics and Systems Biology
			Chemistry	SS21B329	Basic Analytical Chemistry
				SS21B429	Green Chemistry and Green Methods in Chemistry
				SS21B529	Pharmaceutical Chemistry
				SS21B629	Pesticide Chemistry
			Mathematics	SS21B339	Elementary Number Theory
				SS21B439	Introduction to Statistical Methods and Probability
				SS21B539	Applications of Mathematics in Finance and Insurance
				SS21B639	Mathematical Modeling
	School of Agriculture		Horticulture	AG21B309	Production Technology for Vegetable and Spices
				AG21B409	Production Technology for Fruit and Plantation Crops
				AG21B509	Diseases of Field and Horticultural Crops and their Management –I
				AG21B609	`Diseases of Field and Horticultural

						Crops and their Management-II
5		3	Crop Production	AG21B319	Crop production Technology – I (Kharif Crops)
				AG21B419	Crop production Technology –II (Rabi Crops)
				AG21B519	Practical Crop Production – I (Kharif crops)
				AG21B619	Practical Crop Production –II (Rabi crops)
			Agri Business	AG21B329	Agricultural Finance and Cooperation
				AG21B429	Agricultural Marketing Trade & Prices
				AG21B529	Entrepreneurship Development and Business Communication
				AG21B629	Farm Management, Production & Resource Economics
6	**School of Commerce & Management**	2	Commerce	CM21B309	International Business
				CM21B409	Auditing
				CM21B509	Direct Tax
				CM21B609	Goods and Services Tax
			Management	MN21B309	E- Business
				MN21B409	Service Marketing
				MN21B509	Retail Management
				MN21B609	Supply Chain Management
	School of Design		Sketching & Painting	DN21B309	Sketching-I
				DN21B409	Sketching –II
				DN21B509	Painting-I
				DN21B609	Painting-II
			Interior Design	DN21B319	Building Materials & Processes
				DN21B419	Elements of Interior Spaces
				DN21B519	Basics of Lighting

					Design
6		**3**		DN21B619	Building Services
			Apparel Design	DN21B329	Fashion Illustration-I
				DN21B429	Dyeing and Printing Techniques
				DN21B529	Surface Exploration I
				DN21B629	Surface Exploration II
7	**School of Performing Arts**	**3**	Dance	PA21B309	Techniques and Theatrical Performance of Dance I
				PA21B409	Techniques and Theatrical Performance of Dance II
				PA21B509	Techniques and Theatrical Performance of Dance III
				PA21B609	Techniques and Theatrical Performance of Dance IV
			Music	PA21B319	Musical Roots and Theatrical Performance I
				PA21B419	Musical Roots and Theatrical Performance II
				PA21B519	Musical Roots and Theatrical Performance III
				PA21B619	Musical Roots and Theatrical Performance IV
			Theatre	PA21B329	Basics of Acting Production I
				PA21B429	Drama Production II
				PA21B529	Drama Production III
				PA21B629	Drama Production IV
	School of		**Basic Media**	JM21B309	Photography

8	Journalism and Mass Communication	2	Production Techniques	JM21B409	Videography
				JM21B509	Script Writing
				JM21B609	Audio Visual Editing
			Advertising and Public Relations	JM21B319	Introduction to Advertising
				JM21B419	Content Creation
				JM21B519	Introduction to Public Relations
				JM21B619	Tools and Techniques of Public Relations

Syllabus

for

BTech CSE (Hons)-Cloud Computing

I- Semester

School of Advanced Computing

COURSE CODE	ENVIRONMENT STUDIES & DISASTER MANAGEMENT	Total Lecture:30
UC20B101		(LTP=2-0-0=2)

Course Objectives:

- Understand the natural environment and its relationships with human activities.
- Characterize and analyze human impacts on the environment.
- Integrate facts, concepts, and methods from multiple disciplines and apply to environmental problems.
- Capacity to integrate knowledge and to analyses, evaluate, and manage the different public health aspects of disaster events at a local and global levels.
- Capacity to obtain, analyze, and communicate information on risks, relief needs, and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios.

UNIT	CONTENTS	HOURS
I	**Introduction to Environment:** Definition, Components of Environment, Relationship between different components, Man-Environment relationship, Impact of Technology on the environment, Environmental Degradation, Sustainable Development, Environmental Education.	5
II	**Ecology & Ecosystems:** Introduction: Ecology- Objectives and Classification, Concepts of an ecosystem- structure & function of ecosystem, Components of ecosystem- Producers, Consumers, Decomposers, Energy flow in the ecosystem - Ecological succession, Food chains, food webs and ecological pyramids, Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems and its types, Bio- Geo- Chemical Cycles - Hydrological Cycle, Carbon cycle, Oxygen Cycle, Nitrogen Cycle, Sulfur Cycle.	7
III	**Environmental Pollution:** Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like SPM, SO2, NOX , Natural & Anthropogenic Sources, Effects of common air pollutants, Air Pollution Episodes, Sound and Noise measurements, Sources of Noise Pollution, Ambient noise levels, Effects of noise pollution, Noise pollution control measures, Water Quality Standards, Sources of Water Pollution, Classification of water pollutants, Effects of water pollutants, Eutrophication, Water Pollution Episodes, Global Warming and Green Houses Effect, Acid Rain, Depletion of Ozone Layer.	7
IV	**Energy Resources:** Renewable & Nonrenewable Resources: Renewable Resources, Nonrenewable Resources, Indian Scenario, Conventional Energy Sources & its problems, non-conventional energy sources- Advantages and its Limitations	4
V	**Disaster Management:** Natural Disasters and its types, Accidental Disasters, Impact of Disasters on Trade and International Trade, Introduction, Natural disasters , Earthquakes, Hurricanes, Tornadoes, Floods, Drought, Tsunami, Volcanoes, Cyclones and Storms, Forest Fires, Severe Heat Waves, Landslides and Avalanches, Epidemics and Insect Infestations, Technological and Social Disasters Types of Technological Hazards, Social Disasters, Political and Crowd Disasters, War and Terrorism, Components of Disaster Management, Government's Role in	7

	Disaster Management through Control of Information, Actors in Disaster Management, Organizing Relief measures at National and Local Level, Psychological Issues, Carrying Out Rehabilitation Work, Government Response in Disaster	
Course Outcome as per Bloom's Taxonomy		
At the end of the course the students will be able to:		
CO1	**Understand**^{2} the importance of Environment.	
CO2	**Understand**^{2} the knowledge of Ecology & Ecosystems.	
CO3	**Analyze**^{3} to impart basic knowledge about Environment Pollution & theirs Remedies.	
CO4	**Understand**^{2} about Energy Resources.	
CO5	**Understand**^{2} about Disaster Management.	
Text Books	• Varandani N. S.(2013): **Basics of Environmental Studies,** Ahmedabad: Books India Publications. • DhunnaMukesh(2011**): Disaster Management,** Delhi:Vayu Education of India. • Joseph Benny(2017): **Environmental Studies,** Noida: McGraw Hills Education.	
Reference Books	• Rajagopalan R.(2015):**Environmental Studies** ,New Delhi: Oxford University, Press Publication. • T Wright Richard & J Nebel Bernard (2002):**Environmental Science** ,Delhi :Prentice Hall India Publication. • B. Botkin Daniel & Keller Edward A (2014):**Environmental Science,** New Delhi :Wiley Publications.	

