SANJEEV AGRAWAL GLOBAL EDUCATIONAL (SAGE) UNIVERSITY, BHOPAL

Scheme

For

BTech Electronics & Communication Engineering

I Semester

School of Engineering & Technology

Program Educational Objectives (PEOs)

The program educational objectives (PEOs) of the B. Tech programme in Electronics and Communication Engineering in School of Engineering, Sage University are as follows:

- To prepare the students with good understanding of the respective subjects with design, analytical and problem solving skills.

- To train the students with knowledge of latest design trends.

- To inculcate in students the sense of ethics, morality, professionalism, creativity, leadership, independent thinking, self confidence, good communication skills and prepare them to become successful engineers who can work worldwide in industries and research & development laboratories.

- To introduce the research world to them so that they feel motivated for higher studies and innovation not only in their own domain but multidisciplinary domain.

- Provide sound theoretical and practical knowledge of E&C Engineering, managerial and entrepreneurial skills to enable students to contribute to the well being of society with a global outlook.

Program Outcomes (POs):-

- The graduates will be able to apply the concepts of Engineering mathematics through Laplace, z-transform, linear algebra, probability and statistics, differential equations etc. and basic knowledge of engineering physics and chemistry.

- The graduates will be able to understand, interpret the problem, design and perform the experiments to meet the desired solution of the problem within the context of electronics and communication engineering.

- The graduates will have a good understanding of professional and ethical responsibility.

- The graduates will be able to express themselves effectively through written and oral communication.

- The graduates will have a good understanding and knowledge in applying the engineering solutions to society.

- The graduates will have a good understanding for the need of lifelong learning and will be able to work in teams.

- The graduates will show good proficiency in applying the techniques and knowledge of modern engineering skills in tackling contemporary technological challenges.

- The graduates will have good background for admission to post graduate programs (in same domain), management degree programs and also research programs in various organizations of national and international repute.

- The graduates will be able to participate and succeed in competitive examinations.

- Apply the knowledge of mathematics, science, engineering fundamentals engineering specialization to the solution of complex engineering problems

Sanjeev Agrawal Global Educational (SAGE) University, Bhopal
School of Engineering & Technology
B TECH (Electronic & Communication Engineering)

Course Code	Course Title	Contact Hours per Week			Credits	ETE Duration (Hours)	Theory						Practical			Grand Total
		L	T	P			MSE	ASG	TA	ATTD	ESE	Total	CE	ESE	Total	
UC20B101	Environment & Waste Management	2	-	-	2	3	30	05	05	10	50	100				100
UC20B102	Communication Skills	2	-	-	2	3	30	05	05	10	50	100				100
MA20B103	Engineering Maths-I	4	-	-	4	3	30	05	05	10	50	100				100
PY20B104	Engineering Physics	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
ME20B105	Engineering Drawing	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
CS20B106	Programming Practice - I	-	-	4	2	2	-	-	-	-	-	-	20	30	50	50
	DSE – I	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
PB20B101	Project Based Learning-I	-	-	2	2	2							50	50		100
IY20B101	Yoga & Meditation –I*	-	-	2	1*	2							50	50		-
GC20B101	Green Credit-I*	-	-	1	1*	2							50	50		-
	Total				**24+2***							**600**			**300**	**900**

*Mandatory non-graded course

MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, ESE- End Sem Exam ,CE- Continuous evaluation

B TECH (Electronic & Communication Engineering)

Course Code	Course Title	Contact Hours per Week			Credits	ETE Duration (Hours)	Theory						Practical			Grand Total
		L	T	P			MSE	ASG	TA	ATTD	ESE	Total	CE	ESE	Total	
UC20B201	Entrepreneurship Development	2	-	-	2	3	30	05	05	10	50	100				100
EE20B202	Basic Electrical & Electronics Engineering	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
ME20B203	Basic Mechanical & Civil Engineering	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
MA20B204	Engg Maths-II	4	-	-	4	3	30	05	05	10	50	100				100
CS20B205	Programming Practice - II	-	-	4	2	2	-	-	-	-	-	-	20	30	50	50
ME20B206	Workshop Practice	-	-	4	2	2							20	30	50	50
	DSE – II	3	-	2	4	3	30	05	05	10	50	100	20	30	50	150
PB20B201	Project Based Learning-II	-	-	2	2	2					-	-	50	50	100	100
IY20B201	Yoga & Mediation-II*	-	-	2	1*	-					-	-	50	50		
GC20B201	Green Credit*-II*	-	-	1	1*	-					-	-	50	50		
		Total			**24+2***							500			350	850

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Second Year – Semester Third

Course Code	Course Title	Contact Hours per Week			Credits	ETE Duration (Hours)	Theory						Practical			Grand Total
		L	T	P			MSE	ASG	TA	ATTD	ESE	Total	CE	ESE	Total	
MA20B301	Mathematics–III	3	1		4	3	30	05	05	10	50	100				100
EC20B302	Analog Electronics	3		2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B303	Digital logic design	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B304	Network Analysis	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B305	Discipline Electives – III	2	-	-	2	3	30	05	05	10	50	100	-	-	-	100
GE20B301	Generic Electives I	2	-	-	2	3	30	05	05	10	50	100	-	-	-	100
PB20B301	Project Based Learning	-	-	2	2								-	-	50	100
IY20B301	Yoga & Mediation-III	-	-	2	1*								-	50	50	-
GC20B301	Green Credit-III	-	-	1	1*								-	50	50	-
		Total			**22+2***											**850**

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MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, ESE- End Sem Exam , CE-Continuous evaluation

B TECH (Electronic & Communication Engineering)

Second Year – Semester Four

| Course Code | Course Title | Contact Hours per Week | | | Credits | ETE Duration | Theory | | | | | | Practical | | | Grand Total |
		L	T	P			MSE	ASG	TA	ATTD	ESE	Total	CE	ESE	Total	
EC20B401	Signals& Systems	3		2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B402	Analog Communication	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B403	Control System	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B404	Analog Circuits	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B405	Discipline Electives – IV	2	-	-	2	3	30	05	05	10	50	100				100
GE20B401	Generic Electives II	3	-	-	3	3	30	05	05	10	50	100				100
PB20B401	Project Based Learning-IV	2	-	2	2	3							50	50		100
IY20B401	Yoga & Mediation-IV	-	-	2	1*	2								50	50	-
GC20B401	Green Credit-IV	-	-	1	1*	2								50	50	-
		Total			**23+2***											900

*Mandatory non-graded course

MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, ESE- End Sem Exam , CE- Continuous evaluation

Course Code	Course Title	Contact Hours per Week			Credits	ETE Duration (Hours)	Theory						Practical			Grand Total
		L	T	P			MSE	ASG	TA	ATTD	ESE	Total	CE	ESE	Total	
UC20B501	Quantitative Aptitude I	2	-	-	2	3	30	05	05	10	50	100				100
EC20B501	Microprocessor & its Application	3		2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B502	Digital Communication	3	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B503	Data Communication	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B504	Discipline Electives – V	2	-	-	2	3	30	05	05	10	50	100				100
GE20B501	Generic Electives III	2	-	-	2	3	30	05	05	10	50	100				100
PB20B501	Project Based Learning-V	-	-	2	2	2							50	50		100
GC20B501	Green Credit-V	-	-	1	1*	-							50	50		-
		Total			20+1*											850

*Mandatory non-graded course

MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, ESE- End Sem Exam ,CE-Continuous evaluation

Course Code	Course Title	Contact Hours per Week			Credits	ETE Duration	Theory						Practical			Grand Total
		L	T	P			MSE	ASG	TA	ATTD	ESE	Total	CE	ESE	Total	
UC20B601	Quantitative Aptitude II	2	-	-	2	3	30	05	05	10	50	100				100
EC20B601	Digital Signal Processing	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B602	Antenna & Wave propagation	2	1		4	3	30	05	05	10	50	100	20	30	50	150
EC20B603	Microcontroller &Embedded system	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B604	Discipline Electives – VI	3	-	-	3	3	30	05	05	10	50	100				100
GE20B601	Generic Electives IV	2	-	-	2	3	30	05	05	10	50	100				100
PB20B601	Project Based Learning-VI	-	-	2	2	2							50	50		100
GC20B601	Green Credit-VI	-	-	1	1*	-							50	50		-
		Total			21+1*											850

*Mandatory non-graded course

MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, ESE- End Sem Exam , CE- Continuou evaluatio

