



**SCHOOL OF ENGINEERING AND TECHNOLOGY  
SCHOOL OF ENGINEERING AND TECHNOLOGY  
Bachelor of Science (Computer Science)**

**Programme Code: SET0125  
Duration- 3 Years Full Time**

**PROGRAM STRUCTURE  
AND  
CURRICULUM & SCHEME OF EXAMINATION  
2020**



## **1. Standard Structure of the Program at University Level**

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### **1.1 Vision, Mission and Core Values of the University**

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#### **Vision of the University**

**To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.**

#### **Mission of the University**

- 1. Transformative educational experience**
- 2. Enrichment by educational initiatives that encourage global outlook**
- 3. Develop research, support disruptive innovations and accelerate entrepreneurship**
- 4. Seeking beyond boundaries**

#### **Core Values**

- Integrity**
- Leadership**
- Diversity**
- Community**

**Note: Detailed Mission Statements of University can be used for developing Mission Statements of Schools/ Departments.**

## Vision and Mission of the School

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### **Vision of the School**

**To become a globally acclaimed institution of higher learning in engineering and technology promoting excellence in research, innovation and entrepreneurship**

### **Mission of the School**

- 1. To impart quality education with strong industry & academic connectivity in the expanding fields of Engineering and Technology in a conducive and enriching learning environment.**
- 2. To product technocrats equipped with technical & soft skills and experiential learning required to stay current with the modern tools in emerging technologies to fulfill professional responsibilities and uphold ethical values.**
- 3. To inculcate a culture of interdisciplinary research, innovation and entrepreneurship to provide sustainable solutions to meet the growing challenges and societal needs.**
- 4. To foster collaborative learning and to play adaptive leadership role in professional career and pursuit of higher education through effective mentoring and counseling.**

### **Core Values**

- Industry & Academic Connectivity**
- Experiential learning**
- Interdisciplinary research**
- Global**

## 1.2 Vision and Mission of the Department

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### **Vision of the Department**

**To be recognized as the fountainhead of excellence in technical knowledge and research in computer science and engineering to attract students and scholars across the globe**

### **Mission of the Department**

- 1. To strengthen core competency of students to be successful, ethical, effective problem solver in Computer Science & Engineering through analytical learning.**
- 2. To promote interdisciplinary research & innovation-based activities in emerging areas of technology globally**
- 3. To facilitate and foster the industry-academia collaboration to enhance entrepreneurship skills and acquaintance with corporate culture.**
- 4. To inculcate in them a higher degree of social consciousness and moral values towards solving interdisciplinary societal problems using industry-academia collaboration**

### **Core Values**

- Competency**
- Global**
- Entrepreneurship Skills**
- Interdisciplinary research**

### 1.3 Programme Educational Objectives (PEO)

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#### 1.3.1 Writing Programme Educational Objectives (PEO)

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Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

The Program Educational Objectives (PEOs) of UG Program in Computer Science & Engineering are:

**PEO-1** The graduates will establish themselves as professionals by solving real-life problems using exploratory and analytical skills acquired in the field of Computer Science and Engineering.

**PEO-2** The graduates will provide sustainable solutions to ever changing interdisciplinary global problems through their Research & Innovation capabilities.

**PEO-3** The graduates will become employable, successful entrepreneur as an outcome of Industry-Academia collaboration.

**PEO-4** The graduates will embrace professional code of ethics while providing solution to multidisciplinary social problems in industrial, entrepreneurial and research environment to demonstrate leadership qualities

#### Methods of Forming PEO's

- STEP 1 : The needs of the Nation and society are identified through scientific publications, industry interaction and media.
- STEP 2. Taking the above into consideration, the PEOs are established by the Coordination Committee of the department.
- STEP 3. The PEOs are communicated to the alumni and their suggestions are obtained.
- STEP 4. The PEOs are communicated to all the faculty members of the department and their feedback is obtained.
- STEP 5. The PEOs are then put to the Board of Studies of the department for final approval.

*[Note: Prepare a file for the same, how you arrive for PEO's]*

### 1.3.2 Map PEOs with Mission Statements:

DEPARTMENT PEOs  DEPT OF CSE MISSION STATEMENTS	1. The graduates will establish themselves as professionals by solving real-life problems using exploratory and analytical skills acquired in the field of Computer Science and Engineering.	2. The graduates will be able to provide sustainable solutions to ever changing interdisciplinary global problems through their Research & Innovation capabilities.	3. The graduates will become employable, successful entrepreneur and innovator as an outcome of Industry-Academia collaboration.	4. The graduates will be able to embrace professional code of ethics while providing solution to multidisciplinary social problems in industrial, entrepreneurial and research environment to demonstrate leadership qualities.	
1. To strengthen core competency of students to be successful, ethical, effective problem solver in Computer Science & Engineering through analytical learning.	3	3	2	2	10/12
2. To promote interdisciplinary research & innovation based activities in emerging areas of technology globally.	2	3	2	2	9/12
3. To facilitate and foster the industry-academia collaboration to enhance entrepreneurship skills and acquaintance with corporate culture.	2	2	3	3	10/12
4: To inculcate in them a higher degree of social consciousness and moral values towards solving interdisciplinary societal problems using industry-academia collaboration	2	2	2	3	9/12
	9/12	10/12	9/12	10/12	83%

Enter correlation levels 1, 2, or 3 as defined below:

- 1. Slight (Low)    2. Moderate (Medium)    3. Substantial (High)**

If there is no correlation, put “-“

### 1.3.3 Program Outcomes (PO's)

<b>PO1:</b>	<b>Computing knowledge:</b>	Understand the basic principles and methods of computer science for solving complex computing problems.
<b>PO2:</b>	<b>Problem Analysis and Design of solutions:</b>	Analyze and formulate a problem, evaluate a computing-based solution to meet a given set of requirements using software development concepts.
<b>PO3:</b>	<b>Modern tool usage:</b>	Ability to select and apply current techniques and modern IT Tools for innovative software solutions.
<b>PO4:</b>	<b>Technical Skill Development</b>	To develop and sharpen programming, networking, and other computer science skills required in the field of study/ higher education.
<b>PO5:</b>	<b>Societal Concern:</b>	Utilize the role of computing for solving real life problems and to analyze its global impact on individuals, organizations, and society.
<b>PO6:</b>	<b>Environment and Sustainability :</b>	Actively involved with knowledge, skills and right attitude in environmental context for sustainable development.
<b>PO7:</b>	<b>Ethics:</b>	Recognize ethical principles and moral values for the computing profession in global economic environment.
<b>PO8:</b>	<b>Individual and team work:</b>	Ability to function effectively as an individual or a team member engaged in accomplishes a common goal.
<b>PO9:</b>	<b>Communication:</b>	Development of good communication skills in both written and verbal form to convey technical information effectively and accurately.
<b>PO10 :</b>	<b>Life-long learning:</b>	Ability to recognize the need of training and skills to engage in self-regulating and life-long learning.
<b>PSO1 :</b>	<b>Computer Science</b>	Provide effective and efficient solutions to real life problems using acquired knowledge in Data Mining, graph theory, advanced DBMS and other computer science concepts for continued professional development.
<b>PSO2 :</b>	<b>Information Technology</b>	Explore and provide software solutions of complex problems using information technology concepts like Enterprise Resource Planning, network security, IT infrastructure management.

### 1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

Mapping	PEO1	PEO2	PEO3	PEO4
<b>PO1:</b>	3	3	2	1
<b>PO2:</b>	3	3	3	1
<b>PO3:</b>	2	2	3	2
<b>PO4:</b>	2	3	2	2
<b>PO5:</b>	1	2	2	3
<b>PO6:</b>	1	1	2	3
<b>PO7:</b>	1	1	2	3
<b>PO8:</b>	1	2	3	1
<b>PO9:</b>	1	1	3	2
<b>PO10:</b>	2	3	1	1
<b>PSO1:</b>	2	3	1	3
<b>PSO2:</b>	3	3	2	2

*1. Slight (Low)*

*2. Moderate (Medium)*

*3. Substantial (High)*



### 1.3.5 Program Outcome Vs Courses Mapping Table<sup>1</sup>:

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*1. Slight (Low)*

*2. Moderate (Medium)*

*3. Substantial (High)*

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<sup>1</sup> Cel value will contain the correlation value of respective course with PO.

### 1.3.5.2 COURSE ARTICULATION MATRIX<sup>2</sup>

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**1-Slight (Low)**

**2-Moderate (Medium)**

**3-Substantial (High)**

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<sup>2</sup> Each course outcome (Based on Blooms Taxonomy-CO1, CO2, CO3, CO4, CO5, and CO6) of the course needs to map with PO. This table evolves once faculty has mapped each course outcomes of their respective course with PO's.

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## Course Outcome

- **Course Outcomes**–What is it?
  - Course outcomes (COs) are clear statements of what a student should be able to demonstrate on completion of a course.
  - COs should be assessable and measurable knowledge, skills, abilities and attitudes that student attains by the end of the course.
  - It is generally good idea to identify between 4 and 7 outcomes.
  - All courses in a particular programme shall have their own PO.
  - Each CO is mapped to relevant PO.
  - The teaching learning process and assessment process are to be designed in a way to achieve the COs.

## Beginning words for Course Outcome:

Active verbs developed based on Bloom's Taxonomy

Knowledge	Understand	Apply	Analyze	Evaluate	Create
define	explain	solve	analyze	reframe	design
identify	describe	apply	compare	criticize	compose
describe	interpret	illustrate	classify	evaluate	create
label	paraphrase	modify	contrast	order	plan
list	summarize	use	distinguish	appraise	combine
name	classify	calculate	infer	judge	formulate
state	compare	change	separate	support	invent
match	differentiate	choose	explain	compare	hypothesize
recognize	discuss	demonstrate	select	decide	substitute
select	distinguish	discover	categorize	discriminate	write
examine	extend	experiment	connect	recommend	compile
locate	predict	relate	differentiate	summarize	construct
memorize	associate	show	discriminate	assess	develop
quote	contrast	sketch	divide	choose	generalize
recall	convert	complete	order	convince	integrate
reproduce	demonstrate	construct	point out	defend	modify
tabulate	estimate	dramatize	prioritize	estimate	organize
tell	express	interpret	subdivide	find errors	prepare
copy	Identify	Manipulate	survey	grade	produce
discover	indicate	Paint	advertise	measure	rearrange
duplicate	Infer	Prepare	appraise	predict	rewrite
enumerate	relate	produce	Break down	rank	role-play

(Reference: Retrieved from <http://www.teachthought.com/learning/249-blooms-taxonomy-verbs-for-critical-thinking/>)

School of Engineering and Technology							
Department Of Computer Science & Engineering							
B.Sc(Honors) in Computer Science							
Batch: 2020 Onwards					TERM: I		
S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
			L	T	P		
<b>THEORY SUBJECTS</b>							
1	BCO107	Problem solving using C Programming	3	0	0	3	
2	BCO108	Digital Electronics & Computer Organization	3	0	0	3	
3	BCO103	Fundamental of Information Technology	3	0	0	3	
4	EVS112	Environmental Studies	3	0	0	3	
5	MTH136	Mathematics in Computer Applications	3	1	0	4	
<b>Practical/Viva-Voce/Jury</b>							
6	ARP101	Communicative English-1	1	0	2	2	
7	BOL107	Problem solving using C Programming Lab	0	0	2	1	
8	BOL108	Digital Electronics & Computer Organization Lab	0	0	2	1	
<b>TOTAL CREDITS</b>						<b>20</b>	

School of Engineering and Technology							
Department Of Computer Science & Engineering							
B.Sc(Honors) in Computer Science							
Batch: 2020 Onwards					TERM: II		
S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
			L	T	P		
<b>THEORY SUBJECTS</b>							
1	BCO301	Introduction to OOPs using Java	3	0	0	3	
2	BCO109	Data Structures and Algorithms	4	0	0	4	
3	BCO110	Discreate structure	3	1	0	4	
4	BCO111	Operating Systems	3	0	0	3	
5	HMM111	Values and Ethics	2	0	0	2	
<b>Practical/Viva-Voce/Jury</b>							
6	ARP102	Communicative English -2	1	0	2	2	
7	BOL360	Introduction to OOPs using Java Lab	0	0	2	1	
8	BOL109	Data Structures and Algorithms Using C Lab	0	0	2	1	
9	BOL111	Operating Systems Using Linux Lab	0	0	2	1	
<b>TOTAL CREDITS</b>						<b>21</b>	
Summer Internship-I: In summer after 1st year Summer Internship (To be evaluated in 3rd Semester)							