COURSE CODE	COMMUNICATION SKILLS	Total Lecture:30
UC20B102	**(LTP=2-0-0=2)**	

Course Objectives :

The course provides good introduction and understanding about the following:

- The concept and understanding of different types of Communication
- Introduce different tools of communication that are useful in various techniques of problems solving.
- The Grammatical knowledge of Language Learning with the enhancement of word power.
- To introduce the tricks and methods of official and Technical writing**.**

UNIT	CONTENTS	HOURS
I.	**Introduction:** Theory of Communication, Types and modes of Communication, Effective Communication, Barriers and Strategies	6
II.	**Language of Communication**: Verbal and Non-verbal (Spoken and Written), Personal, Social and Business Communication, Intra-personal, Inter-personal, Group communication	6
III.	**Speaking Skills** Dialogue, Group Discussion Interview, Public Speech, Role Play/Extempore Presentations	6
IV.	**Reading and Understanding** Close Reading, Comprehension, Analysis, and Interpretation, Report Writing, Paraphrasing and Summary	6
V.	**Writing Skills** Making notes Documenting Report Writing, Writing Letters - job applications, CV and Resume Academic Writing, Writing a Proposal	6

Course Outcome as per Bloom's Taxonomy	
At the end of the course the students will be able to:	
CO 1	**Apply**[3]correct usage of English grammar in writing and speaking.
CO 2	**Analyze**[4]and improve their speaking ability in English both in terms of fluency and comprehensibility.
CO 3	**Evaluate**[5] themselves by giving oral presentations and will receive feedback on their performances.
CO 4	**Develop**[3] their reading speed and comprehension of academic articles
CO 5	**Compare**[5] their reading fluency skills.
Text Books	• University Of Delhi, Department Of English(2006):**Fluency in English - Part II",**Delhi : Oxford University Press. • Delhi University(2008):**Business English,**Delhi:Pearson.

	• Kumar S. P.(2013):**Language, Literature and Creativity,**Bhopal Madhya pradesh:OrientBlackswan.
Reference Books	• E ,Warriner John(1973):**Warriner's English Grammar and Composition: Complete Course** ,Harcourt, Brace, Jovanovich. • Day R.K**:Literary/Knowledge Texts (Poetry comprehension – Our Casuarina Tree**):Prose Comprehension.

COURSE CODE	ENGINEERING MATHS-I	Total Lecture : 60
IN21B103		(LTP=4-0-0=4)

Course Objectives
- To understand the basic concepts of algebra, Linear Equations and Linear Dependence.
- To apply the De'Moivre's theorem and its application to find roots of algebraic equations
- To develop skills in Differential Calculus and Expansion of functions.
- To understand the concept of partial differentiation and its application

UNIT	CONTENTS	HOURS
1	**Matrix Algebra and its applications** Rank of Matrix, Normal form of matrix, PAQ form of matrix, System of Linear Equations, Linear Dependence and Independence, Linear Transformations. Eigen values, Eigen Vectors, Cayley – Hamilton Theorem.	12
2	**Complex Algebra and its applications** Argand's Diagram, De'Moivre's theorem and its application to find roots of algebraic equations. Hyperbolic Functions, Inverse Hyperbolic Functions, Logarithm of Complex Numbers.	12
3	**Differential Calculus& Expansion of functions** Taylor's Series and Maclaurin's Series, Indeterminate Forms (all various forms), L' Hospital's Rule, Evaluation of Limits	12
4	**Partial differentiation** Partial Derivatives, Euler's Theorem on homogeneous functions, Total Derivatives & Implicit functions, Change of independent variables.	12
5	**Application of partial differentiation** Errors and Approximations, Maxima & Minima for two and several variables, Jacobians and their applications.	12
Course Outcomes as per Bloom's Taxonomy		

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

CO1	**Understand[2]** the basic concepts of algebra, Linear Equations and linear dependence.
CO2	**Apply[3]** De'Moivre's theorem to solve algebraic equations and geometrical expressions of the complex function.
CO3	**Solve[5]** the functions using Taylor's Series and Maclaurin's Series expansion
CO4	**Apply[3]** the concepts of partial differentiation like maxima and minima for two and several variables, Jacobians and their applications.

CO5	**Apply**[3]Euler's theorem on homogeneous functions and to understand the concepts of Total derivatives & Implicit functions, and change the independent variables.
Text Book	• Grewal, B. S., & Grewal, J. S. (1996**). Higher engineering mathematics**. *2002, Khanna Publishers, New Delhi*. • Ramana, B. V. (2006). **Higher Engineering Mathematics**. Tata McGraw-Hill Education.
Referenc e Books	• Dass, H. K. (2008). **Advanced engineering mathematics**. S. Chand Publishing. • Rutland, L. W. (1963). **Advanced Engineering Mathematics**. Erwin Kreyszig. Wiley, New Yor • O'neil, P. V. (2017). **Advanced engineering mathematics**. Cengage learning. • Greenberg, M. D. (1998). **Advanced Engineering Mathematics**. Pearson Education India.

COURSE CODE	PHYSICS	Total Lecture: 45 Theory:45 Practical:15
IN21B104		**(LTP=3-0-2-=4)**

Course Objectives

- To understand the basic concepts of Heisenberg uncertainty principle and Schrödinger's equation and relates thesame with the wave equation
- To apply the concepts of Crystallography to the various diffraction processes
- To develop skills in Nondestructive testing and apply the same in Radiography testing
- To understand the concept of Superconductivity and properties of superconductors to be able to distinguish between Type I and Type II superconductors

UNIT	CONTENTS	HOURS
1	**Wave Packet & Wave Equations** Concept of Group and phase velocities, Wave packet, Heisenberg's uncertainty principle, Thought experiment on single slit electron diffraction, Wave function and its probability interpretation, Schrödinger's Time dependent & time independent equations, Solution of Schrödinger's equation for one dimensional infinite potential well, Barrier Tunneling.	6
2	**Laser and Optic Fiber** **Laser** - Basics of laser and its mechanism, characteristics of laser - Semiconductor laser: Single Hetro-junction laser - Gas laser: CO_2 laser - Applications of lasers: Holography, IT, industrial, medical **Optic Fiber** - Introduction, parameters: Acceptance Angle, Acceptance Cone, Numerical Aperture - Types of optical fiber- step index and graded index - Attenuation and reasons for losses in optic fibers (qualitative) - Communication system: basic building blocks Advantages of optical fiber communication over conventional methods. **Quantum Mechanics** Plank's Hypothesis, Properties of Photons, Compton Effect, Wave – particle duality, De-Broglie Hypothesis, Matter Waves, Davisson – Germer Experiment; Bohr's Quantization condition.	12
3	**Semiconductor Physics** Crystallography: Introduction to crystal structure, crystal systems, no of atoms per unitcell, coordination number, packing fraction for cubic and hcp lattice, Lattice plane,Miller indices, relation between interplaner distance and miller indices, Bragg's law, X- ray diffraction. Qualitative idea on the formation of electron energy bands in solids, Band-theory based classification of solids into insulators, semiconductors and conductors, Fermi-Dirac distribution Function, Intrinsic semiconductors: Germanium and silicon; Fermi- energy, Typical energy band diagram of an intrinsic semi-conductor, Doping	10