			Fourth Year – Semester Seventh														
Course Code	**Course Title**	**Contact Hours per Week**			**Credits**	ETE Duration (Hours)	**Theory**							**Practical**			**Grand Total**
		L	T	P			MSE	ASG	TA	ATTD	ESE	Total	CE	ESE	Total	
UC20B701	Coding Skills	2	-	-	2	3	30	05	05	10	50	100				100
UC20B702	Quantitative Aptitude II	2	-	-	2	3	30	05	05	10	50	100				100
EC20B701	VLSI Design	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B702	Microelectronics Circuits	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B703	Fundamentals of HDL	2	1	2	4	3	30	05	05	10	50	100	20	30	50	150
EC20B704	DSE – VII	3	-	-	3	3	30	05	05	10	50	100				100
EC20B705	Project	-	-	12	6	2							75	75		150
		Total			**25**											**900**

*Mandatory non-graded course

  MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, ESE- End Sem Exam ,CE- Continuous evaluation

Course Code	Course Title	Contact Hours per Week			Credits	ETE Duration (Hours)	Theory							Practical			Grand Total
		L	T	P			MSE	ASG	TA	ATTD	ESE	Total	CE	ESE	Total	
PB20B801	MOOC –1	-		8	4	3							50	50	10	100
PB20B802	MOOC - 2	-		8	4	3							50	50	100	100
EC20B801	Project	-	-	28	14	2							200	200		400
		Total			22											600

*Mandatory non-graded course

MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD-Attendance, ESE- End Sem Exam

B Tech (Electronics & Communication Engineering)
List of Program (Discipline Specific) Electives (DSE)

SN	Course Code	Course Title
First Year – Semester One		
SN	**Course Code**	**Course Title**
1.	CS20B107	Design Thinking
2.	CS20B108	Introduction to Computational Thinking
3.	CS20B109	Introduction to Digital Technology
First Year – Semester Second		
SN	**Course Code**	**Course Title**
1.	CS20B107	Design Thinking
2.	CS20B108	Introduction to Computational Thinking
3.	CS20B109	Introduction to Digital Technology
Second Year – Semester Third		
SN	**Course Code**	**Course Title**
1.	EC20B305	Electronic Measurement & Instrumentation
2.	EC20B306	Electromagnetic Field Theory
3.	EC20B307	Electronic Devices
Second Year – Semester Fourth		
SN	**Course Code**	**Course Title**
1.	EC20B405	Mobile Communication
2.	EC20B406	Optical Communication
3.	EC20B407	Sensors and Instrumentation
Third Year – Semester Fifth		
SN	**Course Code**	**Course Title**
1.	EC20B504	Operating Systems
2.	EC20B505	Satellite Communication
3.	EC20B506	Advanced Microcontrollers
Third Year – Semester Sixth		
SN	**Course Code**	**Course Title**
1.	EC20B604	Power Electronics
2.	EC20B605	Fundamentals of CMOS

3.	EC20B606	Bio-medical Electronics

Third Year – Semester Seven		
SN	**Course Code**	**Course Title**
1.	EC20B704	Information Theory & Coding
2.	EC20B705	Cellular Mobile Communication
3.	EC20B706	Cryptography and Network Security

Curriculum Components

Components	Credits
Program Core (28Courses)	98
Program Electives (Discipline Specific Electives) (07Courses)	20
Generic Electives (04 Courses)	09
Ability & Skill Development (Ability Enhancement Courses) (03 Courses)	06
Ability & Skill Development (Skill Enhancement Courses) (04 Courses)	08
Project Based Learning (PBL)/MOOCs (07courses)	20
Project (02 Courses)	20
International Context/Yoga & Mediation / (5Courses)	04*
Green Credit (06 Courses)	06*
Total	**181+10***

Distribution of credits across all components

SEM No.	Prog. Core	Discipline Specific Electives (DSE)	Generic Electives (GE)	Ability & Skill Development		Project Based Learning (PBL)/ MOOCs	Project	International Context/Yoga & Mediation	Green Credit	Total Credit
				Ability Enhancement Courses	Skill Enhancement Courses					
I.	14	4		2	2	2		1	1	**24+2***
II.	16	4		2		2		1	1	**24+2***
III.	16	2	2			2		1	1	**22+2***
IV.	16	2	3			2		1	1	**23+2***
V.	12	2	2		2	2			1	**20+2***
VI	12	3	2		2	2			1	**21+1***
.VII	12	3		2	2		6			**25**
VIII						8	14			**22**
Total	**98**	**20**	**09**	**06**	**08**	**20**	**20**	**04***	**06***	**181+10***

*Mandatory non-graded course

List of Generic Electives

Students of all Undergraduate programs are required to study one generic 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).

Generic Electives for III Semester

SN	Code	Nomenclature of the Course	Offering School
1.	GE20B301	Introductory Biology	School of Sciences
2.	GE20B302	Basic Analytical Chemistry	School of Sciences
3.	GE20B303	Basic Instrumentation Skills	School of Sciences
4.	GE20B304	Elementary Number Theory	School of Sciences
5.	GE20B305	Production Technology for Vegetable and Spices	School of Agriculture
6.	GE20B306	General Studies – I	Arts and Humanities
7.	GE20B307	Basics of Acting	School of Performing Arts
8.	GE20B308	Introduction to Retail Chain System	School of Management
9.	GE20B309	Photography	School of Design
10.	GE20B310	Introduction to C	School of Engineering & Technology
11.	GE20B311	Introduction to C++	School of Engineering & Technology
12.	GE20B312	Introduction to Ms-Office	School of Engineering & Technology
13.	GE20B313	Introduction to Java	School of Engineering & Technology

Generic Electives for IV Semester

SN	Code	Nomenclature of the course	Offering School
1.	GE20B401	Genetics and Society	School of Sciences
2.	GE20B402	Green Chemistry and Green Methods in Chemistry	School of Sciences
3.	GE20B403	Electrical circuit network Skills	School of Sciences

4.	GE20B404	Introduction to statistical methods and probability	School of Sciences
5.	GE20B405	Farming System & Sustainable Agriculture	School of Agriculture
6.	GE20B406	General Studies – II	Arts and Humanities
7.	GE20B407	Script Writing	School of Performing Arts
8.	GE20B408	Typography	School of Design
9.	GE20B409	Building Leadership & Fellowship Skills	School of Management
10.	GE20B410	Introduction to Digital Marketing	School of Engineering & Technology
11.	GE20B411	Introduction to C	School of Engineering & Technology
12.	GE20B412	Introduction to C++	School of Engineering & Technology
13.	GE20B413	Introduction to Ms-Office	School of Engineering & Technology
14.	GE20B414	Introduction to Java	School of Engineering & Technology

Generic Electives for V Semester

SN	Code	Nomenclature of the course	Offering School
1.	GE20B501	Biotechnology	School of Sciences
2.	GE20B502	Pharmaceutical Chemistry	School of Sciences
3.	GE20B503	Digital, Analog and Instrumentation	School of Sciences
4.	GE20B504	Applications of Mathematic in Finance and Insurance	School of Sciences
5.	GE20B505	Crop Improvement-I	School of Agriculture
6.	GE20B506	Civil Services Aptitude Test – I	Arts and Humanities
7.	GE20B507	Mime	School of Performing Arts
8.	GE20B508	Web designing	School of Advanced Computing
9.	GE20B509	Fine Arts	School of Design
10.	GE20B510	Resolving Conflicts and Negotiation Skills	School of Management
11.	GE20B511	Introduction to C	School of Engineering & Technology
12.	GE20B512	Introduction to C++	School of Engineering & Technology
13.	GE20B513	Introduction to Ms-Office	School of Engineering & Technology

| 14. | GE20B514 | Introduction to Java | School of Engineering & Technology |

Generic Electives for VI Semester

SN	Code	Nomenclature of the course	Offering School
1.	GE20B601	Bioinformatics and Systems Biology	School of Sciences
2.	GE20B602	Pesticide Chemistry	School of Sciences
3.	GE20B603	Elements of Modern Physics	School of Sciences
4.	GE20B604	Mathematical Modeling	School of Sciences
5.	GE20B605	Post Harvest Management and Value Addition of Fruits and Vegetables	School of Agriculture
6.	GE20B606	Civil Services Aptitude Test – II	Arts and Humanities
7.	GE20B607	Body Movement (Expressing through Body nuances)	School of Performing Arts
8.	GE20B609	Digital learning-Adobe cloud	School of Design
9.	GE20B610	Introduction to IFRS	School of Commerce
10.	GE20B611	Introduction to Python	School of Engineering & Technology
11.	GE20B511	Introduction to C	School of Engineering & Technology
12.	GE20B512	Introduction to C++	School of Engineering & Technology
13.	GE20B513	Introduction to Ms-Office	School of Engineering & Technology
14.	GE20B514	Introduction to Java	School of Engineering & Technology

SANJEEV AGRAWAL GLOBAL EDUCATIONAL (SAGE) UNIVERSITY, BHOPAL

Syllabus

For

BTech (EC)

I- Semester

School of Engineering & Technology

Syllabus B.Tech I Semester

Code:	Environment Studies & Disaster Management	Total Lecture:30
UC20B101		(LTP=2-0-0=2)