School of Engineering and Technology							
Department Of Computer Science & Engineering							
B.Sc(Honors) in Computer Science							
Batch: 2020 Onwards					TERM: III		
S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
			L	T	P		
<b>THEORY SUBJECTS</b>							
1	BCO210	Problem solving using Python Programming	3	0	0	3	
2	BCO207	Database Management Systems	3	0	0	3	
3	BCO211	Electronic Commerce & Applications	3	0	0	3	
4	Open Elective -1		3	0	0	3	
	HMM303	Organizational Behavior					
		Psychology & Sociology					
		Management Information Systems (MIS)					
<b>Practical/Viva-Voce/Jury</b>							
5	ARP203	Aptitude Reasoning and Business Communication Skills - Basic	1	0	2	2	
6	<b>ECC301</b>	Community Connect	-	-	-	2	
7	BOL210	Problem solving using Python Programming Lab	0	0	2	1	
8	BOL207	Database Management Systems Lab	0	0	2	1	
9	BOL291	Project Based Learning-1	0	0	2	1	
10	BOL295	Summer Internship-I	-	-	-	1	
<b>TOTAL CREDITS</b>						<b>20</b>	

<b>School of Engineering and Technology</b>							
<b>Department Of Computer Science &amp; Engineering</b>							
<b>B.Sc(Honors) in Computer Science</b>							
<b>Batch: 2020 Onwards</b>					<b>TERM: IV</b>		
<b>S. No.</b>	<b>Course Code</b>	<b>Course</b>	<b>Teaching Load</b>			<b>Credits</b>	<b>Pre-Requisite/Co Requisite</b>
			<b>L</b>	<b>T</b>	<b>P</b>		
<b>THEORY SUBJECTS</b>							
1	BCO212	Introduction to Computer Network	3	0	0	3	
2	BCO213	Fundamentals of Android	3	0	0	3	
3	BCO214	Web Designing and its Application	3	0	0	3	
4	Program Elective-1		3	0	0	3	
	BCO011	Data Encoding and Compression					
	BCO012	Graph Theory					
	BCA013	Information Security and Cyber Laws					
5	BCA314	Essentials of Digital Marketing	3	0	0	3	
<b>Practical/Viva-Voce/Jury</b>							
6	ARP204	Aptitude Reasoning and Business Communication Skills-Intermediate	1	0	2	2	
7	BOL212	Introduction to Computer Network Lab	0	0	2	1	
8	BOL213	Fundamentals of Android Lab	0	0	2	1	
9	BOL214	Web Designing and its Application Lab	0	0	2	1	
10	BOL292	Project Based Learning-2	0	0	2	1	
<b>TOTAL CREDITS</b>						<b>21</b>	
Summer Internship-II: In summer after 2nd year Summer Internship (To be evaluated in 5th Semester)							

School of Engineering and Technology							
Department Of Computer Science & Engineering							
B.Sc(Honors) in Computer Science							
Batch: 2020 Onwards					TERM: V		
S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
			L	T	P		
<b>THEORY SUBJECTS</b>							
1	BCO304	Introduction to PHP	3	0	0	3	
2	BCO305	Introduction to Cloud Computing	3	0	0	3	
3	<b>BCO209</b>	Introduction to Software Engineering	3	0	0	3	
4	Program Elective-2		3	0	0	3	
	BCA021	Client Server Computing					
	BCO021	IT Project Management					
	BCO022	Introduction to Distributed System					
5	Program Elective-3		3	0	0	3	
	BCO031	Computer Graphics					
	BCO032	Multimedia & Animation					
	BCA033	Front End Design Tool VB.Net					
<b>Practical/Viva-Voce/Jury</b>							
6	BOL304	Introduction to PHP Lab	0	0	2	1	
7	Program Elective-3		0	0	2	1	
	BOL031	Computer Graphics Lab					
	BOL032	Multimedia & Animation Lab					
	BOP033	Front End Design Tool VB.Net Lab					
8	BOL393	Project-1	0	0	4	2	
9	BOL395	Summer Internship-II	-	-	-	2	
<b>TOTAL CREDITS</b>						<b>21</b>	



School of Engineering and Technology							
Department Of Computer Science & Engineering							
B.Sc(Honors) in Computer Science							
Batch: 2020 Onwards					TERM: VI		
S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
			L	T	P		
<b>THEORY SUBJECTS</b>							
1	Program Elective -4		3	0	0	3	
	BCA041	Introduction to IOT and Applications					
	BCO041	Soft Computing					
	BCA043	Introduction to AIML					
2	Program Elective-5		3	0	0	3	
	BCA051	Software Testing					
	BCO051	System Analysis & Design					
	BCO052	Mobile Computing					
<b>Practical/Viva-Voce/Jury</b>							
1	Program Elective -4		0	0	2	1	
	BCP041	Introduction to IOT and Applications Lab					
	BOL041	Soft Computing Lab					
	BCP043	Introduction to AIML Lab					
2	Program Elective-5		0	0	2	1	
	BCP051	Software Testing Lab					
	BOL051	System Analysis & Design Lab					
	BOL052	Mobile Computing Lab					
3	BOL394	Project-2	-	-	-	9	
<b>TOTAL CREDITS</b>						<b>17</b>	

## *C. Course Syllabuses*

# TERM-I

<b>Schools: SET</b>		<b>Batch : 2020-20</b>
		<b>Current Academic Year: 2020-20</b>
		<b>Semester: 1<sup>st</sup></b>
1	Course Code	<b>ARP101</b>
2	Course Title	<b>Communicative English-1</b>
3	Credits	<b>2</b>
4	Contact Hours (L-T-P)	<b>1-0-2</b>
5	Course Objective	To minimize the linguistic barriers that emerge in varied socio-linguistic environments through the use of English. Help students to understand different accents and standardise their existing English. Guide the students to hone the basic communication skills - listening, speaking, reading and writing while also uplifting their perception of themselves, giving them self-confidence and building positive attitude.
6	Course Outcomes	<p>CO1 Learn to use correct sentence structure and punctuation as well as different parts of speech. Learning new words its application and usage in different contexts helpful in building meaning conversations and written drafts. Develop over all comprehension ability, interpret it and describe it in writing. Very useful in real life situations and scenarios.</p> <p>CO2 A recognition of one's self and abilities through language learning and personality development training leading up to greater employability chances. Learn to express oneself through writing while also developing positive perception of self. To be able to speak confidently in English</p> <p>CO3 To empower them to capitalise on strengths, overcome weaknesses, exploit opportunities, and counter threats. To ingrain the spirit of Positive attitude in students through a full length feature film followed by a storyboarding activity. Create a Self Brand, identity and self esteem through various interesting and engaging classroom activity</p> <p>CO4 Exposing students to simulating situations wherein students learn to describe people and situations and handle such situations effectively and with ease. Teaching students how to engage in meaningful dialogues and active conversational abilities to navigate through challenging situations in life and make effective conversations. Learn how to transform adverse beginnings into positive endings – through writing activities like story completion.</p>
7	Course Description	The course is designed to equip students, who are at a very basic level of language comprehension, to communicate and work with ease in varied workplace environment. The course begins with basic grammar structure and pronunciation patterns, leading up to apprehension of oneself through written and verbal expression as a first step towards greater employability.

8	Outline syllabus – ARP 101		
	<b>Unit A</b>	<b>Sentence Structure</b>	<b>CO Mapping</b>
	Topic 1	Subject Verb Agreement	CO1
	Topic 2	Parts of speech	
	Topic 3	Writing well-formed sentences	
	<b>Unit B</b>	<b>Vocabulary Building &amp; Punctuation</b>	
	Topic 1	Homonyms/ homophones, Synonyms/Antonyms	CO1
	Topic 2	Punctuation/ Spellings (Prefixes-suffixes/Unjumbled Words)	CO1, CO1
	Topic 3	Conjunctions/Compound Sentences	CO1, CO2
	<b>Unit C</b>	<b>Writing Skills</b>	
	Topic 1	Picture Description – Student Group Activity	CO3
	Topic 2	Positive Thinking - Dead Poets Society-Full-length feature film - Paragraph Writing inculcating the positive attitude of a learner through the movie   SWOT Analysis – Know yourself	CO3, CO2, CO3
	Topic 3	Story Completion Exercise –Building positive attitude - The Man from Earth (Watching a Full length Feature Film )	CO2, CO3 CO4
	<b>Unit D</b>	<b>Speaking Skill</b>	
	Topic 1	Self-introduction/Greeting/Meeting people – Self branding	CO2, CO3
	Topic 2	Describing people and situations - To Sir With Love ( Watching a Full length Feature Film )	CO3, CO4
	Topic 3	Dialogues/conversations (Situation based Role Plays)	CO2, CO4 CO4
9	Evaluations	<i>Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations ( 60% CA and 40% ETE</i>	N/A
10	Texts & References   Library Links	<ul style="list-style-type: none"> <li>Blum, M. Rosen. <i>How to Build Better Vocabulary</i>. London: Bloomsbury Publication</li> <li>Comfort, Jeremy(et.al). <i>Speaking Effectively</i>. Cambridge University Press</li> </ul>	

**Observations:**

1. A Single Consolidated Syllabus has now replaced the Previous Functional English Beginners -1 and Functional English Intermediate -1
2. Credits previously allocated to FEN 01 Lab Sessions have been dissolved
3. The Pearson Voice Labs have been completely eliminated
4. Max Students Size =80/Batch

CO	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1										3		
CO2								1	1	2		
CO3				1				1	2			
CO4		1	1							1	2	

<b>School: SET</b>		<b>Batch : 2020</b>	
<b>Program: BSc</b>		<b>Current Academic Year: 2020-19</b>	
<b>Branch:CS/IT</b>		<b>Semester:I</b>	
1	Course Code	BCO 103	Course Name- BSc
2	Course Title	<b>Fundamentals of IT</b>	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-2	
	Course Status	UG	
5	Course Objective	<ol style="list-style-type: none"> <li>1. The main objective is to introduce IT in a simple language to all undergraduate students, regardless of their specialization.</li> <li>2. The focus of the subject is on introducing skills relating to IT basics, computer applications</li> <li>3. To understand the basic knowledge of computer</li> </ol>	
6	Course Outcomes	Students will be able to: <b>CO1:</b> Identify categories of computers. <b>CO2:</b> Have a basic understanding of personal computers and their operations. <b>CO3:</b> be able to identify computer hardware components and describe their function; <b>CO4: Identify the role of software Operating system overview</b> <b>CO5:</b> The focus of the subject is on introducing skills relating to IT basics, computer applications <b>CO6:</b> Understand basic concepts computer arithmetic	
7	Course Description	The course Fundamentals of Information Technology has become essential the present age of computer technology and information, as the applications of information technology can be found in all aspects of our lives.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction to Computers</b>	
	A	Characteristics of Computers, Evolution of computers, Capabilities and limitations of computers, Generations of computers, Types of computers(micro, mini, main frame, supercomputers),	CO1, CO2,CO2
	B	Block diagram of computer, Basic components of a computer system- Input unit, output unit, Arithmetic logic Unit, Control unit, central processing unit, Instruction set, registers, processor speed, type of processors,	CO1, CO2,CO3
	C	Memory- main memory organization, main memory capacity, RAM, ROM, EPROM, PROM, cache	CO1, CO2

		memory,PCs specifications.	
<b>Unit 2</b>	<b>Basic Computer Organization:</b>		
A	Input devices- Keyboard, Pointing Devices-mouse, Touch Screens, Joystick, Electronic pen, Trackball, Scanning Devices-Optical Scanners, OCR, OMR, Bar Code Readers, MICR, Digitizer, Electronic card reader, Image Capturing Devices-Digital Cameras. Output devices- Monitors- CRT, LCD/TFT		CO1, CO2
B	Printers- Dot matrix,Inkjet, Laser, Plotters- Drum, Flatbed, Screenimage projector.		CO1, CO2
C	Secondary Storage Devices- Magnetic Tape, Magnetic Disks-Internal Hard Disk, External Hard Drives, Floppy Disks, Optical Disks-CD, VCD, CD-R, CD-RW, DVD, Solid State Storage-Flash Memory, USB Drives.		CO1, CO2
<b>Unit 3</b>	<b>Storage</b>		
A	Computer Software- Software and its Need, Types of software- System software,Applicationsoftware, System software-operating system, utility program, programming languages, assemblers, compilersand interpreter		CO1,CO2,CO3,CO4
B	introduction to operation system forPCs-DOS,windows, linux, file allocation table (FAT & FAT32), files & directory structure and its naming rules, programming languages-machine,assembly, high level, 4GL, their merits and demerits,		CO1,CO2,CO3,CO4
C	applicationsoftwareand its types ? word-processing, spreadsheet, presentation graphics, Data Base Management Software, Characteristics, Uses and examples and area of application of each of them, Virus working, feature, typesof viruses, virus detection prevention and cure.		CO2,CO4
<b>Unit 4</b>	<b>Software</b>		
A	Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language,		CO1,CO2,CO3
B	High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing,		CO1,CO2,CO3
C	Spread Sheets Presentation, Graphics, DBMS s/w.		CO1,CO2,CO3
<b>Unit 5</b>	<b>Computer Arithmetic:</b>		
A	Binary, Binary Arithmetic, Number System: Positional & Non Positional, Binary		CO1CO4
B	Octal, Decimal, Hexadecimal, Converting from one number system to another		CO,CO4