	and Extrinsic semiconductors, Current conduction in semiconductors. PN- junction diode; Unbiased, Forward baised& Reverse biased mode with Energy band diagram reference, Diode rectifier equation, Bipolar Transistor action, Hall effect, Hall coefficient & Hall Angle, V-I characteristics of i) Tunnel diode, ii) Zener diode iii) LED		
4	**Magnetism and Superconductivity** **Magnetism** - Origin of magnetism - Classification of magnetism based on permeability (qualitative) - Applications of magnetic devices: transformer cores, magnetic storage, magneto-optical recording **Superconductivity** - Introduction to superconductivity; Properties of superconductors: zero electrical - resistance, critical magnetic field, persistent current, Meissner effect - Type I and Type II superconductors - Low and high temperature superconductors (introduction and qualitative) - AC/DC Josephson effect; SQUID: basic construction and principle of working; Applications of SQUID - Applications of superconductors.		8
5	**Non-Destructive Testing and Nanotechnology** **Non-Destructive Testing** - Classification of Non-destructive testing methods - Principles of physics in Non-destructive Testing - Advantages of Non-destructive testing methods - Acoustic Emission Testing - Ultrasonic (thickness measurement, flaw detection) - Radiography testing **Nanotechnology** - Introduction to nanotechnology - Quantum confinement and surface to volume ratio - Properties of nanoparticles: optical, electrical, mechanical Applications of nanoparticles: Medical (targeted drug delivery), electronics, space and defense, automobile		9
List of Experiments			

Suggested List of Laboratory Experiments (Any eight)
1 Experiment based on Newton's rings (determination of wavelength of monochromatic light, determine radius of curvature of plano-convex lens)
2 To determine position of diffraction minima by studying diffraction at a single slit
3 To determine unknown wavelength by using plane diffraction grating
4 To find out Resolving power of Diffraction Grating/Telescope
5 To verify Malus Law
6 Any experiment based on Double Refraction (Determination of refractive indices, identification of types of crystal)
7 Any Experiment based on Laser (Thickness of wire, determination of number of lines on grating surface) 8 An experiment based on optic fibers
9 To study IV characteristics of Solar Cell and determine parameters (fill factor and efficiency)
10 To determine band gap of given semiconductor
11 To determine Hall coefficient and charge carrier density
12 Temperature dependence characteristics of semiconductor laser
13 To find out Magnetic susceptibility of given material

14 Ultrasonic Interferometer: Determination of velocity of ultrasonic waves in given liquid and find its compressibility	

Course Outcomes as per Bloom's Taxonomy
At the end of the course the students should be able to:

CO1	**Understand**[2] the basic concepts of Heisenberg uncertainty principle, Schrödinger's equation and wave equation
CO2	**Identify**[4], formulate, and solve problems related to various diffraction processes
CO3	**Apply**[3] the concepts of Nondestructive testing to various problems in Radiography Testing
CO4	**Formulate**[4], conduct, analyze, and interpret experiments with Type I and Type II Superconductors and understand the differences in detail .
CO5	**Understand**[2] the various concepts of Nano- Destructive Testing and Nano- Technology and its importance in real time scenario.
Text Book	• Avadhanulu, M. N. (1992). **A textbook of engineering physics**. S. Chand Publishing. Gaur, R. K., & Gupta, S. L. (1987). **Engineering physics**. DhanpatRai and Sons.
Reference Books	• Resnick, R., Halliday, D., & Walker, J. (1988). **Fundamentals of Physics**, Vol. 1. John Wiley. • Serway, R. A., & Jewett, J. W. (1998). **Principles of physics** (Vol. 1). Fort Worth, TX: Saunders College Pub.. • Ashcroft, N. D., &Mermin, S. **Introduction to Solid State Physics**, C. Kittel. • Keer, H. V. (1993). **Principles of the solid stat**e. New Age International. Kulkarni, S. K., & Kulkarni, S. K. (2015). **Nanotechnology: principles and practices**. Springer.

COURSE CODE	BASIC ELECTRICAL AND ELECTRONIICS ENGINEERING	Total Lecture: 45 Theory:45 Practical:15
IN21B105		**(LTP=3-0-2=4)**

Course Objectives
● The course objective is to make students of all the branches of Engineering to understand the efficacy of electronic principles which are pervasive in engineering applications.

UNIT	CONTENTS	HOURS
1	**Semiconductor Diodes and Applications**: p-n junction diode, Characteristics and Parameters, Diode approximations, DC load line analysis, Half-wave rectifier, Two-diode Full-wave rectifier, Bridge rectifier, Capacitor filter circuit (only qualitative approach), Zener diode voltage regulators: Regulator circuit with no load, Loaded Regulator. Numerical examples as applicable. **Bipolar Junction Transistors:** BJT operation, BJT Voltages and Currents, BJT amplification, Common Base, Common Emitter and Common Collector Characteristics, Numerical examples as applicable.	**9**
2	**BJT Biasing**: DC Load line and Bias Point, Base Bias, Voltage divider Bias, Numerical examples as applicable. Introduction to Operational Amplifiers: Ideal OPAMP, Inverting and Non-Inverting OPAMP circuits, OPAMP applications: voltage follower, addition, subtraction, integration, differentiation; Numerical examples as applicable.	**8**
3	**Digital Electronics:** Introduction, Switching and Logic Levels, Digital Waveform. Number Systems: Decimal Number System, Binary Number System, Converting Decimal to Binary, Hexadecimal Number System: Converting Binary to Hexadecimal, Hexadecimal to Binary, Converting Hexadecimal to Decimal, Converting Decimal to Hexadecimal, Octal Numbers: Binary to Octal Conversion. Complement of Binary Numbers. Boolean Algebra Theorems, De Morgan's theorem. Digital Circuits: Logic gates, NOT Gate, AND Gate, OR Gate, XOR Gate, NAND Gate, NOR Gate, X-NOR Gate. Algebraic Simplification, NAND and NOR Implementation: NAND Implementation, NOR Implementation. Half adder, Full adder.	**10**
4	**Flip-Flops:** Introduction to Flip-Flops, NAND Gate Latch/ NOR Gate Latch, RS Flip-Flop, Gated Flip-Flops: Clocked RS Flip-Flop . Microcontrollers: Introduction to Microcontrollers, 8051 Microcontroller Architecture and an example of Microcontroller based stepper motor control system (only Block Diagram approach).	**9**
5	**Communication Systems:** Introduction, Elements of Communication Systems, Modulation: Amplitude Modulation, Spectrum Power, AM Detection (Demodulation), Frequency and Phase Modulation. Amplitude and Frequency Modulation: A comparison. Transducers: Introduction, Passive Electrical Transducers, Resistive Transducers, Resistance Thermometers, Thermistor.	**9**

	Linear Variable Differential Transformer (LVDT). Active Electrical Transducers, Piezoelectric Transducer, Photoelectric Transducer.	

List of Experiments

BEE Laboratory Practical List
1) Verification of Kirchhoff's Current and Voltage Laws
2) Verification of ohms law.
3) PN junction diode characteristics.
4) Zener diode characteristics.
5) Half wave rectifier circuit.
6) Full wave rectifier circuit.
7) Transistor common emitter characteristics.
8) Transistor common base characteristics
9) Truth Table verification of Logic Gates
10) Combinational circuits (verify the truth tables of Half Adder and Full Adder)

Course Outcomes as per Bloom's Taxonomy

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

CO1	**Understand**[2] the applications of diode in rectifiers, filter circuits and wave shaping
CO2	**Apply**[3] the concept of diode in rectifiers, filters circuits
CO3	**Compile**[6] the different building blocks in digital electronics using logic gates and implement simple logic function using basic universal gates.
CO4	**Understand**[2] the functioning of a communication system, and different modulation technologies
CO5	**Understand**[2] the various concepts of communication systems and apply those techniques like frequency and phase modulation in real time scenario.
Text Book	• David A. Bell,(2008) "**Electronic Devices and Circuits**", Oxford University Press, 5th Edition • D.P. Kothari, I. J. Nagrath,(2014.) "Basic Electronics", McGraw Hill Education (India) Private Limited.
Reference Books	• MuhammadAliMazidi,(2011) "**The 8051 Microcontroller and Embedded. Systems**. Using Assembly and C." Second Edition, , Pearson India.