Course Objectives:

1. Understand the natural environment and its relationships with human activities.

2. Characterize and analyze human impacts on the environment.

3. Integrate facts, concepts, and methods from multiple disciplines and apply to environmental problems..

4. Capacity to integrate knowledge and to analyses, evaluate and manage the different public health aspects of disaster events at a local and global levels

5. 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
1	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
2	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
3	Environmental Pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like SPM, SO_2, NO_X , 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	7

	Layer.	
4	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
5	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 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	7

COURSE OUTCOMES

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

CO1	Understand the importance of Environment.
CO2	Understand the knowledge of Ecology & Ecosystems.
CO3	To impart basic knowledge about Environment Pollution & theirs Remedies
CO4	To Know about Energy Resources
CO5	To know about Disaster Management.
Text Book	1. Dr. N. S. Varandani, 2017, Basics of Environmental Studies ,Pearson 2. Mukesh Dhunna, Vayu,2011, Disaster Management ,Education of India, Delhi Publication. 3. Benny Joseph, 2017, Environmental Studies ,3rd edition , McGraw Hills Education.
Reference Books	1. R. Rajagopalan, 2015, Environmental Studies, Oxford University Press Publication 2. Richard T Wright & Bernard J Nebel, Environmental Science, 3rd edition, Prentice Hall India Publication 3. Daniel B Botkin & Edward A Keller, 1988, Environmental Science ,5th edition , Wiley Publications

Code	Communication Skills	Total Lecture:30
UC20B102		**(LTP=2-0-0=2)**

Course Objectives

The purpose of this course is to introduce students to the theory, fundamentals and tools of communication and to develop in them vital communication skills which should be integral to personal, social and professional interactions. Along with the above mentioned, care has been taken to enhance the grammatical skills of the students with sufficient practical purposes. The recommended readings given at the end are only suggestive; the students and teachers have the freedom to consult other materials on various units/topics given below. Similarly, the questions in the examination will be aimed towards assessing the skills learnt by the students rather than the textual content of the recommended books. The students are advised to arrange the prescribed texts well before beginning the classes.

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

COURSE OUTCOMES	
At the end of the course the students will be able to:	
CO 1	Students will heighten their awareness of correct usage of English grammar in writing and speaking.
CO 2	Students will improve their speaking ability in English both in terms of fluency and comprehensibility
CO 3	Students will give oral presentations and receive feedback on their performance
CO 4	Students will increase their reading speed and comprehension of academic articles
CO 5	Students will improve their reading fluency skills through extensive reading
Text Books	1. University Of Delhi Department Of English 2006,Fluency in English - Part II, Oxford University Press, OUP Publishers. 2. Business English, Pearson, 2008. 3. Orient Blackswan,2013, Language, Literature and Creativity.
Reference Books	1. John E. Warriner, Harcourt, Brace, Jovanovich (1973) Warriner's English Grammar and Toru Dutt ,Composition Complete Course - Literary/Knowledge Texts (Poetry comprehension – Our Casuarina Tree 2. R.K, An Astrologer's Day- Prose Comprehension

Code:	**Engineering Maths- 1**	**Total Lecture:60**
MA20B103		**(LTP=4-0-0=4)**

Course Objectives :

The objective is to provide essential knowledge of basic tools of Matrix Algebra, Differential Calculus, Integral Calculus, Vector Calculus and Vector spaces.

The course provides good introduction and understanding about the following:

- Working with matrices and using it as tool in solving the system of equations, learning to find eigenvalues and eigenvectors of a matrix and use it for Diagonalization of a matrix

- The concept and use of differential calculus in tracing of curves in different coordinate systems, partial differentiation, Homogeneous functions and its use in Euler's theorem and minimization/ maximization of the function

- The concept of higher order integration and its application in finding length, area and volume

- The concept of vector differentiation and integration

The concept of Vector Spaces, Sub spaces, Basis of a vector space and Linear Transformations

UNIT	Contents	Hours
1	Rank of a matrix, Inverse of the matrix, solution of linear simultaneous equations. Orthogonal, Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, Normal and Unitary matrices and their elementary properties. Eigen values and Eigen vectors of a matrix, Cayley-Hamilton theorem, Diagonalization of a matrix.	12
2	Expansion of functions of one variable using Taylor's and Maclaurin's theorem, , Partial differentiation, homogeneous functions, Euler's theorem and its extension up to second order, Differentiation of composite functions, Taylor's series expansion of function of two or more variable, Maxima and Minima of function of two or more variables, Lagrange method of undetermined multipliers.	12
3	Brief review of curve tracing (Cartesian, polar and parametric), area of curve, length of curve, volume and surface area of the surface formed by revolution of curve about an axis, beta and gamma functions and their applications in real integration, Double, triple integrals, change of order of integration, area and volume of the surfaces using multiple integrals.	12

4	Vector differentiation, gradient, directional derivative, divergence & curl of vector point function, Line Integral, Surface Integral, Gauss Divergence Theorem, Stokes theorem & Green's Theorem.	12
5	Vector Space, Vector Sub Space, Linear Combination of Vectors, Linearly Dependent, Linearly Independent, Basis of a Vector Space, Linear Transformations	12

COURSE OUTCOMES

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

CO1	Utilize matrices as tool in solving linear systems and determine if a given matrix is diagonalizable.
CO2	Apply differential calculus in tracing of curves, series expansion of functions, solving maximization/ minimization problems.
CO3	Utilize concepts of integral calculus in finding area and volume over higher dimensional domain
CO4	Evaluate integrals of functions or vector-related quantities over curves, surfaces, and domains in two- and three-dimensional space.
CO5	Define vector spaces, sub spaces, basis of a vector space and Linear Transformations.
Text Books	1. Dr B. S Grewal, 2017, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers. 2. H K Das, 2019, Advanced Engineering Mathematics, 22nd Edition, S Chand. 3. P B Bhattacharya, 2018, First Course in Linear Algebra, 2nd edition, New Age International, Reprint.
Reference Books	1. E. Kreyszig-2011,Advanced Engineering Mathematics, 9th edition, John Wiley and Sons, Inc., U.K. 2. D. Poole-2005, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole. 3. Ramana B.V.- 2010, Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint.

Code	Engineering Physics	Total Lecture:45 Practical:15
PY20B104		**(LTP=3-0-2=4)**

Course Objectives

The main objective of the course is to introduce the student to various branches of physics which plays a significant role in the understanding and development of modern day technology.

The course provides good introduction and understanding about the following:

- The origin of quantum mechanics, dual nature of matter, Wave function and its interpretation, Schrodinger wave equation and application,

- The electric and magnetic field for a given charge and current distribution, Maxwell equation and its significance.

- The wave nature of light including Hygen's principle, interference, diffraction and resolving power of grating and prism.

- The spontaneous and stimulated emission and how the concept of stimulated emission explains the production of laser beam. Principle of propagation of light in optical fiber.

- The semiconductor (p and n type), the theory for semiconductor's energy level, various semiconductor devices and basic of digital electronic

Unit	Contents	Hours
1	Quantum Mechanics for Engineers Introduction to Quantum mechanics, Davisson Germer experiment, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave- packets, Uncertainty principle and its experimental verification, Solution of stationary-state Schrodinger equation for one dimensional problems– particle in a box	10
2	Electrodynamics Coulomb's law in vector form, Calculation of electric field and electrostatic potential for a charge distribution, Divergence and curl of electrostatic field, Laplace's and Poisson's equations for electrostatic potential, Boundary conditions of electric field and electrostatic potential, energy of a charge distribution and its expression in terms of electric field, Gauss Divergence theorem, Stokes' theorem; Continuity equation, Maxwell equation and its significance	8
3	Wave Optics Huygens' principle, superposition of waves and interference of light by wavefront splitting and amplitude splitting; Fresnel's biprism, Thin film interference, Newton's rings, Michelson interferometer, Farunhofer	10

	diffraction from a single slit, double slit and circular aperture Diffraction gratings, Rayleigh criterion for limit of resolution and its application to vision, Resolving power of grating and prism.	
4	Laser and Fiber optics Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, Component of laser, different types of lasers: gas lasers (He-Ne, CO_2), solid-state lasers (ruby, Neodymium), Properties of laser beams, applications of lasers in science, engineering and medicine, Introduction to fibre, total internal reflection, acceptance angle and cone, Numerical aperture, V-number, Types fibre, fibre losses, Attenuation constant, Types of dispersion, Intermodal dispersion in graded index fibre. Fibre optics communications system	8
5	Semiconductor and Digital Electronics Band theory of metals, Fermi level, Intrinsic and extrinsic semiconductor, Hall Effect, Fabrication of PN junction diodes, V-I characteristics of PN junction, Zener diode, Tunnel diode, Solar Cell, Basic concepts of Transistor, Logic gates and number system (binary, hexadecimal, and octadecimal), Flip Flop Circuits	9

COURSE OUTCOMES

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

CO 1	To Define interference and diffractions of light in different conditions.
CO 2	Apply the knowledge of basic quantum mechanics, to set up one dimensional Schrodinger's wave equation and its application to a matter wave system.
CO 3	Differentiate the solids on the basis of band theory and to calculate conductivity of semiconductors
CO 4	Describe the basic laser physics, working of lasers, holography and principle of propagation of light in optical fiber.
CO 5	Conclude the importance of Band theory of solid in determining the properties of metals; understand the concept of logic gates and number system.
Text Books	1. Gaur and Gupta, 2012, Engineering Physics, Dhanpat Rai Publications. 2. Md. M. Khan & S. Panigrahi, Principle of Physics Vol. I & Vol. II, Cambridge Univ. Press.
Reference Books	1. L. Maharana, Prafullaku. Panda, Sarat Ku. Dash, BabitaOjha, Lectures on Engineering Physics, Pearson. 2. D.K. Bhattacharrya and PoomTondon, 2015, Engineering Physics, Oxford University Press.