C	Converting from one number system to another , Converting from one number system to another.			CO1,CO2,CO4
Mode of examination	Theory			
Weightage Distribution	CA	MTE	ETE	
	30%	20%	50%	
Text book/s*	1. Computer Fundamentals by P.K.Sinha			
Other References				

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1: : Identity categories of computers.</b>	
2.	<b>CO2:</b> Have a basic understanding of personal computers and their operations.	PO1,PO2,PO3,PO4,PSO1
3.	<b>CO3:</b> be able to identify computer hardware components and describe their function;	PO1, PO3, PO4, PSO2
4.	<b>CO4:</b> Identify the role of softwareOperating system overview	PO1, PO3, PO4, PSO2
5.	<b>CO5:</b> Understand basic concepts and terminology of information technology.	PO1,PO2,PO3,PO4
6.	<b>CO6:</b> Understand basic concepts computer arithmetic	PO9, PO10, PSO2

### **PO and PSO mapping with level of strength for Fundamentals of IT (Course Code BCO 103)**

CSE	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	CO1	3	3	3	3	-	-	-	2	2	1	3	2
CO2	3	2	3	3	--	--	--	2	2	2	2	3	
CO3	3	2	3	3	-	-	-	2	1	2	1	2	
CO4	3	3	3	2	--	--	--	2	1	3	1	2	
CO5	3	2	3	3	--	--	--	2	2	2	2	3	
CO6	3	2	3	3	-	-	-	2	1	2	1	2	

## Syllabus: BOL107\_Problem solving using C Programming Lab

<b>School: SET</b>		<b>Batch: 2020-2022</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2020-2020</b>	
<b>Branch:</b>		<b>Semester: I</b>	
1	Course Code	BOL107	
2	Course Title	BOL107_Problem solving using C Programming Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none"> <li>• Learn basic programming constructs –data types, decision structures, control structures in C</li> <li>• learning logic aptitude programming in c language</li> <li>• Developing software in c programming</li> </ul>	
6	Course Outcomes	<p>By the end of this course you will be able to:</p> <p>CO1: <b>Demonstrate</b> the algorithm, Pseudo-code and flow chart for the given problem.</p> <p>CO2: <b>Develop</b> better understanding of basic concepts of C programming.</p> <p>CO3: <b>Create</b> and implement logic using Operators and control statements.</p> <p>CO4: <b>Construct</b> and implement the logic based on iteration.</p> <p>CO5: <b>Apply</b> and utilize the modular features of the language.</p> <p>CO6: <b>Design</b> and develop solutions to real world problems using C.</p>	
7	Course Description	Basic concepts of C programming, logic building in C programming	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>	<b>CO 1</b>
		<p><b>P1:</b> Getting Started with computers and programming environment</p> <p><b>P2:</b> Drawing flowcharts and implementing some computing problems</p>	
	<b>Unit 2</b>	<b>Constants, Variables &amp; Data Types</b>	CO1,CO2
		<p><b>P4:</b> Demonstration and use of different data types, variables, constants, storage classes</p> <p><b>P5:</b> Demonstration of operators with the help of different</p>	

		use.	
<b>Unit 3</b>	<b>Operators &amp; Expressions</b>		<b>CO1, CO2, CO3</b>
	<b>P6:</b> Implementing some programs based on mathematical expression <b>P7:</b> Implementing some programs based on associativity and precedence.		
<b>Unit 4</b>	<b>Decision Making – Branching &amp; Looping</b>		<b>CO1, CO2, CO3, CO4, CO6</b>
	<b>P8:</b> Use of if-else and nested if statements. <b>P9:</b> Demonstrate the use of switch statement with the help of menu-driven programs. <b>P10:</b> Use of nested loops to print some patterns.		
<b>Unit 5</b>	<b>Functions</b>		<b>CO1, CO2, CO3, CO4, CO5, CO6</b>
	<b>P11:</b> Implementation of Top-Down approach for problem solving with the help of functions. <b>P12:</b> Demonstration of passing parameters using call by value and call by reference. <b>P13:</b> Implementation of recursive functions for various recursively defined problems		
Mode of examination	Jury/Practical/Viva		
Weightage Distribution	CA	MTE	ETE
	60%	0%	40%
Text book/s*	Kernighan, Brian, and Dennis Ritchie. <i>The C Programming Language</i>		
Other References	1. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 2. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: <b>Demonstrate</b> the algorithm, Pseudo-code and flow chart for the given problem.	PO1, PO3, PSO1

2.	CO2: <b>Develop</b> better understanding of basic concepts of C programming.	PO1, PO2, PSO1
3.	CO3: <b>Create</b> and implement logic using Operators and control statements.	PO2, PO4, PO9, PSO2
4.	CO4: <b>Construct</b> and implement the logic based on iteration.	PO2, PO3, PO4, PO5 PO9, PSO1, PSO2
5.	CO5: <b>Apply</b> and utilize the modular features of the language.	PO2, PO3, PO9, PSO1, PSO2
6.	CO6: <b>Design</b> and develop solutions to real world problems using C.	PO3, PO4, PO10., PSO1, PSO2

**PO and PSO mapping with level of strength for Course Name BOL107\_Problem solving using C Programming Lab**

Course Code_ Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
BOL107_Problem solving using C Programming Lab	CO1	2	-	3	-	-	-	-	-	-	-	3	-
	CO2	3	2	-	-	-	-	-	-	-	-	2	-
	CO3	-	3	3	2	-	1	-	-	3	-	3	3
	CO4	-	3	2	-	-	-	2	-	3	-	3	3
	CO5	-	2	-	3	-	-	-	-	2	-	-	2
	CO6	2	-	1	2	-	-	-	-	-	-	3	-

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
BOL107	BOL107_Problem solving using C Programming Lab	2.33	2.5	2.25	2.33	-	1	2	-	2.66	-	2.8	2.66

**Strength of Correlation**

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

<b>School: SET</b>		<b>Batch : 2020-2020</b>	
<b>Program: B. Tech</b>		<b>Current Academic Year: 2020-2020</b>	
<b>Branch: All</b>		<b>Semester: I</b>	
1	Course Code	EVS-112	
2	Course Title	Environmental Science	
3	Credits	03	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ol style="list-style-type: none"> <li>1. Enable students to learn the concepts, principles and importance of environmental science</li> <li>2. Provide knowledge of layers of atmosphere with an insight of role of climatic elements in dispersion of pollutants</li> <li>3. Provide detailed knowledge of causes, effects and control of different types of environmental pollution, solid waste management and its effect on climate change, global warming and ozone layer depletion</li> <li>4. Provide knowledge about ecosystem and biodiversity conservation</li> <li>5. Provide and enrich the students about social issues such as R&amp;R, water conservation and sustainability.</li> <li>6. Overall understanding of environmental components and its protection and management.</li> </ol>	
6	Course Outcomes	<p>CO1.Understand the principles and scope of environmental science</p> <p>CO2.Knowledge about various types of natural resources and its conservation</p> <p>CO3.Study about the structure and composition of atmosphere and factors affecting weather and climate</p> <p>CO4.Study about pollution causes, effects and control and solid waste management and various policies to curb pollution problem</p> <p>CO5.About ecosystem and biodiversity and various strategies for biodiversity conservation.</p> <p>CO6.Overall understanding of the concepts of various elements of environment and related phenomenon.</p>	
7	Course Description	<p>Environmental Science emphasises on various factors as</p> <ol style="list-style-type: none"> <li>1. Importance and scope of environmental science</li> <li>2. Natural resource conservation</li> <li>3. Pollution causes, effects and control methods and solid waste management</li> <li>4. Social issues associated with environment</li> </ol>	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>General Introduction</b>	
	A	Definition, principles and scope of environmental science	CO1/CO6
	B	Water Resources, Land Resources, Food Resources	CO1/CO6
	C	Mineral Resources, Energy Resources, Forest Resources	CO1/CO6

<b>Unit 2</b>	<b>Atmosphere and meteorological parameters</b>			
A	Structure and composition of atmosphere			CO2/CO6
B	Meteorological parameters: Pressure, Temperature, Precipitation, Humidity,			CO2/CO6
C	Radiation, Wind speed and direction, Wind Rose			CO2/CO6
<b>Unit 3</b>	<b>Environmental Pollution (Cause, effects and control measures) and climate change</b>			
A	Air, water, Noise and Soil pollution and Case studies			CO3/CO6
B	Solid waste management: Causes, effects and control measures of urban and industrial wastes.			CO3/CO6
C	Concept of Global Warming, green house effect, ozone layer depletion, Kyoto, IPCC concerns			CO3/CO6
<b>Unit 4</b>	<b>Ecosystem and Biodiversity conservation</b>			
A	Structure and Function of ecosystem, Energy flow in ecosystem, food chain, food web, and ecological succession			CO4/CO6
B	Hot spots, Endangered and endemic species of India, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions			CO4/CO6
C	Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.			CO4/CO6
<b>Unit 5</b>	<b>Social Issues and the Environment</b>			
A	Concept of sustainable development, Water conservation			CO5/CO6
B	Resettlement and rehabilitation of people; its problems and concerns, Case studies			CO5/CO6
C	Population explosion and its consequences			CO5/CO6
Mode of examination	Theory			
Weightage Distribution	CA	MTE	ETE	
	30%	20%	50%	
Text book/s*	<ol style="list-style-type: none"> <li>Joseph, Benny, "Environmental Studies", Tata Mcgraw Hill.</li> <li>.Howard S. Peavy, Donald R. Rowe, George Tchobanoglous. Environmental engineering Mc Graw-Hill, 1985</li> </ol>			
Other References				

### CO and PO Mapping

CO1	Understand the principles and scope of environmental science
CO2	Knowledge about various types of natural resources and its conservation
CO3	Study about the structure and composition of atmosphere and factors affecting weather and climate
CO4	Study about pollution causes, effects and control and solid waste management and various policies to curb pollution problem

CO5	About ecosystem and biodiversity and various strategies for biodiversity conservation
CO6	Overall understanding of the concepts of various elements of environment and related phenomenon

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO112.1	1	1	1	1	1	1	2	1	-	1	1	1	-	1	-
CO112.2	1	2	2	1	-	1	2	-	-	1	1	-	-	1	-
CO112.3	1	2	2	1	-	2	2	-	-	1	2	-	-	2	2
CO112.4	1	2	2	1	-	2	2	-	-	1	2	-	-	2	2
CO112.5	1	2	2	1	1	2	1	2	-	1	2	-	-	2	1
CO112.6	1	2	2	2	1	2	2	1	-	1	2	1	-	2	1