COURSE CODE	PROGRAMMING FOR PROBLEM SOLVING	Total Lecture: 45 Theory:45 Practical:15
IN21B106		**(LTP=3-0-2=4)**

Course Objectives

Even with the introduction of several high level languages and frameworks, the development of procedural codes is important in several commercial app developments. The object oriented platforms and event driven systems use procedural languages for coding integral command content. C is an important procedural language and was developed initially to write the UNIX operating system. UNIX operating system, C compiler and all UNIX application programs are written in C. C is popular because, it is easy to learn, produces efficient programs, can handle low-level activities, and can be compiled on a variety of platforms. This course focuses on all the basic concepts, syntax and constructs of the C language. For students, who are new to programming, this unit can be considered as the starting point before taking up any other programming oriented units. The students will be implementing the concepts explained here to create simple to complex programs.

UNIT	CONTENTS	HOURS
1	**Overview of Programming:** Introduction to computer based problem solving, Program design and implementation issues- Flowcharts & Algorithms, Top down design & stepwise refinement, Programming environment – Machine language, assembly language, high level languages, Assemblers, Compilers, Interpreters .	7
2	**Fundamentals of C programming:** Overview of C, Data Types, Constants & Variables, Operators & Expressions, Control constructs-if then, for, while, Arrays- single & multidimensional arrays, Functions-fundamentals – general form, function arguments, return value, Basic I/O-formatted and Unformatted I/O, Advanced features- Type modifiers and storage class specifies for data types, Bit operators, ? operator, &operator, * operator, Type casting, type conversion.	9
3	**Advanced programming techniques:** Control constructs- Do while, Switch statement, break and continue, exit() function, go to and label, Scope rules- Local & global variables, scope rules of functions, Functions-parameter passing, call by value and call by reference, calling functions with arrays, argc and argv, recursion- basic concepts, ex-towers of Hanoi	9
4	**Dynamic data structures in C:** Pointers- The & and * operator, pointer expression, assignments, arithmetic, comparison, mallocvscalloc, arrays of pointers, pointers to pointers, initializing pointers, pointers to functions, function retuning pointers, Structures- Basics, declaring, referencing structure elements, array of structures, passing structures to functions, structure pointers, arrays and structures within structures, Unions – Declaration, uses, enumerated data-types, typedef.	10

5	**Additional features:** File Handling – The file pointer, file accessing functions, fopen, fclose, puc, getc, fprintf, C Preprocessor- #define, #include, #undef, Conditional compilation directives, C standard library and header files: Header files, string functions, mathematical functions, Date and Time functions	10
	List of Experiments	

List of Programs:

Part A

1 Printing the reverse of an integer.

2 Printing the odd and even series of N numbers.

3 Get a string and convert the lowercase to uppercase and vice--versa using getchar() and putchar().

4 Input a string and find the number of each of the vowels appear in the string.

5 Accept N words and make it as a sentence by inserting blank spaces and a full stop at the end.

6 Printing the reverse of a string.

Part B

1 Searching an element in an array using pointers.

2 Checking whether the given matrix is an identity matrix or not.

3 Finding the first N terms of Fibonacci series.

4 Declare 3 pointer variables to store a character, a character string and an integer respectively. Input values into these variables. Display the address and the contents of each variable.

5 Define a structure with three members and display the same.

6 Declare a union with three members of type integer, char, string and illustrate the use of union.

7 Recursive program to find the factorial of an integer.

8 Finding the maximum of 4 numbers by defining a macro for the maximum of two numbers.

9 Arranging N numbers in ascending and in descending order using bubble sort.

10 Addition and subtraction of two matrices.

11 Multiplication of two matrices.

12 Converting a hexadecimal number into its binary equivalent.

13 Check whether the given string is a palindrome or not.

14 Demonstration of bitwise operations.

15 Applying binary search to a set of N numbers by using a function.

Create a sequential file with three fields: empno, empname, empbasic. Print all the details in a neat format by adding 500 to their basic salary.

Course Outcomes as per Bloom's Taxonomy	
At the end of the course the students should be able to:	
CO1	**Apply³** the basic concepts of Computer components.
CO2	**Design⁶**, implement, test, debug and document programs in C.
CO3	**Apply³** functions, and functions with parameters passing option.
CO4	**Understand²** the advance topics in C like file handling functions and the concept of Standard C library.
CO5	**Understand²** the additional features of file handling and define, include and undef conditional compilation directives.
Text Book	● Yashwant, K. (1999). **Let us C. Array and pointers**, 7th edition, BPB publication.
Reference Books	● Ritchie, D. M., Kernighan, B. W., &Lesk, M. E. (1988**). The C programming language**. Englewood Cliffs: Prentice Hall. ● Balagurusamy, E. (2012**). programming in ANSI** C. Tata McGraw-Hill Education.

COURSE CODE	INTRODUCTION TO CLOUD TECHNOLOGY	Total Lecture: 45 Theory:45 Practical:15
CC21B101		**(LTP=3-0-2=4)**

Course Objectives

- Understanding Cloud and its Architecture
- Understanding concept of Virtualization
- Understand Local Cloud and Internet connected cloud management
- Setting up Cloud platform step by step
- Difference between Cloud computing and IoT
- Understanding IoT Cloud Architecture and Interface
- Connecting things to IoT Cloud
- Learning REST API and accessing Cloud Variables
- Understanding Security Issues Involved in IoT

UNIT	CONTENTS	HOURS
I	**Introduction** Introduction to Cloud Computing, History and Evolution of Cloud Computing, Types of clouds, Private ,Public and hybrid clouds, Cloud Computing architecture, Cloud computing infrastructure, Merits of Cloud computing, , Cloud computing delivery models and services (IaaS, PaaS, SaaS), obstacles for cloud technology, Cloud vulnerabilities, Cloud challenges, Practical applications of cloud computing.	9
II	**Cloud Computing Companies and Migrating to Cloud** Web-based business services, Delivering Business Processes from the Cloud: Business process examples, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud, Efficient Steps for migrating to cloud., Risks: Measuring and assessment of risks, Company concerns Risk Mitigation methodology for Cloud computing, Case Studies .	9
III	**Cloud Cost Management and Selection of Cloud Provider** Assessing the Cloud: software Evaluation, System Testing, Seasonal or peak loading, Cost cutting and cost-benefit analysis, Selecting the right scalable application. Considerations for selecting cloud solution. Understanding Best Practices used in selection of Cloud service and providers, Clouding the Standards and Best Practices Issue: Interoperability, Portability, Integration, Security, Standards Organizations and Groups associated with Cloud Computing, Commercial and Business Consideration	9
IV	**Governance in the Cloud** Industry Standards Organizations and Groups associated with Cloud Computing, Need for IT governance in cloud computing, Cloud Governance Solution: Access Controls, Financial Controls, Key Management and Encryption, Logging and Auditing, API integration. Legal Issues: Data Privacy and Security Issues, Cloud	9