Code	Engineering Drawing	Total Lecture:45 Practical:15
ME20B105		(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
1	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
2	Orthographic Projections, Principles of Orthographic Projections- Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes	10
3	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
4	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
5	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

COURSE OUTCOMES	
At the end of the course the students will be able to:	
CO 1	Use the drawing instruments effectively and able to dimension the given figures. Appreciate the usage of engineering curves in tracing the paths.
CO 2	Understand the concept of projection and acquire visualization skills, projection of points.
CO 3	Able to draw the basic views related to projections of Solid. To know development of different types of surfaces.
CO 4	To know about isometric projection.
CO 5	To know about Auto cad software.
Text Books	1. Bhatt N.D, 2014 , Elementary Engineering Drawing ,53rd EDITION, Charotar Publishing House. 2. R.K.Dhawan, 2011,Engineering Drawing , 1st EDITION, S.chand publication 3. Agarwal and agarwal,Engineering Drawing ,Tmh publication.
Reference Books	1. Gill P.S, 2001, Engineering Drawing & Engg. Graphics, 1st EDITION, S. K. Kataria & Sons. 2. Lakshmi narayan L.V. and Vaish R.S, Engineering Graphics, Jain Brothers.

Code	**Programming Practice –I**	**Total Lecture:0** **Practical:30**
CS20B106		**(LTP=0-0-4=2)**

Course Objectives

1. Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
2. Demonstrate an understanding of computer programming language concepts.
3. Able to define 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.

Unit	Contents	Hours
1	Basics of Computer Hardware and Software Basics of Computer Architecture: processor, Memory, Input& Output devices Application Software & System software: Compilers, interpreters, High level and low level languages Introduction to structured approach to programming, Flow chart Algorithms, Pseudo code (bubble sort, linear search - algorithms and pseudocode)	7
2	Program Basics Basic structure of C program: Character set, Tokens, Identifiers in C, Variables and Data Types , Constants, Console IO Operations, printf and scanf Operators and Expressions: Expressions and Arithmetic Operators, Relational and Logical Operators, Conditional operator, size of operator, Assignment operators and Bitwise Operators. Operators Precedence Control Flow Statements: If Statement, Switch Statement, Unconditional Branching using goto statement, While Loop, Do While Loop, For Loop, Break and Continue statements.(Simple programs covering control flow)	6
3	Arrays and strings Arrays Declaration and Initialization, 1-Dimensional Array, 2-Dimensional Array String processing: In built String handling functions (strlen, strcpy, strcat and strcmp, puts, gets) Linear search program, bubble sort program, simple programs covering arrays and strings	5
4	Working with functions Introduction to modular programming, writing functions, formal parameters, actual parameters Pass by Value, Recursion, Arrays as Function Parameters structure, union, Storage Classes, Scope and life time of variables, simple programs using functions	6
5	Pointers and Files Basics of Pointer: declaring pointers, accessing data though pointers, NULL pointer, array access using pointers, pass by reference effect File Operations: open, close, read, write, append Sequential access and random access to files: In built file handling functions (rewind() ,fseek(), ftell(), feof(), fread(), fwrite()), simple programs covering pointers and files.	6

COURSE OUTCOMES	
At the end of the course the students will be able to:	
CO 1	Demonstrate an understanding of computer programming language concepts.
CO 2	Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.
CO 3	Student must be able to define union and enumeration user defined data type
CO 4	Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.
CO 5	Develop confidence for self education and ability for life-long learning needed for Computer language
Text Books	1. E. Balagurusamy,2019, Programming in ANSI C, 18th edition ,McGraw Hill Education 2. Asok N Kamthane,2011, Programming in C, Pearson. 3. Anita Goel, Pearson, Computer Fundamentals 4. Schaum Series, Gottfried B.S.,Tata, Programming with C,4th Edition, McGraw Hill.
Reference Books	1. Anita Goel and Ajay Mittal,2016, Pearson, Computer fundamentals and Programming in C, Pearson. 2. Brian W. Kernighan and Dennis M. Ritchie,1988, C Programming Language, Pearson 2nd edition,PHI. 3. Yashavant P, Kanetkar,2017, Let us C,16th edition, BPB Publications.

List of Experiments:
Program-1:   Write a program to print sample string like "hello world"with different format.
Program-2:   Write a program to print different data types in 'c' and their ranges.
Program-3:   Write a program to printing a variable of different datatypes.
Program-4:   Write a program to demonstrate arithmetic operators.
Program-5:   Write a program to demonstrate logical operators.
Program-6:   Write a program to read radius value from the keyboard and calculate the area of circle and print the result both floating and exponential notation.
Program-7:   Write a program to calculate simple interest.
Program-8:   Write a program to convert temperature.(Fahrenheit-centigrade and vice-versa.
Program-9:   Write a program to demonstrate relational operators.
Program-10:   Write a program to check equivalence of two number's using conditional operator.
Program-10:   Write a program to demonstrate pre-increment and post-increment.

Program-11:   Write a program to demonstrate pre- decrement and post- decrement.
Program-12:   Write a program for computing volume of cylinder, sphere and cone assume that dimensions are integer's use type casting where ever necessary.
Program-13:   Write a program to read marks of a student in six subjects and print whether pass or fail.
Program-14:   Write a program to calculate roots of quadratic equation.
Program-15:   Write a program to perform arithmetic operation's using switch case.
Program-16:   Write a program to display colors using switch case.
Program-17:   Write a program to display vowels and consonants using switch case.
Program-18:   Write a program to display name of days in a week using switch case.
Program-19:   Write a program to calculate sum of individual digits of a given number.
Program-20:   Write a program to verify the given number is palindrome or not.
Program-21:- Write a program to print prime numbers in the given ranges.
Program-22:   Write a program to display multiplication tables from1 to 10 except 3 and 5.
Program-23:   Write a program to print the Fibonacci series for given values.
Program-24:   Write a program to check the given number is Fibonacci number or not.

	Discipline Specific Elective-I	
Code	**Design Thinking**	Total Lecture:45 Practical:15
CS20B107		(LTP=3-0-2=4)

- To familiarize students with design thinking concepts and principles

- To ensure students can practices the methods, processes and tools of design thinking.

- To ensure students can apply the design thinking approach and have ability to model real world situations.

- To enable students to learn how to make team collaboration more efficient by enabling all team members to use standard Design Thinking Model.

- To develop an advance innovation and growth mindset form of problem identification and reframing, foresight, hindsight and insight generation.