<b>School: SET</b>		<b>Batch : 2020- 2023</b>	
<b>Program: BCA</b>		<b>Current Academic Year:</b>	
<b>Branch:</b>		<b>Semester: <u>1</u></b>	
1	Course Code	MTH136	
2	Course Title	Mathematics in Computer Applications	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Compulsory	
5	Course Objective	The objective of this course is to familiarize the prospective engineers with techniques in basic calculus and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.	
6	Course Outcomes	CO1: Explain the concept of differential calculus, illustrate the curvature and Maxima, minima and saddle point. (K2, K3, K4) CO2: Explain the basic concepts matrices and determinate, evaluate system of linear equation by using rank and inverse method. (K2, K3, K5) CO3: Explain the basic concept of sets, relation, functions, groups Rings and Field. (K2, K4) CO4: Discuss the basic of Vector spaces. (K1, K3) CO5: Describe and use the linear transformation and evaluate nullity and kernel. (K1, K2, K3, K5) CO6: Explain the concept of Eigen values and Eigen vectors; evaluate the diagonalization of matrices, explain the basic introduction of Inner product spaces.(K2, K3, K4, K5)	
7	Course Description	This course is an introduction to the fundamental of Mathematics. The primary objective of the course is to develop the basic understanding of differential and integral calculus, linear Algebra and Abstract Algebra.	
8	<b>Outline syllabus: Mathematics in Computer Applications</b>		<b>CO Mapping</b>
	<b>Unit 1</b>	<b>Differential Calculus:</b>	
	A	Successive differentiation, Leibnitz Theorem, Taylors theorem with Lagranges forms of remainders,	
	B	Expansion of a function of one variable in Taylors and Meclanrin's infinite series. Maxima and Minima of one variable, partial Derivatives, Euler's theorem, change of variables, total differentiation,	



	C	Errors and approximation. Taylors series in two variables. Maxima and Minima of two or more variables		
	<b>Unit 2</b>	<b>Integral Calculus:</b>		
	A	Definite integral and its application for area, length and volume.		
	B	Multiple integrals. Change of order of integration.		
	C	Transformation of integral from Cartesian to polar. Applications in areas, volume and surfaces.		
	<b>Unit 3</b>	<b>Differential Equation:</b>		
	A	First degree and first order Differential equation		
	B	Higher order differential equation with constant coefficients.		
	C	Linear partial differential equation of first order P.D.E. of higher with constant coefficients.		
	<b>Unit 4</b>	<b>LINEAR ALGEBRA:</b>		
	A	Spaces and Subspaces, Basic and Dimension of Vector Spaces,		
	B	Linear Transformation,		
	C	Their Nullity and Rank.		
	<b>Unit 5</b>	<b>MATRIX ALGEBRA:</b>		
	A	Elementary Transformation, Inverse of a Matrix by Row Operation, Rank,		
	B	Solution of a System of Linear Simultaneous Equation by Matrix Methods,		
	C	Eigen Values and Eigen Vectors, Quadratic Forms.		
	Mode of examination	Theory		
	Weightage Distribution	CA 30%	MTE 20%	ETE 50%
	Text book/s*	1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002. 2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.		
	Other References	1. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005. 2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008. 3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010. 4. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East-West press, Reprint 2005.		

**COURSE OUTCOMES – PROGRAMME OUTCOMES MAPPING TABLE**  
**PO and PSO mapping with level of strength for Course Name Mathematics in**  
**Computer Applications (MTH136)**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	Computing knowledge	Problem Analysis and Design of solutions:	Modern tool usage:	Technical Skill Development	Societal Concern:	Environment and Sustainability:	Ethics	Individual and team work:	Communication	Life-long learning:	Multimedia Applications	
CO1	3	-	-	3	-	-	-	2	2	3	-	-
CO2	3	3	-	3	-	-	-	3	-	2	-	-
CO3	3	3	3	3	-	-	-	3	-	2	-	-
CO4	2	2	2	3	-	-	-	2	-	-	-	-
CO5	2	2	2	3	-	-	-	-	-	2	-	-
CO6	2	3	3	3	2	2	2	3	3	3	2	3

# TERM-II

<b>Schools: SET</b>		<b>Batch : 2020-20</b>	
		<b>Current Academic Year: 2020-20</b>	
		<b>Semester: 2<sup>nd</sup> ( Second )</b>	
1	Course Code	<b>ARP102</b>	
2	Course Title	Communicative English -2	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
5	Course Objective	To Develop LSRW skills through audio-visual language acquirement, creative writing, advanced speech et al and MTI Reduction with the aid of certain tools like texts, movies, long and short essays.	
6	Course Outcomes	<p><b>CO1</b> Move from primary self-assessment to larger goal and vision statement realisation with the help of feature length films as enablers and multimedia as language facilitators.</p> <p><b>CO2</b> To develop a positive attitude through written expression of positive thought process and outlook with the help of writing activities like story completion et al.</p> <p><b>CO3</b> Learn advanced writing skills in English like full length essays et al.</p> <p><b>CO4</b> Master the science of speech and correct pronunciation through the accent-neutralisation program followed by reading sessions applying the lessons learnt.</p>	
7	Course Description	The course takes the learnings from the previous semester to an advanced level of language learning and self-comprehension through the introduction of audio-visual aids as language enablers. It also leads learners to an advanced level of writing, reading, listening and speaking abilities, while also reducing the usage of L1 to minimal in order to increase the employability chances.	
8	Outline syllabus – ARP 102		
	<b>Unit A</b>	<b>Acquiring Vision, Goals and Strategies through Audio-visual Language Texts</b>	<b>CO Mapping</b>
	Topic 1	Pursuit of Happiness / Goal Setting & Value Proposition in life	CO1
	Topic 2	12 Angry Men / Ethics & Principles	
	Topic 3	The King's Speech / Mission statement in life   strategies & Action Plans in Life	
	<b>Unit B</b>	<b>Creative Writing</b>	
	Topic 1	Story Reconstruction - Positive Thinking	CO2
	Topic 2	Theme based Story Writing - Positive attitude	
	Topic 3	Learning Diary Learning Log – Self-introspection	
	<b>Unit C</b>	<b>Writing Skills 1</b>	

	Topic 1	Precis	CO3
	Topic 2	Paraphrasing	
	Topic 3	Essays (Simple essays)	
	<b>Unit D</b>	<b>MTI Reduction/Neutral Accent through Classroom Sessions &amp; Practice</b>	
	Topic 1	Vowel, Consonant, sound correction, speech sounds, Monothongs, Diphthongs and Triphthongs	CO4
	Topic 2	Vowel Sound drills , Consonant Sound drills, Affricates and Fricative Sounds	
	Topic 3	Speech Sounds   Speech Music  Tone   Volume  Diction  Syntax  Intonation   Syllable Stress	
	<b>Unit E</b>	<b>Gauging MTI Reduction Effectiveness through Free Speech</b>	
	Topic 1	Jam sessions	N/A
	Topic 2	Extempore	
	Topic 3	Situation-based Role Play	
9	Evaluations	<i>Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations ( 60% CA and 40% ETE</i>	N/A
10	Texts & References   Library Links	<ul style="list-style-type: none"> <li>• Wren, P.C.&amp;Martin H. <i>High English Grammar and Composition</i>, S.Chand&amp; Company Ltd, New Delhi.</li> <li>• Blum, M. Rosen. <i>How to Build Better Vocabulary</i>. London: Bloomsbury Publication</li> <li>• Comfort, Jeremy(et.al). <i>Speaking Effectively</i>. Cambridge University Press.</li> </ul> The Luncheon by W.Somerset Maugham - <a href="http://mistera.co.nf/files/sm_luncheon.pdf">http://mistera.co.nf/files/sm_luncheon.pdf</a>	

### Observations:

1. A Single Consolidated Syllabus has now replaced the Previous Functional English Beginners -2 and Functional English Intermediate -2
2. Credits previously allocated to FEN 02 the Lab Sessions have been dissolved
3. The Pearson Voice Labs have been completely eliminated
4. Max Students Size =80/Batch

CO	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1					1	1	1	1	1			
CO2			1								1	
CO3										1		
CO4										1		

<b>School: SET</b>		<b>Batch : 2020</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2020-21</b>	
<b>Branch:</b>		<b>Semester: II</b>	
1	Course Code	BCO109	
2	Course Title	Data Structures & Algorithms	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Status	Core	
5	Course Objective	<ol style="list-style-type: none"> <li>1. Learn the systematic way of solving problems, various methods of organizing large amounts of data.</li> <li>2. Be familiar with writing recursive methods.</li> <li>3. Solve problems using data structures such as linear lists, stacks, queues, linked list binary trees, heaps binary search trees, and graphs and writing programs for these solutions.</li> <li>4. Efficiently implement the different data structures and solutions for specific problems.</li> <li>5. Choose the appropriate data structure and algorithm design method for a specified application.</li> </ol>	
6	Course Outcomes	<p>CO1: <b>Explain</b> the concepts of data structure, data type and ADT.</p> <p>CO2: <b>Classify</b> and Compare operations like traversing, insertion, deletion, searching etc. on various data structures.</p> <p>CO3:<b>Create</b> and Utilize approach for the application standard algorithms for searching and sorting.</p> <p>CO4: <b>Compare</b> relationship among data structure to solve various problems.</p> <p>CO5: <b>Apply</b> various implementation on data structure such as stacks, queues, trees and graphs to solve various computing problems.</p> <p>CO6: <b>Test</b> and propose data structure that efficiently model the information in a problem</p>	
7	Course Description	<p>This course starts with an introduction to data structures with its classification, array and pointer based implementations. As the course progresses the study of Linear and Non-Linear data structures are studied. The course talks primarily about Linked list, stacks, queue, Tree structure, Graphs etc. This Course also deals with the concept of searching, sorting and hashing methods.</p>	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>	
	A	Introduction to Data Structure, Basic Terminology: Data and information, ADT, Data Structure – Definition, Data Structure –Operations, Applications and types.	CO1, CO2
	B	Definition, Representation of Linear Arrays in Memory, Types and implementation of Arrays: 1D, 2D & M-D Concept, Applications of Arrays, Address	CO1, CO2

		Calculation, Matrix Operations,			
C		Sorting & Searching Algorithms-Bubble sort, Selection sort, Merge sort, linear and binary search.			CO1, CO2
<b>Unit 2</b>		<b>LINKED LIST</b>			
A		Concept of Linked List, Representation of linked List in memory, Memory Allocation, Garbage Collection, Overflow and Underflow			CO2, CO5
B		Traversing a linked list, Searching a linked list, Insertion & Deletion in Linked List			CO2, CO5
C		More types of linked list: Doubly Linked list, Header Linked List, Two way List and Circular linked list.			CO3
<b>Unit 3</b>		<b>STACKS, QUEUES</b>			
A		Concepts of Stack, Operation on Stack, Array Representation of Stack, Arithmetic Expression POLISH Notation			CO2, CO4
B		Concepts of Queue, Operation on Queue, Representation of queues			CO2, CO4,
C		Other types of queue: Priority Queues, Deque and Circular queue.			CO4, CO6
<b>Unit 4</b>		<b>TREES AND GRAPH</b>			
A		Trees: Terminologies, Binary tree, Binary tree Representation, Applications			CO2, CO5
B		Binary Search Trees, Tree Traversals			CO2, CO5
C		Graphs: Terminology, Types, Traversal			CO2, CO5
<b>Unit 5</b>		<b>Algorithm and It's Analysis</b>			
A		Introduction : Algorithms, Properties of Algorithm, Analyzing algorithms, Complexity of algorithms			CO5, CO6
B		Growth of functions, Performance measurements, Asymptotic Notations and their properties, Mathematical analysis for Recursive and Non-recursive algorithms			CO5, CO6
C		Recurrences relations, Methods to solve recurrence relation: Substitution method, Recursion tree method, Iteration Method, Master Method			CO5, CO6
Mode of examination		Theory			
Weightage Distribution	CA	MTE	ETE		
	30%	20%	50%		
Text book/s*	1. Lipschutz, "Data Structures" Schaum's Outline Series, TMH				
Other References	1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein "Data Structures Using C and C++" , PHI 2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication				