	Contracting models, Jurisdictional Issues Raised by Virtualization and Data Location, Legal issues in Commercial and Business Considerations	
V	**Ten Cloud DO and DONTS** Don't be reactive, do consider the cloud a financial issue, don't go alone, do think about your architecture, don't neglect governance, don't forget about business purpose, do make security the centerpiece of your strategy, don't apply the cloud to everything, don't forget about Service Management, do start with a pilot project.	9

List of Experiments

List of Practical:
1. Study the basic cloud architecture and represent it using a case study
2. Enlist Major difference between SAAS PAAS & IAAS also submit a research done on various companies in cloud business and the corresponding services provided by them , tag them under SAAS , PAAS & IAAS.
3. Study and present a report on Jolly cloud.
4. Present a report on obstacles and vulnerabilities in cloud computing on generic level
5. Present a report on Amazon cloud services.
6. Present a report on Microsoft cloud services.
7. Present a report on cost management on cloud
8. Enlist and explain legal issues involved in the cloud with the lelp of a case study
9. Explain the process of migrating to cloud with a case study.
10. Present a report on Google cloud and cloud services

Course Outcomes as per Bloom's Taxonomy

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

CO1	**Understand[2]** the basic concepts of Cloud and its architecture.
CO2	**Understand[2]** the seven step model of migration into a cloud and various concepts related to it.
CO3	**Understand[2]** the management of cloud cost and various section of cloud providers.
CO4	**Understand[2]**the importance of the IT governance in cloud computing and jurisdictional issues raised by virtualization and data location.
CO5	**Find[1]** out the Ten (10) cloud DO's and DON'T's of cloud technology and its various applications
Text Book	• Biron, J., & Follett, J. (2016). **Foundational elements of an iot solution**. O'Reilly Media, Incorporated. • Buyya, R., Broberg, J., &Goscinski, A. M. (Eds.). (2010). **Cloud computing: Principles and paradigms** (Vol. 87). John Wiley & Sons. • " Hwang, K., Dongarra, J., & Fox, G. C. (2013). **Distributed and cloud computing: from parallel processing to the internet of things.** Morgan kaufmann

SANJEEV AGRAWAL GLOBAL EDUCATIONAL (SAGE) UNIVERSITY, BHOPAL

Syllabus

for

BTech CSE (Hons)-Cloud Computing

II- Semester

School of Advanced Computing

COURSE CODE	ENTREPRENEURSHIP DEVELOPMENT		Total Lecture: 30
UC20B202		(LTP=2-0-0=2)	

Course Objectives:

Develop understanding and confidence in students to venture into entrepreneurship by giving them baseline understanding of the various aspects impacting decision making on various frontiers as faced by an enterprise

UNIT	CONTENTS	HOURS
I.	Introduction: Entrepreneur – meaning, evolution, importance, qualities, nature, types, traits. Entrepreneurship development - its importance, role of Entrepreneurship. Entrepreneurial environment, culture and stages in entrepreneurial process, changing dimensions in entrepreneurship – Digital entrepreneurship. Entrepreneur Vs. Intrapreneur, Entrepreneur Vs. Entrepreneurship, Entrepreneur Vs. Manager; Role of Entrepreneur in Indian economy and developing economies with reference to Self-Employment Development Entrepreneurial Culture	7
II.	Starting A New Venture: Generating business idea – sources of new ideas, methods of generating ideas, opportunity recognition. Choice of the organization: Sole Proprietorship, partnerships, Joint Stock Co. , Co-Operatives Family Business – meaning, characteristics, importance, types and models. Growing and evolving family business – Complexity of family enterprise – Diversity of successions; Different Dreams and challenges. easibility study – market feasibility, technical/operational feasibility, financial feasibility, environmental scanning, competitor and industry analysis. Drawing business plan - preparing project report, presenting business plan to investors.	7
III.	Financing and Managing New Venture: Financing and Managing the new venture, Source of capital, Record Keeping, financial controls, Marketing and sales control. Internet advertising Features and evaluation of joint ventures. Basic Government Procedures to be complied with; Policies governing SMEs – Steps in setting up a small unit. Type of business- Large Scale/ MSME; Judging Funding requirements of the business; New Generation Funding sources- Venture Capital Funding, SME Funding, Angel Investors etc	5
IV.	Institutional support and government initiatives for Entrepreneurs': Role of Directorate of Industries, Role of following agencies in the Entrepreneurship Development - District Industries Centers (DIC), Industrial Development Corporation (IDC), State Financial Corporations (IFCs), Commercial Banks, Small Scale Industries Development Corporations (SSIDCs), Khhadi and Village Industries Commission (KVIC), Industries Service Institute (SISI), NABARD, National Small Industries corporation (NSIC), Small Industries Development, Bank of India (SIDBI) and other relevant institutions / organizations. Role of Central Government and State Government in promoting Entrepreneurship - Introduction to various incentives, subsidies and grants.	6
V.	New Venture Expansion and Exit Strategies: Joint Ventures, Acquisitions, mergers, franchising, public issues, right issues, bonus issues and stock issues. Exit Strategies, Reasons for exiting and long and short term preparation, CSR, Dimensions of CSR	5

	Course Outcome as per Bloom's Taxonomy
Attheendofthecoursethestudentswillbeableto**:**	
CO 1	**Develop**[3] managerial qualities and competencies of an entrepreneur.
CO 2	**Acquaint**[2]himself with the challenges of starting a new venture and the process of setting up a business.
CO 3	**Build**[3] essential skills and creativity needed to build teams and work in and with them.
CO 4	**Know**[1] the essential procedure and funding avenues for setting up a new business.
CO 5	**Learn**[1] the various government initiatives and accordingly plan for his business.
Text Books	- VarshaineyG. K. (2019): **Fundamental of Entrepreneurship,** Bangalore**:** SahityaBhawan Publications. - Bharti**,** A. N. **,**TripathiPramodh Kumar (2021-22): **Fundamental of Entrepreneurship** Agra**,** U. P. :RajeevSahityaBhawan Publication**,** SBPD Publication. H. Nandan(2013): **Fundamental of Entrepreneurship,** New Delhi**,** Delhi**,** Third Edition: PHI Learning. K. Nagarajan. (2017): **Project Management,** Second Edition**,** New Delhi: New Age International.
Reference Books	- Peters Hisrich (2017): **Entrepreneurship,** Tenth Edition**,** Noida: McGraw Hills. - Berger Brigitt **(**1991**): The Culture of Entrepreneurship,** Chennai: ICS Pt. - Steven Brandt (1997): **Entrepreneuring: 10 Commandments for Building a Growth Company (Build Your Business Guides),** Third Edition**,** Singapore: Archipelago Pub. - GurmitNarula(2002): **The Entrepreneurial Connection**,Noida: Tata McGraw Hills.

COURSE CODE	ENGINEERING DRAWING	Total Lecture: 45 Theory:45 Practical:15
IN21B202		(LTP=3-0-2=4)

Course Objectives :

This course is design to develop understanding of Engineering Drawing to undergraduate students. It covers various areas of engineering drawing. Principle program outcomes of the course are listed below:

- To prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- To prepare you to communicate effectively
- To prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice.