Unit	Contents	Hours
1	ENTERPRISE DESIGN THINKING – HISTORY, OVERVIEW Introduction to Design Thinking, Understand what came before Design Thinking, Design making : Design making: concepts and prototyping; Design breaking; Identifying and using design principles; Identify who did what to bring it about, Learn how it built upon previous approaches, Need of design thinking; An approach to design thinking, Design thinking Process, Enterprise Design Thinking, Understand the principles, loop, and keys. Determine what is most important.	10
2	ENTERPRISE DESIGN THINKING – 7 KEY HABITS, THE LOOP, USER RESEARCH 7 key habits of effective design thinkers, Iteration: understand the importance; Learn how to observe, reflect, & make. An Overview on Loop: - Its principles and keys. Determine what is most important. User Research Its Importance, Empathy through listening.	10
3	THE LOOP – MAKE, USER FEEDBACK Understand how Make fits into the Loop, learn how to leverage Observe information, Learn Ideation, Storyboarding, & Prototyping. Understand user feedback and the Loop, Learn the different types of user feedback, learn how	9

	to carry out getting feedback.		
4	DEVELOPING IDEAS & GENERATING INNOVATIONS Create Thinking, Generating Design Ideas, Lateral Thinking, Analogies, Brainstorming, Mind mapping, National Group Technique, Synectic's, Development of work, Analytical Thinking, Group Activities Recommended; What is design innovation? A mindset for innovation, and asking "what if?" asking "what wows?" and "what works?"		8
5	REVERSE ENGINEERING Introduction - Forward Engineering Design, Design Thought and Process, Design Steps; Reverse Engineering Leads to New Understanding about Products; Schematic Drawings and Analysis; Reverse Engineering in Computer Applications; Reasons for Reverse Engineering - Reverse Engineering Process - Step by Step - Case Study. List of Practical: 1. Enterprise Design Thinking – Listening 2. Enterprise Design Thinking – Hmw 3. Enterprise Design Thinking – User Research 4. Enterprise Design Thinking- Reflect 5. Enterprise Design Thinking- Ideation 6. Enterprise Design Thinking- Storyboarding 7. Enterprise Design Thinking- Prototyping 8. Enterprise Design Thinking- User Feedback 9. Enterprise Design Thinking- Playback 10. Case Study		8

COURSE OUTCOMES

	At the end of the course the students will be able to:
CO 1	Examine Design Thinking concepts and principles
CO 2	Understand and apply enterprise Design thinking

CO 3	Practice the methods, processes, and tools of Design Thinking
CO 4	Apply the Design Thinking approach and model to real world situations
CO 5	Apply and Understand Reverse and Forward Engineering
Text Books	1. Kaushik Kumar , 2019, Design Thinking to Digital Thinking, Springer

	Discipline Specific Elective-I	
Code	**Introduction to Computational Thinking**	**Total Lecture:45** **Practical:15**
CS20B108		**(LTP=3-0-2=4)**

Course Objectives

The aim of this course is hence to take students with no prior experience of thinking in a computational manner to a point where they can derive simple algorithms and code the programs to solve some basic problems in their domain of studies. In addition, the course will include topics to appreciate the internal operations of a processor, and raise awareness of the socio-ethical issues arising from the pervasiveness of computing technology.

Unit	Contents	Hours
1	Computer Networking: Introduction, Goals, ISO-OSI Model, Functions of Different Layers. Internetworking Concepts, Devices, TCP/IP Model. Introduction to Internet, World Wide Web, E- commerce Computer Security Basics: Introduction to viruses, worms, malware, Trojans, Spyware and Anti- Spyware Software, Different types of attacks like Money Laundering, Information Theft, Cyber Pornography, Email spoofing, Denial of Service (DoS), Cyber Stalking, ,Logic bombs, Hacking Spamming, Cyber Defamation , pharming Security measures Firewall, Computer Ethics & Good Practices, Introduction of Cyber Laws about Internet Fraud, Good Computer Security Habits,	10
2	CT concept – Abstraction, Decomposition, Pattern recognition, Algorithm, Limit of computing, Analysis of Algorithm Complexity, Space and time Complexity, code optimization.	10
3	Human intelligence and artificial intelligence, introduction, Need of AI and its application. Introduction to Internet of thing, characteristics, benefits, hardware and its application. Introduction of Data science and its application. Cloud computing: definition, characteristics, service delivery models (IaaS, PaaS and SaaS), cloud deployment models/ types of cloud (public, private, community and hybrid clouds), Pros and Cons of cloud computing. Edge and Fog Computing, Quantum Computers. Introduction of Big Data and Hadoop.	9
4	Data base Management System: Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language and Manipulation Languages	8

5	Computer: Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software. Computer Application in e-Business, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and Climatology, Computer Gaming, Multimedia and Animation etc. Operating System: Definition, Function, Types, Management of File, Process & Memory. Introduction to MS word, MS PowerPoint, MS Excel	8

COURSE OUTCOMES

At the end of the course the students will be able to:	
CO 1	Describe the internal operation of a basic processor, how a program is executed by a computer and computing trends.
CO 2	Code basic programs based on the programming language used in the course.
CO 3	Formulate a problem and express its solution in such a way that a computer can effectively carry it out. (i.e. equip you with CT skills)
CO 4	Apply the CT concepts on case studies/problem-based scenarios through hands-on practice of the CT processes.
CO 5	Acquire knowledge of Microsoft office suit and have hands on it.
Text Books	1. Behrouz A. forouzan ,2007, Data communication & networking, fourth edition,MC Graw-Hill 2. Henry F.korth ,1997,Data base system concept ,6 edition, McGraw-Hill Education .
Reference Books	4. TD malhotra,2020, New trends in computer 1st EDITION, Evergreen Publications

	Discipline Specific Elective-I	
Code	**Introduction to Digital Technology**	Total Lecture:45 Practical:15
CS20B109		**(LTP=3-0-2=4)**

Course Objectives

This course is designed for students to understand, communicate, and adapt to a digital world as it impacts their personal life, society, and the business world. Various forms of technologies will be highlighted to expose students to the emerging technologies impacting the digital world. Professional communication skills and practices, problem-solving, ethical and legal issues, and the impact of effective presentation skills are taught in this course as a foundational knowledge to prepare students to be career ready. The knowledge and skills taught in this course build upon each other to form a comprehensive introduction to digital world.

Unit	Contents	Hours
1	Introduction to Internet, WWW and Web Browsers: Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting, World Wide Web; Web Browsing software's, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website	10
2	What is Search Engine, The Mission of Search Engines , Types of SE, Need of SE,How search engines works,Major functions of a search engine ,Popular Search Engines, Click Tracking: How Users Click on Results, Natural Versus Paid , Understanding Search Engine Results, Algorithm-Based Ranking Systems: Crawling, Indexing, and Ranking, Determining Searcher Intent and Delivering Relevant, Fresh Content, Analyzing Ranking Factors , Web Traffic , Different types of keywords , Google trends & insights , Steps in Search Engine.	10

3	Introduction, Types of websites, Components of web site, Websites vs. Portals, Domain rank, Architecture of Website, Website Designing Basics , Essentials of good website designing, Usability and User Experience in Website, Domain, Importance of Domain Names and Value, URL renaming/re-writing, Hosting , Hosting Selection, Difference between dynamic & static website, Creating Robots file & sitemaps, Google webmaster tools.	9
4	Introduction to Social Media, merits & Demerits of Social Media ,Social Media Marketing, Social Media Strategy and Planning, Social Media Measurement, Content Strategy ,Social Media Sites , Face book Account Creation , Face book Page Creation , Business Promotion ,About Instagram-Live ,Reels ,LinkedIn ,Twitter, Social Media management and measurement tools, a social media audit tools.	8
5	Introduction –Content, Art of Writing, Type of Contents, Promotion of contents , What is Blogging , Promotion of Blogs , Submission of Blogs , Different platforms for Blogs (BlogSpot, word press, Type Pad) , Advantage of Blogs ,Career as a Blogger , Popular Blogs ,Blog vs. Article. How to Create and Manage an Account on different Platforms, How to Get audience, Social Sharing & Comments, How to Optimize Submissions,	8

COURSE OUTCOMES	
At the end of the course the students will be able to:	
CO 1	Explore, research, and present findings on positions and career paths in technology and the impact of technology on chosen career area.
CO 2	Demonstrate effective professional communication skills (oral, written, and digital) and practices that enable positive customer relationships.
CO 3	Identify, describe, evaluate, select and use appropriate technology.
CO 4	Understand, communicate, and adapt to a digital world.
CO 5	Explore and explain the basic components of computer networks.
Text Books	1. ISRD Group, Internet Technology & Web Design, TMH Education. 2. Jan Zimmerman, Social Media Marketing ALL IN ONE For Dummies. 3. Andrew S Tannenbaum, Computer Network, Pearson Education.
Referenc e Books	1.Jason Mcdonald,Social media Marketing Workbook 2020.