	3. Jean Paul Trembley and Paul G. Sorenson, “An Introduction to Data Structures with applications”, McGraw Hill 4. R. Kruse et al, “Data Structures and Program Design in C”, Pearson Education 5. G A V Pai, “Data Structures and Algorithms”, TMH
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### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: <b>Define</b> the concepts of data structure, data type and ADT.	PO1, PO3, PSO1
2.	CO2: <b>Classify</b> and Compare operations like traversing, insertion, deletion, searching etc. on various data structures.	PO1, PO2, PSO1
3.	CO3: <b>Create</b> and Utilize approach for the application standard algorithms for searching and sorting.	PO2, PO4, PO9, PSO2
4.	CO4: <b>Compare</b> relationship among data structure to solve various problems.	PO2, PO3, PO4, PO5, PO9, PSO1, PSO2
5.	CO5: <b>Apply</b> various implementation on data structure such as stacks, queues, trees and graphs to solve various computing problems.	PO2, PO3, PO9, PSO1, PSO2
6.	CO6: <b>Test</b> and propose data structure that efficiently model the information in a problem	PO3, PO4, PO10., PSO1, PSO2

### **PO and PSO mapping with level of strength for Course Data Structures & Algorithms**

Course Code_ Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
Data Structures & Algorithms	CO1	2		3								3	
	CO2	3	2									2	
	CO3		3		2					3		3	
	CO4		3	2	2	1				3		3	3
	CO5		2	2						2		1	2
	CO6			1	2						2	3	2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2



Data Structures & Algorithms	2.5	2.5	2	2	1					2.67	2	2.5	2.33
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***Strength of Correlation***

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

## Syllabus for Discrete Structures Theory Courses

<b>School:</b>		<b>School of Engineering and technology</b>	
<b>Department</b>		<b>Department of Computer Science and Engineering</b>	
<b>Program:</b>		<b>BSC</b>	
<b>Branch:</b>			
1	Course Code	BC110	
2	Course Title	Discrete Structures	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Core	
5	Course Objective	This course provides a mathematical foundation for subsequent study in Computer Science, as well as developing the skills necessary to solve practical problems.	
6	Course Outcomes	After the completion of this course, students will be able to: CO-1. <b>Apply the</b> basic principles of sets and operations in sets. CO-2. <b>Classify</b> logical notation and determine if the argument is or is not valid. CO-3. <b>Construct</b> and prove models by using algebraic structures. CO-4. <b>Analyze</b> basic principles of Boolean algebra with mathematical description. CO-5. <b>Construct</b> Permutations and combinations in counting techniques and applications of Recurrence. CO-6. <b>Compose</b> computer programs in a formal mathematical manner.	
7	Course Description	The purpose of this course is to understand and use (abstract) discrete structures that are backbones of computer science. A basic understanding of discrete mathematical topics is fundamental for work in computer science. Many students of this course will find they have familiarity with some of the topics: for instance, truth tables, logical propositions, elements of set theory, as well as basic notions of functions and mathematical induction. In this course we will discover that logical propositions are the underlying model of discrete systems. From this modest beginning we develop algorithms and prove their efficacy. Topics include propositional and predicate logic, basic proof techniques, set algebra and Boolean algebra, recursion and induction and introductory combinatorics. The knowledge gained will be extremely useful in upper level of computer science classes.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction to Set Theory, Relations and Functions.</b>	
	A	Set Theory: Introduction, Combination of sets, Multi sets, ordered pairs, Set Identities.	CO1, CO6
	B	Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Order of relations.	CO1, CO6
	C	Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions.	CO1, CO6

	<b>Unit 2</b>	<b>Logics and Mathematical Induction</b>		
	A	Propositional Logic: Proposition, well formed formula, Truth tables, Tautology, Satisfiability, Contradiction,		
	B	Algebra of proposition, Theory of Inference, Natural Deduction.		
	C	Predicate Logic: First order predicate, well formed formula of predicate, quantifiers, Inference theory of predicate logic.		
	<b>Unit 3</b>	<b>Algebraic Structures</b>		
	A	Semigroup, Monoid, Groups, Abelian Group, Cyclic Groups, Sub-Algebraic Structures and order		
	B	Cosets , Lagrange's theorem, Normal Subgroups, Homomorphism's,		
	C	Definition and elementary properties of Rings and Fields, Integers Modulo n.		
	<b>Unit 4</b>	<b>Lattices and Applications</b>		
	A	Partial order sets: Definition, Partial order sets, Combination of partial order sets, Hasse diagram.		
	B	Definition, Properties of lattices – Bounded, Complemented, Modular and Complete Lattice, Morphisms of lattices.		
	C	Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra, Algebraic manipulation of Boolean expressions. Simplification of Boolean Functions, Karnaugh maps		
	<b>Unit 5</b>	<b>Number Theory and Recurrence Relation.</b>		
	A	Natural Numbers: Introduction, Mathematical Induction, Variants of Induction, Induction with Nonzero Base cases.		
	B	Combinatory: Introduction, Counting Techniques, Pigeonhole Principle		
	C	Recurrence Relation & Generating function: Recursive definition of functions, Recursive algorithms, Method of solving recurrences.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1) <i>I. C. L. Liu, Elements of Discrete Mathematics, second edition 1985, McGraw-Hill Book Company. Reprinted 2000.</i> 2) Jean Paul Trembley, R Manohar, "Discrete Mathematical Structures with Application to Computer Science", McGraw-Hill. 3) <i>K. H. Rosen, Discrete Mathematics and applications, fifth edition 2003, Tata McGraw Hill Publishing Company.</i>		
	Other References	1) <i>J.L. Mott, A. Kandel, T.P .Baker, Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India.</i>		

	2) <i>W.K. Grassmann and J.P.Tremblay, Logic and Discrete Mathematics, A Computer Science</i>
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**PO and PSO mapping with level of strength Discrete Structures, CO and PO Mapping**

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1: Apply</b> the basic principles of sets and operations in sets.	<b>PO1,PO4 ,PSO2</b>
2.	<b>CO2: Classify</b> logical notation and determine if the argument is or is not valid.	<b>PO3,PSO2</b>
3.	<b>CO3: Construct</b> and prove models by using algebraic structures.	<b>PO3,PO4,PSO3,PSO4</b>
4.	<b>CO4: Analyze</b> basic principles of Boolean algebra with mathematical description.	<b>PO1, PO4, PSO3</b>
5.	<b>CO5: Construct</b> Permutations and combinations in counting techniques and applications of Recurrence.	<b>PO1, PSO2</b>
6	<b>CO6: Compose</b> computer programs in a formal mathematical manner.	<b>PO3, PO4, PO5,PSO4,PSO5</b>

**PO and PSO mapping with level of strength OF BCO110\_Discrete structure (CO-PO AND CO-PSO MAPPING )**

	PO 1:	PO 2:	PO 3:	PO 4:	PO 5:	PO 6:	PO 7:	PO 8:	PO 9:	PO 10:	PS O1:	PS O2:
	Computing knowledge	Problem Analysis and Design of solutions	Modern tool usage	Technical Skill Development	Societal Concern	Environment and Sustainability	Ethics	Individual and teamwork	Communication	Life-long learning	Multi-media Applications	Application Development
<b>CO1</b>	3	3	2	1	1	1	1	2	1	3		2
<b>CO2</b>	3	3	2	2	1	1	1	2	1	3		2
<b>CO3</b>	3	3	1	2	1	1	1	2	1	2		3
<b>CO4</b>	3	2	1	1	1	1	1	2	1	2		2
<b>CO5</b>	3	3	2	2	1	1	1	2	1	3		3
<b>CO6</b>	2	2	2	2	1	1	1	2	1	3		3

*Average of non-zeros entry in following table (should be auto calculated).*

	<b>PO 1:</b>	<b>PO 2:</b>	<b>PO 3:</b>	<b>PO 4:</b>	<b>PO 5:</b>	<b>PO 6:</b>	<b>PO 7:</b>	<b>PO 8:</b>	<b>PO 9:</b>	<b>PO 10:</b>	<b>PS O1:</b>	<b>PS O2:</b>
	<b>Com puti ng kno wled ge</b>	<b>Prob lem Anal ysis and Desi gn of solu tions</b>	<b>Mod ern tool usag e</b>	<b>Tech nical Skill Deve lopment</b>	<b>Soci etal Con cern</b>	<b>Envi ron ment and Sust aina bilit y</b>	<b>Ethi cs</b>	<b>Indi vidu al and team wor k</b>	<b>Com mun icati on</b>	<b>Lif e- long lear ning</b>	<b>Mult imed ia Appl icati ons</b>	<b>Appl icati on Deve lop ment</b>
BC A17 0_Di scree ate struc ture	<b>2.8 3</b>	<b>2.6 7</b>	<b>1.6 7</b>	<b>1.6 7</b>	<b>1.0 0</b>	<b>1.0 0</b>	<b>1.0 0</b>	<b>2.0 0</b>	<b>1.0 0</b>	<b>2.6 7</b>		<b>2.5 0</b>

***Strength of Correlation***

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

## Operating Systems

<b>School: SET</b>		<b>Batch :2020</b>	
<b>Program: B.Sc</b>		<b>Current Academic Year: 2020-20</b>	
<b>Branch: CS/IT</b>		<b>Semester: III</b>	
1	Course Code	BCO111	
2	Course Title	Operating Systems	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Non Elective	
5	Course Objective	<ol style="list-style-type: none"> <li>1. Provide students with an overview of the application and requirements of Operating system</li> <li>2. Gain insight into the challenges and limitations of resource management</li> <li>3. Provide the students with practice on applying algorithms</li> <li>4. Prepare students understand the principles of design of operating system</li> <li>5. Enhance students skills to operate multi user multi-tasking operating system</li> </ol>	
6	Course Outcomes	Students will be able to: <b>CO1:</b> To understand and implement algorithms in resource allocation and utilization. <b>CO2:</b> To Understand the strengths and weaknesses of the algorithms. <b>CO3:</b> To identify the challenges and apply suitable algorithms for them. <b>CO4:</b> To implement tools and utility of operating system. <b>CO5:</b> Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems <b>CO 6:</b> Measure, evaluate, and compare OS components through instrumentation for performance analysis	
7	Course Description	This course introduces the requirement and utilization of operating system encompassing the principles to design operating systems, identify the challenges and choose the relevant and algorithms to apply.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>	
	A	Operating System Concepts and functions, Comparison of different Operating system. Open-Source Operating Systems.	CO1, CO2
	B	Types of Operating Systems (Batch,	CO1, CO2

		Multiprogramming, Multi Tasking)			
C		Operating System Services, System Boot			CO1, CO2
<b>Unit 2</b>					
A		<b>Process Management</b> Process Concepts (PCB, Process States , Process Operations),			CO1, CO2,CO4
B		CPU Scheduling: Concept , Types of schedulers( Short term, Long term, Middle term), Dispatcher,			CO1, CO2,CO4
C		Performance Criteria CPU Scheduling Algorithms( FCFS, SJF, Priority, Round Robin, Multilevel Queue, Multilevel feedback Queue)			CO1, CO2,CO4
<b>Unit 3</b>		<b>Deadlock Handling</b>			
A		Race condition, Critical sections, Mutual exclusion,			CO1,CO2
B		Deadlock concepts& Handling Techniques: Avoidance, Prevention			CO1,CO3
C		Deadlock Detection & Recovery			CO4
<b>Unit 4</b>		<b>Memory Management</b>			
A		Memory Hierarchy, Memory Management technique: Paging			CO1
B		Segmentation, Paged segmentation			CO3
C		Virtual memory concept, demand paging, Page replacement algorithms(FCFS, Optimal, LRU)			CO1
<b>Unit 5</b>		<b>File and Disk Management</b>			
A		Disk structure, Disk scheduling (FCFS,SSTF, SCAN, LOOK,C-SCAN, C-LOOK).			CO2,CO3
B		File Concept, File operations, File Directories			CO1,CO2,CO3
C		Using process & file handling Linux commands.			CO1,CO2,CO3
Mode of examination		Theory			
Weightage Distribution	CA	MTE	ETE		
	30%	20%	50%		
Text book/s*	1. Silberschatz G, Operating System Concepts, Wiley				
Other References	1. W. Stalling, “Operating System”, Maxwell Macmillan 2. Tannenbaum A S, Operating System Design and Implementation, Prentice Hall India				

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> To understand and implement algorithms in resource allocation and utilization.	PO1,PO2,PO3,PO4,PSO1
2.	<b>CO2:</b> To assess the strengths and weaknesses of the algorithms.	PO1, PO3, PO4, PSO2
3.	<b>CO3:</b> To identify the challenges and apply suitable algorithms for them.	PO1,PO2,PO3,PO4
4.	<b>CO4:</b> To implement tools and utility of operating system.	PO9, PO10
5.	<b>CO5:</b> Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems	PO1,PO2,PO3,PO4, PO9, PO10
6.	<b>CO 6:</b> Measure, evaluate, and compare OS components through instrumentation for performance analysis	PO1,PO2,PO3,PO4, PO9, PO10