UNIT	CONTENTS	HOURS
I.	Introduction to Engineering Drawing Principles of Engineering Graphics and their significance, usage of Drawing instruments, Conic sections ellipse ,parabola, Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal ,Vernier Scales and scale of chords.	10
II.	Orthographic Projections, Principles of Orthographic Projections- Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes	10
III.	Projections of Regular Solids those inclined to both the Planes,Sections and Sectional Views of Right Angular Solids covering, Prism, Cylinder, Pyramid, Cone , Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone.	9
IV.	Isometric Projections , Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.	8
V.	Overview of Computer Graphics covering, listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software ,Auto Cad [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids.	8

List of Experiments

List of Programs:

  1. Construct any Engineering Curve by any method

  2. Orthographic view of any machine element along with sectional view

3. Draw Isometric view for given orthographic views	
4. Draw the development of lateral surface of a solid/ truncated solid	
5. Draw the isometric or Orthographic view of a product/object (For example Workshop Job prepared during the workshop practice or any product developed during the first-year session)	

Course Outcome as per Bloom's Taxonomy

Attheendofthecoursethestudentswillbeableto:	
CO 1	**Use**[3] the drawing instruments effectively and able to dimension the given figures. Appreciate the usage of engineering curves in tracing the paths.
CO 2	**Understand**[2] the concept of projection and acquire visualization skills, projection of points.
CO 3	**Define** [1] the basic views related to projections of Solid. To know development of different types of surfaces.
CO 4	**Compare**[4] & understand isometric projection & Orthographic Projection
CO 5	**Use**[2] Autocad software.
Text Books	S. Ramamrutam& R. Narayanan, (2013). *"**Basic Civil Engineering***",DhanpatRai Publication - N NBasak, (2017). *"**Surveying***", 2nd edition , McGraw Hill New Delhi - R.K. Rajput, (2018). *"**Thermal Engineering***",Laxmi Pub. - R.K.Rajput , (2017). *"Fluid Mechanics"*,6th, S.Chand Pub.
Reference Books	- Rangwala, S. C. and Dalal, K. B., (2013). *"**Building Construction***",CharotarPublishinghouseKandya, - Nag P.K, (2015). **"Engineering Thermodynamics*"* , TMH - R.K.Bansal , (2014). *"**Fluid Mechanics***", Laxmi Publications

COURSE CODE	BASIC MECHANICAL & CIVIL ENGINEERING	Total Lecture: 45 Theory:45 Practical:15
IN21B203		**(LTP=3-0-2=4)**

Course Objectives:

- To inculcate the essentials of Civil Engineering & Mechanical Engineering field to the students of all branches of Engineering.
- ToprovidethestudentsanillustrationofthesignificanceoftheCivil& Mechanical EngineeringProfessionin Satisfying societal needs.
- To provide a comprehensive knowledge of force, work and energy to calculate work done, power required and efficiency for various simple machines.
- To understand the importance and application of various laws.

UNIT	CONTENTS	HOURS
I.	General introduction to Civil Engineering - Introduction to types of buildings, Components of a residential building, Introduction to industrial buildings; Introduction to planning of residential buildings - Simple building plans; Introduction to the various building area terms; Setting out of a building; Surveying – Principles, Objectives, Horizontal measurements with tapes, Ranging; Leveling – Instruments, Reduction of levels; Modern surveying instruments.	**10**
II.	Building materials – Bricks, Stone, cement blocks, Cement, Cement mortar, Steel; Building construction – Foundations, Brick masonry, Roofs, Floors, Decorative finishes, Plastering, Paints and Painting.	**10**
III.	Fundamental Concepts and Definitions: Definition of Thermodynamics, System, surrounding and universe, Phase, Concept of continuum, Macroscopic & microscopic point of view.. Thermodynamic equilibrium, Property, State, Path, process, Cyclic process, Energy and its form, Work and heat, Enthalpy. Laws of thermodynamics: Zeroth law, First law of thermodynamics. Concept of processes, Second law : Essence of second law, Thermal reservoir, Heat engines, COP of heat pump and refrigerator. Statements of second law, Carnot cycle.	**9**
IV.	Properties of steam and thermodynamic cycles : Properties of steam, Use of property diagram, Steam tables, Processes involving steam in closed and open systems. Working Principle of low pressure boiler. Equivalent evaporation & efficiency of boiler ,Introduction to I.C. Engines: Two, four stoke S.I. and C.I. engines. Carnot cycle ,Otto Cycle, Diesel cycle.	**8**
V.	Fluids: Fluid properties pressure, density and viscosity etc. Types of fluids , Newton's law of viscosity , Pascal's law , , Only working principle of Hydraulic machines, pumps, turbines, Reciprocating pumps . Refrigeration & Air Conditioning: History ,scope& application of refrigeration, VCRS system, VARS system, introduction & concept of air conditioning system. **List of Experiments:** 1. Study of various types of Boilers. 2. Study of four stroke petrol Engines. 3. Study of four stroke diesel Engines.. 4. Study of two stroke petrol Engines.	**8**

	5. Study of Two stroke diesel Engines. 6. Study of different types of Boilers Mountings. 7. To determine normal consistency of cement 8. To determine compressive strength of cement & concrete 9. To determine soundness of cement 10. To determine water absorption of Aggregate & Brick 11. To perform particle size analysis of aggregate. 12. Horizontal measurement & Ranging.	

Course Outcome as per Bloom's Taxonomy

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

CO 1	**Illustrate**[2] the fundamental aspects of Civil Engineering.
CO 2	**Demonstrate**[3] the concepts of surveying for making horizontal and vertical measurements.
CO 3	**Define**[1] basic thermodynamics concepts like system, path process cycle etc. Explain the laws of thermodynamics and apply them to closed, study flow systems.
CO 4	**Describe**[2] the properties of pure substance and their changes during phase transformations.
CO 5	**Evaluate**[3] the thermal performance of different heat engines and refrigeration cycles and calculate efficiency/coefficient of performance. Calculate the Fluid properties, Stability of floating bodies and hydrostatic forces on surfaces
Text Books	Grewal, B. S., & Grewal, J. S. (1996). **Higher engineering mathematic**s. 2002, Khanna Publishers, New Delhi. Ramana, B. V. (2006). **Higher Engineering Mathematics**. Tata McGraw-Hill Education •
Reference Books	• Dass, H. K. (2008). **Advanced engineering mathematics**. S. Chand Publishing. • Owen, D. R. J. (1973). **Advanced engineering mathematics**, Erwin Kreyszig, Wiley, London, • O'neil, P. V. (2017). **Advanced engineering mathematics.** Cengage learning. • Greenberg, M. D. (1998). **Advanced Engineering Mathematics**. Pearson Education India.

COURSE CODE	ENGINEERING MATHS-II	Total Lecture:60
IN21B204		**(LTP=4-0-0=4)**

Course Objectives
- To Solve the real world engineering problems using Ordinary differential equation, various curve fitting techniques and will able to calculate area and volume using multiple integral and solid geometry.