Code	Project Based Learning I	Total Lecture: Practical:30
PB20B101		**(LTP=0-0-4=2)**
	Contents	Hours
	In this course we have only practical part and student are allowed to devlop small project on the basis of the knowledge .They have required however ,if a student show interest in the basis technology of the Computer Science/Electronics/Mechanical/Civil Engineering. Then appropriate guidance will be given by relative faculty member	30

Code	Yoga and Meditation-I	Total Lecture: Practical:15
IY20B101		**(LTP=0-0-2=1)**
	Contents	Hours
Learning Objectives:	To practice mental hygiene. To possess emotional stability. To integrate moral values. To attain higher level of consciousness. It will prepare the students physically and mentally for the integration of their physical, mental and spiritual faculties so that the students can become healthier, saner and more integrated members of the society and of the nation	15

Code	Green Credit-I	Total Lecture: Practical:15
GC20B101		**(LTP=0-0-2=1)**
	Contents	Hours
Learning Objectives:	Green Credit helps in self-discipline and self-control, leading to immense amount of awareness, concentration and higher level of consciousness. Main objective are: To provide the basic practical understanding about plantation. To familiarize the various issues related with plantation and associated problems. To make a bonding between tree and students. Preparing basic awareness about the environmental issues confronted by the humanity in the present global scenario and to equip the students to understand the environmental movements and basic of plantations.	15

Syllabus B.Tech

SECOND SEMESTER

Code	Entrepreneurship Development	Total Lecture:30 Practical:
UC20B201		(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
1	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
2	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. Feasibility 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
3	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
4	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	6

	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.	
5	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 OUTCOMES

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

CO 1	**Develop** managerial qualities and competencies of an entrepreneur.
CO 2	**Acquaint** himself with the challenges of starting a new venture and the process of setting up a business.
CO 3	**Build** essential skills and creativity needed to build teams and work in and with them.
CO 4	**Know** the essential procedure and funding avenues for setting up a new business.
CO 5	**Learn** the various government initiatives and accordingly plan for his business.
Text Books	1. Project Management - K. Nagarajan-2011, New Age International, Second Edition 2. Vasant Desai ,2019 , Dynamics of Entrepreneurship Development ,6th edition Himalaya Publishing House 3. Dr. P.C.Shejwalkar-2011,Entrepreneurship Development, Everest Publishing House.
Reference Books	1. David H. Holt, 1991, Entrepreneurship: New Venture Creation,4th edition Prentice Hall Publications. 2. Hisrich Peters, Entrepreneurship, Tenth Edition, Mc Graw Hills, 3. Brigitte Berger, 1991, The Culture of Entrepreneurship ICS Pt. Gurmit Narula, Tata McGraw Hills ,The Entrepreneurial Connection

Code	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	TotalLecture:45 Practical: 15
EE20B202		**(LTP=3-0-2=4)**

Course Objectives:

 1:Provide working knowledge for the analysis of basic DC and AC circuits used in electrical and electronic devices

2: Students will gain knowledge regarding the various laws and principles associated with electrical   systems..

3: Students will gain knowledge regarding Fundamentals of Electrical Machines

4: Student will gain knowledge. Evolution and Impact of Electronics in industries and in society

5: Student will gain knowledge on electronic systems.& field of electrical & electronics engineering.

UNIT	Contents	Hours
1	D.C. Circuits: Basic Laws: Ohm's law, Kirchhoff's voltage and current laws, Nodes-Branches and loops, , Mesh analysis and Nodal analysis, Series elements and Voltage Division, Parallel elements and Current Division, Star-Delta transformation, Independent sources and Dependent sources, source transformation. Superposition theorem, Thevinin's theorem Basic electrical parameter measuring Instruments Voltmeters & ammeter, wattmeter, energy meter,	10
2	AC Fundamentals-I: Reviews of Complex Algebra, Sinusoids, phasors, Phasor Relations of circuit elements, Impedance and admittance, Impedance Combinations, Series and Parallel combination of Inductors and capacitor.	10
3	AC Fundamental-II: RMS and average values, Form factors, Steady state Analysis of series, Parallel and Series Parallel combination of R,L,C with Sinusoidal excitation, Instantaneous power,	9

	Real power, Reactive power and Apparent power, concept of Power factor, Frequency.	
4	Fundamentals of Electrical Machines: Construction, Principle, Operation and Application of –(i) Single phase Transformer (ii) Single phase Induction motor (iii) DC Motor.	8
5	Evolution and Impact of Electronics in industries and in society, Familiarization with Resistors, Capacitors, Inductors, PN Junction diode: Structure, Principle of operation, various types of Diode, Bipolar junction transistors (BJT), Half wave and full wave rectifiers, Basics of CRO (analog & digital). List of Experiments : • To verify Kirchhoff's Voltage. • To verify Kirchhoff's Current laws. • To verify thevenin's theorem • To verify superposition theorem • To study star and delta connection for a 3-Φ AC circuit. • To measure the active and reactive power in single phase ac circuit. • To obtain the transient <u>response</u> and measure the time constant of a series RL and RC circuit for a pulse waveform. • To study and verify the various digital logic gates • To study of various electronic devices • To study PN Junction Diode characteristics. • Verification of truth table for various gates, Flip-Flops. • Verification of De morgan's theorems. • Study of V-I Characteristics of Diodes. • To study and plot VI characteristics of semiconductor diodes	8
Course Outcome		

At the end of the course the students should be able to:	
CO1	Understand the basic properties of electrical elements, and solve DC circuit analysis problems. DC network theorems.
CO2	Understand the fundamental behavior of AC circuits and solve AC circuit problems. Apply the knowledge gained to explain the behavior of the circuit at series & parallel resonance of circuit & the effect of resonance.
CO3	To impart basic knowledge of electrical quantities such as current, voltage, power, energy and frequency
CO4	To introduce the concepts of**.** Fundamentals of Electrical Machines
CO5	To introduce the concepts of Electronics in industries and in society, transformers and their applications, Semiconductors Devices, Rectifiers.
Text Books	1. B.L. Theraja & A.K Theraja,1959, Electrical Technology - Vol. 1, S. Chand Publication. 2. J.B GUPTA , Basic Electrical & Electonics Engineering, Tmh 3. SAHADEV CHATURVEDI Basic Electrical Engineering 4. B.L. Theraja & A.K Theraja, Textbook Of Electronics Device & Circuit - Vol. IV, S. Chand Publication 5. D.P. Kothari & I.J. Nagrath, Basic Electrical Engineering, Tata McGraw Hill, latest edition 6. Ashfaq Hussain, Basic Electrical Engineering, S. Chand Publication
Reference Books	1. D.P. Kothari & I.J. Nagrath, Basic Electrical Engineering, latest edition, Tata McGraw Hill. 2. S.N. Singh-2013 , Basic Electrical Engineering, P.H.I. 3. Rajendra Prasad-2014, Fundamentals of Electrical Engineering, Prentice Hall. 4. M.S. Sukhija, T. K. Nagsarkar-2012, Basic Electrical and electronics engineering, Oxford University press. 5. C.L. Wadhwa, Basic Electrical Engineering. New Age International. 6. B.L. Theraja & A.K Theraja Textbook of Electrical Technology - Vol. 1, S. Chand Publication

Code	**Basic Mechanical & Civil Engineering**	Total Lecture:45 Practical:15
ME20B203		(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.
- To provide the students an illustration of the significance of the Civil & Mechanical Engineering Profession in 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
1	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
2	Building materials – Bricks, Stone, cement blocks, Cement, Cement mortar, Steel; Building construction – Foundations, Brick masonry, Roofs, Floors, Decorative finishes, Plastering, Paints and Painting.	10
3	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
4	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
5	Fluids: Fluid properties pressure, density and viscosity etc. Types of fluids , Newton's law of viscosity , Pascal's law , , Only working principle of	8

	Hydraulic machines, pumps, turbines, Reciprocating pumps . Refrigeration & Air Conditioning: History ,scope & application of refrigeration, VCRS system, VARS system, introduction & concept of air conditioning system.	

COURSE OUTCOMES

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

CO 1	The students will be able to illustrate the fundamental aspects of Civil Engineering.
CO 2	Students will be able to explain the concepts of surveying for making horizontal and vertical measurements.
CO 3	Define basic thermodynamics concepts like system, path process cycle etc. Explain the laws of thermodynamics and apply them to closed, study flow systems.
CO 4	Explain the properties of pure substance and their changes during phase transformations.
CO 5	Evaluate 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	1. S. Ramamrutam & R. Narayanan,2013 , Basic Civil Engineering, Dhanpat Rai Publication 2. Rangwala, S. C. and Dalal, K. B.,2013, Engineering Materials, Charotar Publishing house 3. N N Basak, 2017, Surveying,2nd edition , McGraw Hill New Delhi 4. R.S.khurmi.,1978, Thermal Engineering,15th edition, S.Chand Pub. 5. R.K. Rajput, Thermal Engineering, Laxmi Pub. 6. R.K.Rajput ,1988,Fluid Mechanics,6th, S.Chand Pub.
Reference Books	1. B C Punamia, Surveying Tata McGraw Hill New Delhi 2. Rangwala, S. C. and Dalal, K. B., 2013, Building Construction, Charotar Publishing house Kandya, 3. Nag P.K, Engineering Thermodynamics , TMH 4. R.K.Bansal Fluid Mechanics ,Laxmi Publications

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.
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.

Code	Engineering Maths - II	Total Lecture:60 Practical:
MA20B204		(LTP=4-0-0=4)

Course Objectives

The objective is to acquaint the students with basic knowledge of Ordinary and Partial Differential Equations, Calculus of complex functions, Laplace and Inverse Laplace Transform, and Sequences and Series and specifically Fourier Series.

The course provides good introduction and understanding about the following:

- The concept and understanding of different analytical techniques of solving first and higher order ordinary and partial differential equations,

- Introduce the tools of differentiation and integration of functions of complex variable that are used in various techniques dealing engineering problems.