### **PO and PSO mapping with level of strength for Course Name Introduction to operating systems (Course Code BCO111 )**

C S E	Cos	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PSO	PSO
		1	2	3	4	5	6	7	8	9	0	1	2
	CO1	3	3	3	3	--	--	--	2	2	1	3	2
	CO2	3	2	3	3	--	--	--	2	2	2	2	3
	CO3	3	3	3	3	--	--	--	1	1	1	3	2
	CO4	2	2	2	2	1	--	--	2	3	3	2	2



<b>School:</b>		<b>School of Engineering and technology</b>		
<b>Department</b>		<b>Department of Computer Science and Engineering</b>		
<b>Program:</b>		<b>Bachelor Of Science</b>		
<b>Branch:</b>		<b>Computer Science</b>		
1	Course Code	BCO 301		
2	Course Title	Introduction to OOP using Java		
3	Credits	4		
4	Contact Hours (L-T-P)	3-1-0		
	Course Status	Core /Elective/Open Elective		
5	Course Objective	Understand the fundamentals of object-oriented concept in Java, defining classes, objects, invoking methods inheritance, interfaces and exception handling mechanisms.		
6	Course Outcomes	CO1: Describe the fundamental of object oriented concept in java. CO2: Compare and contrast different features of java. CO3: Develop programs using core concepts of java. CO4: Analyze Exception and Error in java programs CO5: Explain the concept of inheritance, polymorphism and interfaces. CO6: Design application of real world problem using Java.		
7	Course Description	Basic Object Oriented Programming (OOP) concepts, including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are introduced and their implementations using Java are discussed.		
8	Outline syllabus			CO Mapping
	<b>Unit 1</b>	<b>Introduction to Object Oriented Paradigm</b>		
	A	Procedural Languages, object based languages, object oriented languages, difference between programming paradigms, advantages of OOPs.		CO1, CO2
	B	Object oriented programming features: Abstraction, class, object, Encapsulation, data hiding, polymorphism, inheritance		CO2
	C	Java virtual machine, Byte Code, Architecture of JVM, Class Loader, Execution Engine, Garbage collection,		CO2
	<b>Unit 2</b>	<b>Introduction to Java</b>		
	A	Java development Kit (JDK), Introduction to IDE for java development, Setting java environment (steps for path and CLASSPATH setting)		CO2
	B	Constants, Variables, Data Types, Operators, Expressions, Decision Making,		CO2

	C	Branching, Loops, command line argument		CO2
	<b>Unit 3</b>	<b>Introducing class &amp; object</b>		
	A	Arrays, Type conversion & casting, Input from keyboard, Classes, Objects, Methods		CO1,CO2,C O3
	B	Method overloading, Constructors, Constructors overloading, static keyword		CO1,CO2,C O3
	C	Introducing Access Control, String handling		CO1,CO2,C O3
	<b>Unit 4</b>	<b>Inheritance &amp; Polymorphism</b>		
	A	Types of inheritance, Implementing Interface, Concept of multiple inheritances		CO5
	B	Use of this and super, Polymorphism, Overriding methods		CO5
	C	Final class, method and variable, Abstract class and method		CO5
	<b>Unit 5</b>	<b>Exception and Multithreading</b>		
	A	Introduction to Exception Handling, Introduction to try, catch, Finally		CO4,CO5,C O6
	B	throw and throws, Checked and Unchecked exceptions, User define exception		CO4,CO5,C O6
	C	Introduction to Multithreading: multithreading advantages and issues, Creating thread using Runnable interface and Thread class, Thread life cycle.		CO4,CO5,C O6
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA 30%	MTE 20%	ETE 50%
	Text book/s*	1.Schildt H, "The Complete Reference JAVA2", TMH		
	Other References	1. Balagurusamy E, "Programming in JAVA", TMH 2. Professional Java Programming: BrettSpell, WROX Publication		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1:Describe the fundamental of object oriented concept in java.	PO3,PO10
2.	CO2: Compare and contrast different features of java.	PO3,PO10
3.	CO3: Develop programs using core concepts of java.	P01,PO2,PO3,PO4,PO10
4.	CO4:Analyze Exception and Error in java programs	PO3,PO10
5.	CO5: Explain the concept of inheritance ,polymorphism and interfaces.	PO3,PO10
6.	CO6:Design application of real world problem using Java.	PO1,PO2,PO3,PO4,PO5,PO6 ,PO8,PO10,PSO1,PSO2

**PO and PSO mapping with level of strength for Course Name Introduction to OOP using Java (Course CodeBCO-301)**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
Introduction to OOP using Java _BCO-301	CO1			2							2		
	CO2			2							2		
	CO3	2	3	2	2						2		
	CO4			2							2		
	CO5			2							2	2	1
	CO6	2	3	2	3	3	2		3		2	2	2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCO 301	Introduction to OOP using Java	2	3	2	2.5	3	2	0	3	0	2	2	1.5

***Strength of Correlation***

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

<b>School: SET</b>		<b>Batch: 2020-2022</b>	
<b>Program: BSc</b>		<b>Current Academic Year: 2020-19</b>	
<b>Branch: CSE</b>		<b>Semester:III</b>	
1	Course Code	BOL111	
2	Course Title	BOL111_Operating Systems Using Linux Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	Introduces the UNIX/Linux operating system, including: task scheduling and management, memory management, input/output processing, internal and external commands, shell configuration, and shell customization. Explores the use of operating system utilities such as text editors, electronic mail, file management, scripting, and C/C++ compilers	
6	Course Outcomes	On completion of this course the student should be able to: <ol style="list-style-type: none"> <li>1. To Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.</li> <li>2. To accomplish typical personal, office, technical, and software development tasks.</li> <li>3. To Analyze system performance and network activities. Effectively use software development tools including libraries, preprocessors, compilers, linkers, and make files.</li> <li>4. Comprehend technical documentation, prepare simple readable user documentation and adhere to style guidelines.</li> <li>5. Analyze various utilities to structure the Linux Program</li> <li>6. Implement the Linux utilities to successfully write a program</li> </ol>	
7	Course Description	This courses introduces Linux Operating System	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Practical based on Basic Linux Commands</b>	CO1, CO2, CO4
		Introduction to Unix, Unix architecture, Features of Unix, Internal & External Commands, Basic unix commands: pwd, cd, mkdir, rmdir, ls, help, man, whatis	
	<b>Unit 2</b>	<b>Practical based on File Management</b>	CO1, CO2. CO3, CO4
		Unix file system, file permission, file handling commands: cat, touch, cp, rm, mv, more/less, lp, wc, cmp, diff, comm.,dos2unix & unix2dos, gzip&gunzip, zip & unzip, tar	
	<b>Unit 3</b>	<b>Practical based on process Management</b>	CO2, CO3, CO4
		Process basics: PID, PPID, ps, process states, zombies, foreground	

		and background processes, nice, kill.			
	<b>Unit 4</b>	<b>Practical Based on Filters</b>			CO2, CO3, CO4
		Simple filters: pr, head, tail, cut, paste, sort, nl, tr,grep			
	<b>Unit 5</b>	<b>Practical Based on Shell Scripting</b>			CO1, CO2, CO3, CO4, CO6
		Shell scripts, execution of shell scripts, using command line arguments, loops , condition			
	Mode of examination	Jury/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	1. Sumitabha Das, “Unix Concepts and Applications”, Tata McGraw Hill.			
	Other References	1. Unix Shell programming by Stephen G. Kochan and Patric Wood 2. Unix and shell programming by Richard F. Gilberg and Behrouz A. forouzan			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1:- To Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.	PO1,PO2,PO3,PO4,PSO1
2.	CO2:-To accomplish typical personal, office, technical, and software development tasks.	PO1, PO3, PO4, PSO2
3.	CO3:-To Analyze system performance and network activities. Effectively use software development tools including libraries, preprocessors, compilers, linkers, and make files.	PO1,PO2,PO3,PO4
4.	CO4:-Comprehend technical documentation, prepare simple readable user documentation and adhere to style guidelines.	PO9, PO10, PSO2
5.	CO5:-Analyze various utilities to structure the Linux Program	PO1,PO2,PO3,PO4, PO9, PO10, PSO2
6.	CO6:-Implement the Linux utilities to successfully write a program	PO3,PO4, PO9, PO10, PSO2

**PO and PSO mapping with level of strength for Course Name BOL111\_Operating Systems**  
 Using Linux Lab

	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	CO1	3	3	3	3	--	--	--	2	2	1	3	2
	CO2	3	2	3	3	--	--	--	2	2	2	2	3
	CO3	3	3	3	3	--	--	--	1	1	1	3	2
	CO4	2	2	2	2	1	--	--	2	3	3	2	2
	CO5	2	2	2	2	1	--	--	2	3	3	2	2
	CO6	2	2	2	2	1	--	--	2	3	3	2	2

<b>School:</b>		<b>School of Engineering and technology</b>	
<b>Department</b>		<b>Department of Computer Science and Engineering</b>	
<b>Program:</b>		<b>Bachelor of Science</b>	
<b>Branch:</b>		<b>BSC</b>	
1	Course Code	<b>BOL360</b>	
2	Course Title	Introduction to OOP using Java Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory/Elective	
5	Course Objective	To implement Java language syntax and semantics and concepts such as classes, objects, inheritance, polymorphism, packages and multithreading.	
6	Course Outcomes (must be 6 COs, following verbs given in Bloom's Taxonomy)	CO1: Installing, Writing and executing Java programs CO2: Understand and formulate the problems in basic programming constructs CO3: Applying OOP concepts to solve real world problems CO4: Implement inheritance and polymorphism features of Java CO5: Implementing multithreading to enhance efficiency and handle run time errors CO6: Develop Java programs for application development	
7	Course Description	Basic Object Oriented Programming (OOP) concepts including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are discussed.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Jdk installation and simple Java Programs</b>	
		Installing jdk, setting path, Installation and uses of IDE, Writing simple Java, programs, program execution, JVM, byte code, platform independency	CO1
	<b>Unit 2</b>	<b>Basic Java Programs</b>	
		Programs on different datatypes, type casting, operators, Programs using if .. else, switch .. case statements, Programs using for, while, do .. while loop control structures, break and continue, command line arguments.	CO2, CO3
	<b>Unit 3</b>	<b>Inroducing class &amp; object</b>	
		Programs to define classes, create objects, accessing members of a class through objects, method overloading. Programs to define constructors, initializing instance variables, constructor	CO2, CO3

		overloading.Programs on string handling			
	<b>Unit 4</b>	<b>Inheritance &amp; Polymorphism</b>			
		Programs on single, multilevel, hierarchical inheritance,Programs to use super, method overriding,Programs to use final variables, methods and classes, use abstract classes and interfaces.			CO3,CO4,CO6
	<b>Unit 5</b>	<b>Exception and Multithreading</b>			
		Programs to use try.. catch.. finally for exception handling,Programs to throw user defined exceptions, uses of throws.Programs to create multiple threads by extending Thread class and implementing Runnable interface.			CO3,CO5,CO6
	Mode of examination	Jury/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	1.Schildt H, “The Complete Reference JAVA2”, TMH			
	Other References	3. Balagurusamy E, “Programming in JAVA”, TMH Professional Java Programming: BrettSpell, WROX Publication			

**PO and PSO mapping with level of strength for Course Name Introduction to OOP using Java Lab (Course Code BOL360)**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
<b>BOL360</b> Introducti on to OOP using Java Lab	CO1	1			2	2					2		2	2		
	CO2	2			2	2					2			2		
	CO3	2	3	3	3	2					2		2	3		
	CO4	3			3	2					2			2	2	
	CO5	3			3	2					2			2	2	
	CO6	3	3	3	3	2					2		3	3	2	

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BOL 360	Introduction to OOP using Java Lab	2.5	3	3	2.5	3	0	0	0	0	2	2.5	2