UNIT	CONTENTS	HOURS
1	**Ordinary differential Equations of first order and first degree** Definition, Order and Degree of DE, Formation of DE, Solutions of Variable Separable DE, Exact DE, Linear DE and reducible to these types.	12
2	**Application of differential equations** Applications of DE to Orthogonal Trajectories, Newton's Law of Cooling, Kirchhoff's Law of Electrical Circuits, Rectilinear Motion, One–Dimensional Conduction of Heat, Decay problems	12
3	**Curve Tracing, Reduction formulae, Gamma & Beta functions** Tracing of Curves, Cartesian, Polar and Parametric Curves. Reduction formulae, Gamma & Beta functions.	12
4	**Solid Geometry, Differentiation under integral sign & Error functions** Cartesian, Spherical Polar and Cylindrical Coordinate Systems. Sphere, Cone and Cylinder,Differentiation under integral sign & Error functions.	12
5	**Multiple Integrals and its applications** Double and Triple integrations, Applications to Area &Volume.	12
	Course Outcomes as per Bloom's Taxonomy	
	At the end of the course the students should be able to:	
CO1	**Apply[3]** different forms of Ordinary differential equation and applications of the same in engineering.	
CO2	**Understand[2]** the application of differential equation in the physics problems like Newton's law of cooling, Kirchhoff's law, Motion and Heat conservation.	
CO3	**Understand[2]** Use the technique and theory of linear algebra to model various real world problems like curve fitting	
CO4	**Evaluate[5]** the volume of solids such as pyramid, sphere, etc. by slicing method.	
CO5	**Apply[3]**double and triple integrations to various real time problems pertaining to area and volume.	
Text Book	• Grewal, B. S., & Grewal, J. S. (1996). **Higher engineering mathematic**s. 2002, Khanna Publishers, New Delhi. • Ramana, B. V. (2006). **Higher Engineering Mathematics**. Tata McGraw-Hill Education	

Reference Books	- Dass, H. K. (2008). **Advanced engineering mathematics**. S. Chand Publishing. - Owen, D. R. J. (1973). **Advanced engineering mathematics**, Erwin Kreyszig, Wiley, London - O'neil, P. V. (2017). **Advanced engineering mathematics.** Cengage learning. - Greenberg, M. D. (1998). **Advanced Engineering Mathematics**. Pearson Education .

COURSE CODE	PROGRAMMING PRACTICE –II	Practical:30
IN21B205		(LTP=0-0-4=2)

Course Objective: The objective of course is to develop programming skills of students, using object oriented programming concepts, learn the concept of class and object using C++ and develop classes for simple applications.

UNIT	CONTENTS	HOURS
I.	Introduction to Programming – Program and Programming –Programming Languages –Types of software's, Operating Systems –Dos commands –Basic Linux commands and vi editor – Compiler, Interpreter, Loader and Linker Fundamentals in C++ –History of 'C++' – Migrating from procedural oriented language –to object oriented languages Program –Keywords –Variables –Constants –Data type –Operators –Manipulators and uses –Basic Structure of a 'C++' program	5
II.	Control statements –Conditional Control Statements –if –if-else –nested if-else – else-if ladder –Multiple Branching Control Statement –switch-case –Loop Control Statements –while –do-while –for –Nested Loops –Jump Control statements –break –continue –goto –exit –return –Programming Examples –FAQ's	6
III.	Pointer array Reference –pointer variable –Reference variable/alias variables? – Reference to Reference variable? –Reference to array? –Reference vs normal variable? –Reference vs pointer variable? –1D and 2D Arrays –What is dynamic memory allocation? –The new and delete operator –new vsmalloc –delete vs free – Dynamic 1D and 2D Arrays	7
IV.	Function –What is function ? –Why function ? –Advantages of using functions – Function Prototype –Defining a function –Calling a function –Actual and Formal Arguments –Types of functions –Parameter Passing Techniques –Call by Value – Call by Reference –Call by Pointer –Return statement –Returning More than one value From A Function –Return by value mechanism –Return by pointer mechanism –Return by reference mechanism –Inline Functions –Default Arguments –Function Overloading –Lambda function. –Recursion	6
V.	Introduction to oops –c structure vsc++structuree –Class –Object –Encapsulation – Abstraction –Polymorphism –Inheritance –Message Passing Classes and Objects – Declaring / defining classes –Data members and member functions –Access specifiers : public and private and protected –Creating objects of a class –Pointers to object –Implicit this pointer –Static data members –Static member functions – Passing objects to a member function –Returning objects from a member function –Friend functions –Friend classes –Nested classes –Local classes –The const member functions –The const objects –Array of objects –static objects –inline functions. **List of practical** 1. Write a program to prints numbers, alphabets and special characters on the	6

output screen.

2. Write a program to that accept age in years from user as input and displays his age in months and days.
3. Write a program that demonstrate the use of arithmetic and assignment operators by getting two numbers from user.
4. Write a program that to calculate area of circle, square, rectangle and triangle using switch-case statements
5. Write a program to that accepts number from user and displays all the factors of that number.
6. Write a program that accepts a number from keyboard and find its factorial.
7. Write a program that accepts 9 numbers in form of matrix and display transpose of that matrix.
8. Write a program to count number of words in a sentence.
9. Write a program to create structure of book which contains book title, author name, publication and price as its members and displays book records for n books.
10. Write a program which accepts value of base and power from user and displays its value (base^ power) using UDF.
11. Write a program which should work like a strlen function using UDF.
12. Write a program that demonstrate the basic class program to get department, name and salary of an employee.
13. Create a class "Bank_Account" that contains Depositor_Name ,Acc_No , Acc_type ,Balance as its data members. Also create member functions for account creation, deposit, withdraw and balance inquiry for class. Demonstrate its use in main.
14. Define a class "Time" that contains following data members and member functions.
15. Data members: 1. Hours
1. Minutes
2. Seconds

16. Member Functions: 1. To get time from user
1. To display time on the screen
2. To calculate sum of two time objects

17. Write a program that can read values of Time for two objects T1 and T2, calculate sum and display sum using defined member functions
18. Create class "Sales" having following data members and member functions:
19. Data Members:
    1. Name of Salesman
    2. Sales of Salesman
20. Member functions to calculate commission
    1. Commission is Rs. 10 per thousand if sales are at least Rs. 25000 or more
    2. Commission is Rs. 5 otherwise

21. Write a program that calculate and print name and sales of salesman.
22. Write a program to count number objects created for particular class using

constructor.
23. Create class "Person" having a two data members as person name and nationality. Also create two constructors for this class in which one has two arguments and second has one argument.
24. Write a program to declare two classes, each one have one int data member. Find the sum of data members of both classes using friend function. Create suitable objects and functions
25. Create Class "Circle" having radius as data member, constructor and member function to calculate area of circle. Class should overload = = operator to compare two circle objects whether they are equal in radius.
26. Implement following class relationship and test with main class.
27. Vehicle 1. Two-Wheeler   a.Bike b.Bicycle
             2. Four-Wheeler   a.Car b.Truck   c.Taxi

Course Outcome as per Bloom's Taxonomy	
Attheendofthecoursethestudentswillbeableto:	
CO1	**Implement**[3] the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
CO2	**Demonstrate**[2] an understanding of computer programming language concepts.
CO3	**Define**[1] data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures. Student must be able to define union and enumeration user defined data types.
CO4	**Design**[6] and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.
CO5	**Develop**[6] confidence for self education and ability for life-long learning needed for Computer language.
Text Books	• Herbert Schildt (2017). *"**The complete refer**ence"* C++, 4[th]edition,Mcgraw Hill. • Bjarne, (2018). *"**A Tour of C++",** 2nd edition, Addison-Wesley.
Reference Books	• Herbert Schildt (2017). *"**The complete reference**"* C++, 4[th]edition,Mcgraw Hill. • Bjarne, (2018). *"**A Tour of C++",** 2nd edition, Addison-Wesley.

COURSE CODE	LINUX AND SHELL PROGRAMMING	Total Lecture: 60 Theory:45 Practical:15
1O21B210		**(LTP=3-0-2=4)**

Course Objectives
- The course explores the security and network access controls in Linux
- To understand how to Organize network system and Mail Services
- Know how to Secure Data and Account Management.