- The concept of Laplace and Inverse Laplace Transform and its application

The method of testing convergence of sequences and series and concept of Fourier series

Unit	Contents	Hours
1	Differential Equation of First Order and Higher Degree, Linear Differential Equation with Constant Coefficient of Higher Order, Cauchy's Differential Equation, Method of Variation of Parameter, Simultaneous Differential Equation, Introduction to series solution method.	12
2	Formation of first and second order partial differential equations. Linear & Non-Linear partial differential equation of First Order, Homogeneous & Non-Homogeneous Linear P.D.E with constant coefficient of Higher Order, Separation of Variables, Wave equation & Heat Equation.	12
3	Analytic functions, C-R equations, necessary and sufficient conditions, Harmonic conjugates, Milne's method, complex line integration, Cauchy's theorem for simply and multiply connected domains, Cauchy's integral formula for the derivatives of an analytic function, Taylor series, Laurent series, Zeros and poles of a function, residue at a singularity, Residue theorem, its applications for the Evaluation of Real Definite Integral.	12
4	Laplace and inverse Laplace transform of some standard functions, Shifting theorems, Laplace transform of derivatives and integrals. Convolution theorem. Laplace transform of periodic functions, error functions, Heaviside unit step function and Dirac delta function. Solution of differential equation by using Laplace transforms.	12

5	Sequences, Series, Convergence, Tests for convergence of series (Comparison tests, D'Alembert's Ratio test, Integral test, Raabe's, Cauchy's Root test, Logarithmic), Fourier series: Half range sine and cosine series.	12

COURSE OUTCOMES

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

CO 1	Define and differentiate between ordinary and partial differential equations and solve different boundary value problems in engineering
CO 2	Define functions of complex variable, their differential and integral calculus and utilize it in evaluating real integrals
CO 3	Understand and apply Laplace transformation in finding solution of differential equations in engineering
CO 4	Evaluate the convergence or divergence of various sequences and series utilizing appropriate tests.
CO 5	Formulate and find solution of more complicated engineering problems.
Text Books	1. Dr B. S Grewal, 2017, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers. 2. H K Das, 2019, Advanced Engineering Mathematics, 22nd Edition, S Chand,. 3. R.K. Jain and S.R.K. Iyenger, 2016, Advanced Engineering Mathematics, 5th Edition, CRC Press, Narosa Publishing House, New Delhi.
Reference Books	1. E. Kreyszig-2011, Advanced Engineering Mathematics, 9th edition, John Wiley and Sons, Inc., U.K. 2. D. Poole-2005, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole. 3. Ramana B.V.- 2010, Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint.

Code	Programming Practice –II	Total Lecture: Practical:30
CS20B205		**(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.

1	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
2	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
3	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 vs malloc –delete vs free –Dynamic 1D and 2D Arrays	7
4	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
5	Introduction to oops –c structure vs c++ 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.	6

Course Outcome(s) as per Blooms Taxonomy		
Upon completion of this course, students will acquire knowledge about:		
CO1	• Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.	
CO2	• Demonstrate an understanding of computer programming language concepts.	
CO3	• Able to define 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	• Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.	
CO5	• Develop confidence for self education and ability for life-long learning needed for Computer language.	
Text Books	1. Herbert Schildt-2017, The complete reference C++, 4th edition, Mcgraw Hill. 2. Bjarne, A Tour of C++,4th edition, Addison-Wesley.	
Reference Books	1. Herbert Schildt-2017, The complete reference C++, 4th edition, Mcgraw Hill. 2. Bjarne, A Tour of C++,4th edition, Addison-Wesley.	
List of practical		
1	Write a program to prints numbers, alphabets and special characters on the 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.
	 Data members: 1. Hours
	               2. Minutes
	               3. Seconds
	
	Member Functions: 1. To get time from user
	                    2. To display time on the screen
	                    3. To calculate sum of two time objects
	
	Write a program that can read values of Time for two objects T1 and T2, calculate sum and display sum using defined member functions

15	Create class "Sales" having following data members and member functions: Data Members: 1. Name of Salesman 2. Sales of Salesman 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 Write a program that calculate and print name and sales of salesman.
16	Write a program to count number objects created for particular class using constructor.
17	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.

18	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
19	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.
20	Implement following class relationship and test with main class. Vehicle 1. Two-Wheeler a.Bike b.Bicycle 2. Four-Wheeler a.Car b.Truck c.Taxi

Code	**Workshop Practice**	**Total Lecture:** **Practical:30**
ME20B206		**(LTP=0-0-4=2)**

Course Objectives

The course on Engineering Workshop Practice is intended to expose engineering students to different types of manufacturing / fabrication processes, dealing with different materials such as metals, ceramics, plastics, wood, glass etc. While the actual practice of fabrication techniques is given more weightage, some lectures and video clips available on different methods of manufacturing are also included

Unit	Contents	Hours
1	Carpentry Shop: Timber : Type, Qualities of timber disease, Timber grains, Structure of timber, Timber, Timber seasoning, Timber preservation .Wood Working tools: Wood working machinery, joints & joinery. Various operations of planning using various carpentry planes sawing & marking of various carpentry joints. Suggested Jobs :Name Plate ,Any of the Carpentry joint like mortise or tennon joint	7
2	Fitting Shop: Study and use of Measuring instruments, Engineer steel rule, Surface gauges caliper, Height gauges, feeler gauges, micro meter. Different types of files, File cuts, File grades, Use of surface plate, Surface gauges drilling tapping Fitting operations: Chipping filling, Drilling and tapping.Suggested Jobs :Preparation of job piece by making use of filling, sawing and chipping , drilling and tapping operations.	6
3	Foundry: Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns. Moulding: Properties of good mould & Core sand, Composition of Green , Dry and Loam sand. Methods used to prepare simple green and bench and pit mould dry sand bench mould using single piece and split patterns.	6
4	Practice on electric arc welding, Practice on oxy-acetylene gas welding, Introduction and demonstration on submerged arc welding, Metal Forming: Demonstration of deep drawing and other forming process .	6
5	Introducing to various machine tools and demonstration on machining, Making a steel pin as per drawing by machining in centre lathe, External screw thread on lathe, Making a cast iron Vee block by shaping, Making a regular polygon prism (MS)/ hexagon by milling machine, Slot fitting by milling machine, Study of machining in machining in machining centre (CNC), Study of Electro discharge machining (EDM).	5

COURSE OUTCOMES	
At the end of the course the students will be able to:	
CO 1	Apply the knowledge of the above trades in their day –to – day activities.
CO 2	Apply the knowledge of the above trades in their day –to – day activities.
CO 3	Apply the knowledge of the above trades in their day –to – day activities..
CO 4	Select appropriate equipment and consumables for required application and also to apply knowledge of tools required for getting an object of required shape and size.
CO 5	Select appropriate equipment and consumables for required application and also to apply knowledge of tools required for getting an object of required shape and size.
Text Books	- Hajra Choudhury S.K., Elements of workshop Technology Vol. I, Media Promoters. - Hajra Choudhury S.K., Elements of workshop Technology Vol. II, Media Promoters.
Reference Books	- Chapman W.A.J., Workshop Technology - Part I, CBS Publishers. - Chapman W.A.J., Workshop Technology - Part II, CBS Publishers.

	Discipline Specific Elective-II	
Code	**Design Thinking**	**Total Lecture:45 Practical:15**
CS20B107		**(LTP=3-0-2=4)**

- To familiarize students with design thinking concepts and principles

- To ensure students can practices the methods, processes and tools of design thinking.

- To ensure students can apply the design thinking approach and have ability to model real world situations.

- To enable students to analyse primary and secondary research in the introduction to design thinking and develop ideas.

- To develop an advance innovation and growth mindset form of problem identification and reframing, foresight, hindsight and insight generation.