**Strength of Correlation**

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*



## List of Experiments

Unit No	S.No	Name of the Practical
1	1.1	Write a Java program to print 'Hello' on screen and then print your name on a separate line
	1.2	Write a Java program to print the sum (addition), multiply, subtract, divide and remainder of two numbers.
2	2.1	Write a Java program to accept a number and check the number is even or not. Prints 1 if the number is even or 0 if the number is odd.
	2.2	Write a Java program that accepts three integers from the user and return true if the second number is greater than first number and third number is greater than second number. If "abc" is true second number does not need to be greater than first number.
3	3.1	Write a Java program to find the maximum occurring character in a string
	3.2	Write a Java program to find first non repeating character in a string.
	3.3	Write a program in java to demonstrate method overloading
4	4.1	Write a program in java to demonstrate multilevel inheritance in java.
	4.2	Write a java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.
5	5.1	Write a program that creates a user interface to perform integer division. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 and Num2 were not integers, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.
	5.2	Write a java program that implements a multi-thread application that has three threads. First hread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number

<b>School:</b>	<b>School of Engineering and technology</b>	
<b>Department</b>	<b>Department of Computer Science and Engineering</b>	
<b>Program:</b>	<b>B.Tech</b>	
<b>Branch:</b>	<b>Computer Science</b>	
1	Course No.	HMM111
2	Course Title	<b>Human Value and Ethics</b>
3	Credits	2
4	Contact Hours (L-T-P)	(2-0-0)2
5	Course Objective	To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence
6	Course Outcomes	<p><b>On a successful completion of this course students will be able to</b></p> <ol style="list-style-type: none"> <li>1. Understand that the technical education without study of human values can generate more problems than solutions.</li> <li>2. Define the principles and ideals, which help in making the judgement of what is more important.</li> <li>3. See that 'I' and 'Body' are two realities, and most of their desires are related to 'I' and not body, while their efforts are mostly centered on the fulfilment of the needs of the body assuming that it will meet the needs of 'I' too.</li> <li>4. Appreciate the importance of harmony in the self, family and the society for mutual fulfilment.</li> <li>5. Understand the importance of harmony among human beings, other living beings and entire nature for universal equilibrium and mutual co-existence.</li> <li>6. Know and practice the ethical approach in profession for continuous happiness and sustained prosperity.</li> </ol>
7	Outline of syllabus:	
<b>7.01</b>	<b>Unit A</b>	<b>The Need and Process for Value Education</b>
7.02	Unit A Topic 1	The need, basic guidelines, content and process for Value Education
7.03	Unit A Topic 2	Concept of 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration; Continuous Happiness and Prosperity- A look at basic Human Aspirations
7.04	Unit A Topic 3	Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority
<b>7.05</b>	<b>Unit B</b>	<b>Understanding Harmony in the Human Being - Harmony in Myself</b>
7.06	Unit B Topic 1	Human being as a co-existence of the sentient 'I' and the material 'Body'
7.07	Unit B Topic 2	The needs of Self ('I') and 'Body' ; Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
7.08	Unit B Topic 3	The characteristics and activities of 'I' and harmony in 'I' ; Understanding the harmony of I with the Body: Correct appraisal of Physical needs, meaning of Prosperity in detail
<b>7.09</b>	<b>Unit C</b>	<b>Harmony in the Family and Society</b>
7.10	Unit C Topic 1	Values in human-human relationship; Trust and Respect as the

		foundational values of relationship
7.11	Unit C Topic 2	Understanding the meaning of Trust; Difference between intention and competence; The meaning of Respect; Difference between respect and differentiation; the other salient values in relationship
7.12	Unit C Topic 3	Harmony in the society (society being an extension of family; Visualizing a universal harmonious order in society - from family to world family
<b>7.13</b>	<b>Unit D</b>	<b>Harmony in the Nature and Existence</b>
7.14	Unit D Topic 1	The harmony in the Nature
7.15	Unit D Topic 2	Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature
7.16	Unit D Topic 3	Understanding Existence as Co-existence of mutually interacting units in all-pervasive space
<b>7.17</b>	<b>Unit E</b>	<b>Competence in professional ethics</b>
7.18	Unit E Topic 1	Ability to utilize the professional competence for augmenting universal human order
7.19	Unit E Topic 2	Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
7.20	Unit E Topic 3	Ability to identify and develop appropriate technologies and management patterns for above production systems.
8	Course Evaluation	
8.1	Course work: 30 marks	
8.11	Attendance	None
8.12	Homework	4 assignments, no weight
8.13	Quizzes/Class Tests	Two
8.14	Projects	None
8.15	Presentations	None
8.16	Any other	None
8.2	MTE	one, 20 marks
8.3	End-term examination: 50 marks	
9.1	Text books	1. R.R Gaur, R Sangal, G P Bagaria, "A foundation course in Human Values and professional Ethics", Excel books, New Delhi
9.2	Other references	1. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. 2. A.N. Tripathy, 2003, Human Values, New Age International Publishers. 3. PL Dhar, RR Gaur, Science and Humanism, Commonwealth Purblishers.

### Mapping of Outcomes vs. Topics

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO 3
<b>HMM 111</b>	CO1	1	1	1	1	2	1	2			2	3	1	1	3	
	CO2	1	3	2	2	1	3	1	1	2		3	3	2	2	1
	CO3		2	2	2		2	2		1		1		1	3	2
	CO4	1		1	2	3				2	3		2			1
	CO5		3		1	2	3	2	1		2	2	1	3	1	
	CO6	2		1			1			1	1				2	3

# TERM-III

<b>School: SET</b>		<b>Batch : 2020-19</b>	
<b>Program:</b>		<b>Current Academic Year: 2020-19</b>	
<b>Branch: CSE</b>		<b>Semester: III</b>	
1	Course Code	<b>ARP203</b>	Course Name : <b>Aptitude Reasoning and Business Communication Skills-Basic</b>
2	Course Title	<b>: Aptitude Reasoning and Business Communication Skills-Basic</b>	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
Course Status			
5	Course Objective	To enhance holistic development of students and improve their employability skills. To provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To step up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a student will have entered the threshold of his/her 1 <sup>st</sup> phase of employability enhancement and skill building activity exercise.	
6	Course Outcomes	<p>CO1: <i>At the end of the session this activity will help to ascertain a student's skill and competency level which will lead to effective mapping of his skills and competencies and an effective training need identification and training need analysis model can be drawn</i></p> <p>CO2: <i>At the end of the session a student will have a heightened sense of self awareness, raised levels of self-esteem &amp; self-effectiveness, will have developed a positive mental frame of mind helping a student become more evolved in his/her life .</i></p> <p>CO3: <i>At the end of the session the program would have instilled positive thinking and professional ethics in students and reinforce positive attitude building</i></p> <p>CO4: <i>At the end of the session a student would have learned how to build positive emotional competence in self and learn GOAL Setting and SMART Goals technique</i></p> <p>CO5: <i>At the end of the session a student would have enhanced LSRWG and P (Listening Speaking Reading Writing Grammar and Pronunciation)   Verbal Abilities - 1</i></p> <p>CO6: <i>At the end of the session a student would have Understanding of AMCAT + ELITMUS Study patterns for Quantitative aptitude and Logical   Analytical Reasoning</i></p>	
7	Course Description	This Level 1 blended training approach equips the students for Industry employment readiness and combines elements of soft skills and numerical abilities to achieve this purpose.	
8	Outline syllabus – ARP 203		
	<b>Unit 1</b>	<b>BELLS ( Building Essential Language and Life Skills)</b>	<b>CO Mapping</b>
	A	<i>Know Yourself: Core Competence. A very unique and interactive approach through an engaging questionnaire to ascertain a student's current skill level to design, architect and expose a student to the right syllabus as also to identify the correct TNI/TNA levels of the student.</i>	CO1
	B	Techniques of Self Awareness   Self Esteem & Effectiveness  Building Positive Attitude   Building Emotional Competence	CO2
	C	Positive Thinking & Attitude Building   Goal Setting and SMART Goals – Milestone Mapping   Enhancing L S R W G and P (Listening Speaking Reading Writing Grammar and Pronunciation)   Verbal Abilities - 1	CO3,CO4,CO5
	<b>Unit 2</b>	<b>Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical</b>	
	A	Sylogism   Letter Series   Coding, Decoding , Ranking & Their Comparison	CO6

		Level-1	
	B	Number Puzzles	C06
	C	Selection Based On Given Conditions	C06
	<b>Unit 3</b>	<b>Quantitative Aptitude</b>	C06
	A	Number Systems Level 1   Vedic Maths Level-1	C06
	B	Percentage ,Ratio & Proportion   Mensuration - Area & Volume  Algebra	C06
	<b>Weightage Distribution</b>	<i>Class Assignment/Free Speech Exercises / JAM – 60%   Group Presentations/Mock Interviews/GD/ Reasoning, Quant &amp; Aptitude – 40%</i>	
	<b>Text book/s*</b>	<i>Wiley's Quantitative Aptitude-P Anand   Quantum CAT – Arihant Publications   Quicker Maths- M. Tyra   Power of Positive Action (English, Paperback, Napoleon Hill)   Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon   Goal Setting (English, Paperback, Wilson Dobson</i>	

**Syllabus: BCO 207 Database management System**

<b>School: SET</b>		<b>Batch : 2020</b>	
<b>Program: BSc</b>		<b>Current Academic Year: 2020-20</b>	
<b>Branch:CSE</b>		<b>Semester:4</b>	
1	Course Code	BCO 207	Course Name:B.Sc.
2	Course Title	<b>Database Management Systems</b>	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	<b>The objective of this course is to:</b> <ol style="list-style-type: none"> <li>1. To learn about basic concepts of databases, terms,</li> <li>2. Introduce students to build data base management systems</li> <li>3. Apply DBMS concepts to various examples and real life applications</li> </ol>	
6	Course Outcomes	<b>At the end of the course student will be able to:</b> <b>CO1:</b> Explain the basics concepts of data base. <b>CO2:</b> Demonstrate the knowledge of databases to E-R modelling. <b>CO3:</b> Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respective data. <b>CO4:</b> Apply normalization techniques to reduce redundancy from the database. <b>CO5:</b> To appraise the basic issues of Transaction processing, Serializability & concurrency control <b>CO6:</b> Design & develop database for real life problems	
7	Course Description	This course introduces basic aspects of data bases	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>INTRODUCTION TO DATABASES</b>	
	A	Concept & Overview of DBMS, Traditional method vs Modern method of DBMS, Data Models	CO1
	B	Database languages, Database Administrator, Database Users	
	C	Three Schema architecture of DBMS, Data Models ,Hierarchical, Network Data Modelling	
	<b>Unit 2</b>	<b>INTRODUCTION TO ENTITY–RELATIONSHIP (ER) MODEL</b>	
	A	Relational data model concepts, Concept of keys,Entity Types, Entity Sets, Attributes, and Keys	CO1, CO2,CO6
	B	Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types	

	C	Refining the ER Design for the COMPANY Database, ER Diagrams, Naming Conventions, and Design Issues.			
	<b>Unit 3</b>	<b>INTRODUCTION TO SQL</b>			
	A	Overview of the SQL Query Languages Data Definition ,			CO1,CO3
	B	Basic Structure of SQL Queries, Additional Basic Operations			CO1,CO3
	C	Set Operations , Null Values, Aggregate Functions			CO1,CO3
	<b>Unit 4</b>	<b>NORMALIZATION IN DESIGN OF DATABASES</b>			
	A	Functional Dependency, Different anomalies in designing a Database, loss less join decompositions			CO1,CO4
	B	Normalization first, second and third normal forms, Boyce Codd normal form(BCNF)			CO1,CO4
	C	Multi-valued dependencies, fourth normal forms			CO1,CO4
	<b>Unit 5</b>	<b>TRANSACTION MANAGEMENT</b>			
	A	Transaction processing system, schedule and recoverability, Testing of serializability,			CO1,CO5
	B	Serializability of schedules, Conflict & view serializable schedule,			CO1,CO5
	C	Recovery from transaction failures,, Concurrency Control, Two-Phase Locking Techniques for Concurrency Control			CO1,CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	<ol style="list-style-type: none"> <li>1. Korth , Silberschatz&amp; Sudarshan, Data base Concepts, Tata McGraw-Hill</li> <li>2. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education Inc.</li> </ol>			
	Other References	<ol style="list-style-type: none"> <li>1. Thomas Connolly, Carolyn Begg, Database Systems: A Practical Approach to design, Implementation and Management, Pearson Education, Latest Edition.</li> <li>2. Jeffrey D. Ullman, Jennifer Windon, A first course in Database Systems, Pearson Education.</li> <li>3. Date C.J., An Introduction to Database Systems, Addison Wesley.</li> <li>4. Richard T. Watson, Data Management: databases and organization, Wiley.</li> </ol>			