UNIT	CONTENTS	HOURS
I	Introduction to Linux: Linux distributions, Overview of Linux operating system, Linux architecture, Features of Linux, Accessing Linux system, Starting and shutting down system, Logging in and Logging out, Comparison of Linux with other operating systems.	9
II	Commands in Linux: General-Purpose commands, File oriented commands, directory oriented commands, Communication-oriented commands, process oriented commands, etc. Regular expressions & Filters in Linux: Simple filters viz. more, wc, diff, sort, uniq, grep; Introducing regular expressions.	9
III	Linux file system: Linux files, inodes and structure and file system, file system components, standard file system, file system types.	9
IV	Processes in Linux: Starting and Stopping Processes, Initialization Processes, Mechanism of process creation, Job control in linux using at, batch, cron& time.	9
V	Shell Programming: vi editor, shell variables, I/O in shell, control structures, loops, subprograms, creating & executing shell scripts in linux.	9

List of Experiments

List of Practical:
1. Use of Basic UNIX Shell Commands: ls, mkdir, rmdir, cd, cat, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit.
2. Commands related to inode, I/O redirection and piping, process control commands, mails.
3. Shell Programming: Shell script exercises based on following:
    i. Interactive shell scripts
    ii. Positional parameters
    iii. Arithmetic
    iv. if-then-fi, if-then- else-fi, nested if-else
    v. Logical operators
    vi. else + if equals elif, case structure
    vii. while, until, for loops, use of break.
4. Write a shell script to create a file. Follow the instructions
    i. Input a page profile to yourself, copy it into other existing file;
    ii. Start printing file at certain line
    iii. Print all the difference between two file, copy the two files.
    iv. Print lines matching certain word pattern.

5. Write shell script for-
    i.   Showing the count of users logged in,
    ii. Printing Column list of files in your home directory
    iii. Listing your job with below normal priority
    iv. Continue running your job after logging out.
6. Write a shell script to change data format. Show the time taken in execution of this script.
7. Write a shell script to print files names in a directory showing date of creation & serial number of the file.
8. Write a shell script to count lines, words and characters in its input.
9. Write a shell script to print end of a Glossary file in reverse order using Array.
10. Write a shell script to check whether Ram logged in, Continue checking further after every
11. 30 seconds till success.
12. Write a shell script to compute gcd lcm & of two numbers. Use the basic function to find gcd & LCM of N numbers.
13. Write a shell script to find whether a given number is prime. Take a large number such as 15 digits or higher and use a proper algorithm.
14. Write a shell script to reverse a given integer.
15. Write a shell script to list the files arranged in descending order of their size.
16. Write a shell script to check whether the given string is palindrome or not

Course Outcomes as per Bloom's Taxonomy

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

CO1	Understand^{2}Linux architecture	
CO2	Use^1 various Linux commands that are used to manipulate system operations	
CO3	Understand^2 to code using C++ control structures (if, if-else, switch, while, do-while, for)	
CO4	Understand^{2}Linux File system	
CO5	Understand^{2}and make effective use of I/O and shell scripting language to solve problems.	
Text Book	• YashwantKanetkar, **Unix& Shell programming** – BPB Publications. • Richard Petersen, **The Complete Reference** – Linux, McGraw-Hill. • M.G.Venkateshmurthy, **Introduction to Unix& Shell Programming**, Pearson Education.	
Reference Books	• Stephen Prata, **Advanced UNIX-A programmer's Guide**, SAMS Publication. • Sumitabha Das, **Your Unix - The Ultimate Guide**, Tata McGraw-Hill.	

COURSE CODE	INTRODUCTION TO INFORMATION SECURITY	Total Lecture: 45 Theory:45 Practical:15
CC21B210		**(LTP=3-0-2=4)**

Course Objectives
- Securing data is a vital role of any organization. Data is always at risk - it can either get lost, or corrupted or misused. This course primarily focuses on the types of threats, vulnerabilities, risks and other various concepts that about Information Security
- It explains the formation of security policy at various levels inside the Organization and provides the definition procedures, standard and guidelines.
- The modules emphasizes the need for access management. Server security, internet security and risk management are a few other topics that are discussed in this course.

UNIT	CONTENTS	HOURS
I	**Introduction to Information Security** Introduction: Security Definition, Why Security, Security and its need, Current Trends and Statistics, The C I A of Security the Relation: Security functionality and Ease of Use Triangle, Security Terminologies, Security Protocols. Security on Social Networking Sites , Securing Email Communications, Securing Mobile Devices, Securing the Cloud, Securing Network Connections.	9
II	**User Identity and Access Management** User identity and Access Management: Authentication, Account Authorization, Validation, Access Control and Privilege management. Governance concepts. Organization processes. Cryptography- Encryption and Decryption, Algorithms, Hashing concepts and implementation..	9
III	**System and Server Security** System Security concepts, Desktop & Server Security, Firewalls, Password cracking Techniques, Threats involved, Key-logger, viruses and worms, Malwares & Spy wares, Windows Registry. AntiMalware/AV/Anti Rootkit and other solutions	9
IV	**Internet Security** Internet Security: Internet concepts and working, LAN Security, Threats involved, Hacking attacks and preventive measures. Internet mediums to malware. Data exposure. Data digging. Social engineering methodologies.	9
V	**Risk Assessment and Cyber Laws** Vulnerability Assessment, Penetration Testing**,** Risk analysis, Risk mitigation, Cyber Laws, Cyber Threats and Kill Chain Methodology, Intelligence Reporting and Dissemination	9

List of Experiments

Introduction to Information Security Laboratory Practical List
    1) Study of the features of firewall in providing network security and to set Firewall Security in windows
    2) Steps to ensure Security of any one web browser (Mozilla Firefox/Google Chrome)
    3) Study of different types of vulnerabilities for hacking a websites / Web Applications.
    4) System Security Configuration in Windows 7.
    5) Hashes and message digest calculation using has calculators.
    6) Service Management of Windows 7 for prevention of attacks.
    7) Fundamentals of Computers – IP Address, MAC Address, Static IP and Dynamic IP.
    8) Perform Basic Encryption/Decryption(Text only)
    9) Implementation of Caesar Cipher technique.
    10) E-Mail Security- Header Analysis, E-Mail Tracker Pro.
    11) Steganography – S-Tools, Snow.
    12) Passwords – ERD Commander, Cain & Able.
    13) Protection of Information Assets – Recuva, Prodiscovery.

Course Outcomes as per Bloom's Taxonomy	
At the end of the course the students should be able to:	
CO1	**Understand**[2] the importance of securing data, the concepts of IT security, threats, vulnerabilities, impact and control measures
CO2	**Explain**[2] different ways of problem solving
CO3	**Familiarize**[2] with access management, server and internet security and cyber laws
CO4	**Understand**[2] how to act logically in real world problems
CO5	**Find**[1] out the vulnerabilities and act to get solved by using various technologies.
Text Book	• Godbole, N. (2008). **Information Systems Security**: Security Management, Metrics, Frameworks And Best Practices (With CD). John Wiley & Sons. • Tipton, H. F., & Krause, M. (2007). **Information security management handbook**. CRC press.
Reference Books	• https://www.eccouncil.org/programs/certified-secure-computer-user-cscu/ • https://www.geeksforgeeks.org/identity-and-access-management/ • https://www.ibm.com/security/identity-access-management • https://www.microsoft.com/en-in/security/business/identity • https://www.eccouncil.org/programs/threat-intelligence-training/