Unit	Contents	Hours
1	**ENTERPRISE DESIGN THINKING – HISTORY, OVERVIEW** Introduction to Design Thinking, Understand what came before Design Thinking, Design making : Design making: concepts and prototyping; Design breaking; Identifying and using design principles; Identify who did what to bring it about, Learn how it built upon previous approaches, Need of design thinking; An approach to design thinking, Design thinking Process, Enterprise Design Thinking, Understand the principles, loop, and keys. Determine what is most important.	10
2	**ENTERPRISE DESIGN THINKING – 7 KEY HABITS, THE LOOP, USER RESEARCH** 7 key habits of effective design thinkers, Iteration: understand the importance; Learn how to observe, reflect, & make. An Overview on Loop: - Its principles and keys. Determine what is most important. User Research Its Importance, Empathy through listening.	10
3	**THE LOOP – MAKE, USER FEEDBACK** Understand how Make fits into the Loop, learn how to leverage Observe information, Learn Ideation, Storyboarding, & Prototyping. Understand user	9

		feedback and the Loop, Learn the different types of user feedback, learn how to carry out getting feedback.	
4	**DEVELOPING IDEAS & GENERATING INNOVATIONS** Create Thinking, Generating Design Ideas, Lateral Thinking, Analogies, Brainstorming, Mind mapping, National Group Technique, Synectic's, Development of work, Analytical Thinking, Group Activities Recommended; What is design innovation? A mindset for innovation, and asking "what if?" asking "what wows?" and "what works?"	8
5	**REVERSE ENGINEERING** Introduction - Forward Engineering Design, Design Thought and Process, Design Steps; Reverse Engineering Leads to New Understanding about Products; Schematic Drawings and Analysis; Reverse Engineering in Computer Applications; Reasons for Reverse Engineering - Reverse Engineering Process - Step by Step - Case Study.	8

COURSE OUTCOMES	
At the end of the course the students will be able to:	
CO 1	Examine Design Thinking concepts and principles
CO 2	Understand and apply enterprise Design thinking
CO 3	Practice the methods, processes, and tools of Design Thinking
CO 4	Apply the Design Thinking approach and model to real world situations
CO 5	Apply and Understand Reverse and Forward Engineering
Text Books	Kaushik Kumar , 2019, Design Thinking to Digital Thinking, Springer

	Discipline Specific Elective-II	
Code	**Introduction to Computational Thinking**	**Total Lecture:45 Practical:15**
CS20B108		**(LTP=3-0-2=4)**

Course Objectives

The aim of this course is hence to take students with no prior experience of thinking in a computational manner to a point where they can derive simple algorithms and code the programs to solve some basic problems in their domain of studies. In addition, the course will include topics to appreciate the internal operations of a processor, and raise awareness of the socio-ethical issues arising from the pervasiveness of computing technology.

Unit	Contents	Hours
1	Computer Networking: Introduction, Goals, ISO-OSI Model, Functions of Different Layers. Internetworking Concepts, Devices, TCP/IP Model. Introduction to Internet, World Wide Web, E- commerce Computer Security Basics: Introduction to viruses, worms, malware, Trojans, Spyware and Anti- Spyware Software, Different types of attacks like Money Laundering, Information Theft, Cyber Pornography, Email spoofing, Denial of Service (DoS), Cyber Stalking, ,Logic bombs, Hacking Spamming, Cyber Defamation , pharming Security measures Firewall, Computer Ethics & Good Practices, Introduction of Cyber Laws about Internet Fraud, Good Computer Security Habits,	10
2	CT concept – Abstraction, Decomposition, Pattern recognition, Algorithm, Limit of computing, Analysis of Algorithm Complexity, Space and time Complexity, code optimization.	10
3	Human intelligence and artificial intelligence, introduction, Need of AI and its application. Introduction to Internet of thing, characteristics, benefits, hardware and its application. Introduction of Data science and its application. Cloud computing: definition, characteristics, service delivery models (IaaS, PaaS and SaaS), cloud deployment models/ types of cloud (public, private, community and hybrid clouds), Pros and Cons of cloud computing. Edge and Fog Computing, Quantum Computers. Introduction of Big Data and Hadoop.	9
4	Data base Management System: Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language	8

	and Manipulation Languages	
5	Computer: Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software. Computer Application in e-Business, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and Climatology, Computer Gaming, Multimedia and Animation etc. Operating System: Definition, Function, Types, Management of File, Process & Memory. Introduction to MS word, MS PowerPoint, MS Excel	8

COURSE OUTCOMES	
At the end of the course the students will be able to:	
CO 1	Describe the internal operation of a basic processor, how a program is executed by a computer and computing trends.
CO 2	Code basic programs based on the programming language used in the course.
CO 3	Formulate a problem and express its solution in such a way that a computer can effectively carry it out. (i.e. equip you with CT skills)
CO 4	Apply the CT concepts on case studies/problem-based scenarios through hands-on practice of the CT processes.
CO 5	Acquire knowledge of Microsoft office suit and have hands on it.
Text Books	1. Behrouz A. forouzan ,2007, Data communication & networking, fourth edition,MC Graw-Hill 2. Henry F.korth ,1997,Data base system concept ,6 edition, McGraw-Hill Education .
Reference Books	1. TD malhotra,2020, New trends in computer 1st EDITION, Evergreen Publications

	Discipline Specific Elective-II	
Code	**Introduction to Digital Technology**	**Total Lecture:45 Practical:15**
CS20B109		**(LTP=3-0-2=4)**

Course Objectives

This course is designed for students to understand, communicate, and adapt to a digital world as it impacts their personal life, society, and the business world. Various forms of technologies will be highlighted to expose students to the emerging technologies impacting the digital world. Professional communication skills and practices, problem-solving, ethical and legal issues, and the impact of effective presentation skills are taught in this course as a foundational knowledge to prepare students to be career ready. The knowledge and skills taught in this course build upon each other to form a comprehensive introduction to digital world.

Unit	Contents	Hours
1	Introduction to Internet, WWW and Web Browsers: Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting, World Wide Web; Web Browsing software's, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website	10
2	What is Search Engine, The Mission of Search Engines , Types of SE, Need of SE,How search engines works,Major functions of a search engine ,Popular Search Engines, Click Tracking: How Users Click on Results, Natural Versus Paid , Understanding Search Engine Results, Algorithm-Based Ranking Systems: Crawling, Indexing, and Ranking, Determining Searcher Intent and Delivering Relevant, Fresh Content, Analyzing Ranking Factors , Web Traffic , Different types of keywords , Google trends & insights , Steps in Search Engine.	10
3	Introduction, Types of websites, Components of web site, Websites vs. Portals, Domain rank, Architecture of Website, Website Designing Basics ,	9

	Essentials of good website designing, Usability and User Experience in Website, Domain, Importance of Domain Names and Value, URL renaming/re-writing, Hosting , Hosting Selection, Difference between dynamic & static website, Creating Robots file & sitemaps, Google webmaster tools.	
4	Introduction to Social Media, merits & Demerits of Social Media ,Social Media Marketing, Social Media Strategy and Planning, Social Media Measurement, Content Strategy ,Social Media Sites , Face book Account Creation , Face book Page Creation , Business Promotion ,About Instagram-Live ,Reels ,LinkedIn ,Twitter, Social Media management and measurement tools, a social media audit tools.	8
5	Introduction –Content, Art of Writing, Type of Contents, Promotion of contents , What is Blogging , Promotion of Blogs , Submission of Blogs , Different platforms for Blogs (BlogSpot, word press, Type Pad) , Advantage of Blogs ,Career as a Blogger , Popular Blogs ,Blog vs. Article. How to Create and Manage an Account on different Platforms, How to Get audience, Social Sharing & Comments, How to Optimize Submissions,	8

COURSE OUTCOMES

At the end of the course the students will be able to:	
CO 1	Explore, research, and present findings on positions and career paths in technology and the impact of technology on chosen career area.
CO 2	Demonstrate effective professional communication skills (oral, written, and digital) and practices that enable positive customer relationships.
CO 3	Identify, describe, evaluate, select and use appropriate technology.
CO 4	Understand, communicate, and adapt to a digital world.
CO 5	Explore and explain the basic components of computer networks.
Text Books	1.ISRD Group,Internet Technology & Web Design,TMH Education. 2.Jan Zimmerman,Social Media Marketing ALL IN ONE For Dummies. 3. Andrew S Tannenbaum ,Computer Network,Pearson Education.
Reference Books	1.Jason Mcdonald,Social media Marketing Workbook 2020.

Code	Project Based Learning II	Total Lecture: Practical:30
PB20B201		**(LTP=0-0-4=2)**
	Contents	Hours
	In this course we have only practical part and student are allowed to devlop small project on the basis of the knowledge .They have required however ,if a student show interest in the basis technology of the Computer Science/Electronics/Mechanical/Civil Engineering. Then appropriate guidance will be given by relative faculty member	30

Code	Yoga and Meditation-II	Total Lecture: Practical:15
GC20B201		LTP=0-0-2=1
	Contents	Hours
Learning Objectives:	To practice mental hygiene. To possess emotional stability. To integrate moral values. To attain higher level of consciousness. It will prepare the students physically and mentally for the integration of their physical, mental and spiritual faculties so that the students can become healthier, saner and more integrated members of the society and of the nation	15

Code	Green Credit-II	Total Lecture: Practical:15
GC20B201		**LTP=0-0-2=1**
	Contents	Hours
Learning Objectives:	Green Credit helps in self-discipline and self-control, leading to immense amount of awareness, concentration and higher level of consciousness. Main objective are: To provide the basic practical understanding about plantation. To familiarize the various issues related with plantation and associated problems. To make a bonding between tree and students. Preparing basic awareness about the environmental issues confronted by the humanity in the present global scenario and to equip the students to understand the environmental movements and basic of plantations.	15