### CO and PO Mapping

S. No.	Course Outcome(CO)	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	Understand the basics concepts of data base.	PO1,PO4,PO8,PO9,PO10
2.	Acquire the knowledge of databases to E-R modelling.	PO1, PO2, PO4, PO8,PO10
3.	Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respective data.	PO1, PO2, PO3,PO4,PO8,PO10
4.	Learn the basic concept of normalization & apply them to reduce redundancy from the database .	PO1,PO2,PO3,PO4,PO8
5	To appraise the basic issues of Transaction processing ,Serializability& concurrency control	PO1,PO2,PO3,PO4,PO10
6	Design & develop database for real life problems	PO1,PO2,PO3,PO4,PO5,PO6,PO9,PO10,PSO1,PSO2

### PO and PSO mapping with level of strength for Course Name:

\ Database Management Systems (Course Code BCO 207)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	Computing knowledge	Problem Analysis and Design of solutions:	Modern tool usage:	Technical Skill Development	Societal Concern:	Environment and Sustainability:	Ethics	Individual and team work:	Communication	Life-long learning:	Computer Science	Information Technology
CO1	3	-	-	3	-	-	-	2	2	3	-	-
CO2	3	3	-	3	-	-	-	3	-	2	-	-
CO3	3	3	3	3	-	-	-	3	-	2	-	-
CO4	2	2	2	3	-	-	-	2	-	-	-	-
CO5	2	2	2	3	-	-	-	-	-	2	-	-
CO6	2	3	3	3	2	2	2	3	3	3	2	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code/ Name	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
BCO207/ DBMS	2.5	2.6	2.5	3	2	2	2	2.6	2.5	2.4	2	2

**Strength of Correlation:** 1. Addressed to *Slight (Low=1) extent* 2. Addressed to *Moderate (Medium=2) extent*

## Syllabus for Problem solving using Python Programming

<b>School:</b>		<b>School of Engineering and technology</b>		
<b>Department</b>		<b>Department of Computer Science and Engineering</b>		
<b>Program:</b>		BSC		
<b>Branch:</b>				
1	Course Code	BCO210		
2	Course Title	Problem solving using Python Programming		
3	Credits	3		
4	Contact Hours (L-T-P)	3	0	0
Course Status		Core /Elective/Open Elective		
5	Course Objective	<p>The objective of this course is to:</p> <ul style="list-style-type: none"> <li>• Explain the basic syntax of Python Program</li> <li>• Explain various programming constructs –data types, decision structures, control structures in python</li> <li>• Know how to use in-built data structures in python – Lists, Tuples, Dictionary</li> <li>• Know how to use libraries for string manipulation and File handling</li> </ul> <p>Learn the fundamental principles of Object-Oriented Programming</p> <p>Using such knowledge small project can be made</p>		
6	Course Outcomes	<p><b>At the end of this course students will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Demonstrate the fundamentals of python</li> <li>2. Analyze and implement the concept of python data structure</li> <li>3. Design function for a problem using python programming</li> <li>4. Formulate the understanding of file handling</li> <li>5. Discuss and implement the OOPs concept</li> <li>6. Create accurate logical solution of any given problem</li> </ol>		
7	Course Description	<p>This course starts with an introduction to Python, History of Python and basics syntax for writing Python Program. As the course progresses the study of decision structure, control structure and in-built data structure are studied in detail. This course mainly focuses on OOPs concepts. This course also deals with File handling, and Module concept.</p>		
8	Outline syllabus			CO Mapping
	<b>Unit 1</b>	<b>Introduction to Python</b>		
	A	History, Features, Working with Python, Installing Python, basic syntax to write a program, The concept of		CO1

		data types		
	B	Variables, Constants, Identifiers, keywords, Arithmetic and Logical operators and Boolean expressions. Debugging, comments in the program		CO1
	C	Conditional Statements : If, If-else, Nested if-else; Looping: For, While, Nested loops; Control Statements: Break, Continue, Pass		CO1
	<b>Unit 2</b>	<b>Lists, Tuples and Dictionaries</b>		
	A	Lists; Creation, Attributes, Accessing, Operations, Searching and sorting in Lists; Linear, Binary; Bubble, Selection, Insertion		
	B	Tuple; Accessing, operations, working with Tuples		
	C	Dictionaries; Notations, Accessing, Operations, Working with Dictionaries		
	<b>Unit 3</b>	<b>Functions, Recursion &amp;String</b>		
	A	Defining, Calling, Types of functions , Passing parameters with call by value and call by reference, Global and local variables		
	B	Recursion, Writing recursive functions, Factorial Using recursion , Fibonacci series Using Recursion		
	C	String; Accessing, Manipulation /Operation, String methods, Slicing.		
	<b>Unit 4</b>	<b>Module, File Handling &amp; Exception Handling</b>		
	A	Importing Module, Creating Module, Packages, Math and Random Module		
	B	Need of File Handling, Different modes of operation, Opening, Writing, Reading, Closing		
	C	Exception, Exception Handling, Try and Except clause, Finally clause,		
	<b>Unit 5</b>	<b>Object Oriented Programming Concepts</b>		
	A	Overview of OOP concepts, Class and objects, Attributes		
	B	Adding methods to a class, Passing an Object as Parameter to a method, Overloading; Method Overloading		
	C	Inheritance; Types of inheritance(single, Multiple, Multi-level)		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Tony Gaddis, Starting Out with Python, 3rd edition, Pearson		

	2. Y. Daniel Liang, Introduction to Programming Using Python, Pearson 3. Jason R .Briggs, Python For Kids, San Francisco 4. E Balagurusamy, Introduction to Computing & Problem solving Using Python, TMH
Other References	1. Downey, Allen B., Think Python: How to Think Like a Computer Scientist. O'Reilly, 2012. Obtain free PDF at <a href="http://www.greenteapress.com/thinkpython/">http://www.greenteapress.com/thinkpython/</a> 2. Python Programming: An Introduction to Computer Science (Second Edition) John Zelle, ISBN 978-1-59028-241-0-9, Franklin, Beedle & Associates Inc., 2003. 3. Budd T A, Exploring Python , 2011, Tata McGraw Hill Education

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	Demonstrate the fundamentals of python	PO 1, PO2,PO3,PO4,PO6,PO7,PO10,PSO1,PSO2
2.	Analyze and implement the concept of python data structure	PO 1, PO2,PO3,PO4,PO6,PO7,PO10,PSO1,PSO2
3.	Design function for a problem using python programming	PO 1, PO2,PO3,PO4,PO5, ,PO6,PO7,PO10,PSO1,PSO2
4.	Formulate the understanding of file handling	PO 1, PO2,PO3,PO4,PO5,PO6,PO7,PO10,PSO1,PSO2
5.	Discuss and implement the OOPs concept	PO 1, PO2,PO3,PO4,PO5,PO6,PO7,PO10,PSO1,PSO2
6.	Create accurate logical solution of any given problem	PO 1, PO2,PO3,PO4,PO5,PO6,PO7,PO10,PSO1,PSO2

### PO and PSO mapping with level of strength for Course Name Problem solving using Python Programming

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
Problem solving using Python Programming	CO1	1	1	1	1	-	2	2	-	-	2	1	1
	CO2	2	1	1	1	-	2	2	-	-	2	1	2
	CO3	1	2	1	2	-	2	2	-	-	2	2	2
	CO4	2	2	3	2	2	2	2	-	-	2	2	2
	CO5	2	2	2	2	2	2	2	-	-	2	2	2
	CO6	3	3	3	2	2	2	2	--	-	2	3	3

### Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
	Problem solving using Python Programming	1.8	1.8	1.8	1.6	1	2	2	-	-	2	1.83	2

**Syllabus for Electronic Commerce & Applications BCO211**

<b>School:</b>		<b>School of Engineering and technology</b>		
<b>Department</b>		<b>Department of Computer Science and Engineering</b>		
<b>Program:</b>		<b>B.SC</b>		
<b>Branch:</b>				
1	Course Code	<b>BCO211</b>		
2	Course Title	Electronic Commerce & Applications		
3	Credits	3		
4	Contact Hours (L-T-P)	3	0	0
Course Status		Core /Elective/Open Elective		
5	Course Objective	<p><b>Students will try to learn:</b></p> <ol style="list-style-type: none"> <li>1. Understand the basic working principles of information systems and enterprises</li> <li>2. Equip the students with preliminaries of technologies used in business information systems</li> <li>3. Familiarize students with the Business applications and e-commerce initiatives</li> <li>4. Enable the students to build decision support systems</li> </ol> <p>Enhance the knowledge of the student about the management Security challenges in IT sector</p>		
6	Course Outcomes	<p>After Successful completion of this course the student will be able to:</p> <p>CO1: Demonstrate the fundamentals of a computer based information systems and enterprises.</p> <p>CO2: Infer and interpret the technologies associated with business information systems</p> <p>CO3: Identify and analyze e-commerce initiatives in various Business applications using case studies and relate the use of such applications using support systems in enterprises.</p> <p>CO4: Categorize the Decision Support system and Strategic system</p> <p>CO5: Discover the various security control measures in IT sector</p> <p>CO6: Develop better understanding about latest ecommerce trend.</p>		
7	Course Description	The concept of electronic commerce, and to understand how electronic commerce is affecting business enterprises, governments, consumers and people in general		
8	Outline syllabus			CO Mapping
	<b>Unit 1</b>	<b>Introduction to Information Systems in Business</b>		
	A	The Fundamental Roles of Information Systems, Internet and		CO1

		Business			
	B	Globalization and Information Technology			CO1
	C	Components of an Information System, Types of Information Systems			CO1
	<b>Unit 2</b>	<b>Computer Hardware and Software</b>			
	A	Computer Hardware – Trends in Computer Systems, Storage Trends and Trade Offs;			CO2
	B	Computer Software – Software Suites and Integrated Packages, Programming Packages			CO2
	C	Business Telecommunication – Networking the Enterprise, Managing Organizational Change			CO2
	<b>Unit 3</b>	<b>e-commerce and Enterprise Collaboration</b>			
	A	Foundations of eCommerce, Business-to-Consumer eCommerce			CO3, CO6
	B	Business-to-Business eCommerce, Online Transaction Processing,			CO3, CO6
	C	Enterprise Collaboration, Groupware for Enterprise Collaboration, (Case studies)			CO3, CO6
	<b>Unit 4</b>	<b>Information Systems for Decision Support, Strategic Advantages</b>			
	A	Introduction, Decision Support Systems (DSS), Executive Information Systems			CO4
	B	Competitive Strategy Concepts, Strategic roles of Information Systems			CO4
	C	Challenges of Strategic Information systems, Sustaining strategic success			CO4
	<b>Unit 5</b>	<b>Management Security Challenges &amp; Controls</b>			
	A	Organization and Information Technology			CO5, CO6
	B	Security and Ethical Challenges: Information systems controls, its need, Audit information systems			CO5, CO6
	C	Ethical dimensions, Computer Crime, Societal solutions, you and ethical responsibility			CO5, CO6
	Mode of examination	Theory/Jury/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	1. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, E-Commerce: Fundamentals and Applications, John Wiley & Sons, 2003, ISBN : 9780471493037 2. James A O'Brien and George M Marakas, Management Information System, Tata McGraw Hill, 10th Edition, 2008, ISBN -13 : 978-1-25-902671-3, ISBN-10 : 1-25-902671-X			
	Other References	1. Kenneth C. Laudon, Jane P. Laudon, Management of Information Systems, Pearson, Dorling Kindersley(India)			

**CO and PO Mapping**

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Demonstrate the fundamentals of a computer based information systems and enterprises.	PO1,PO2,PO4,PO5,PO7,PO10,PSO1
2.	CO2: Infer and interpret the technologies associated with business information systems	PO1, PO2,PO3,PO4,PO5,PO7,PO10,PSO1
3.	CO3: Identify and analyze e-commerce initiatives in various Business applications using case studies and relate the use of such applications using support systems in enterprises.	PO1, PO2, PO3,PO4,PO5,PO7,PO10,PSO1,PSO2
4.	CO4: Categorize the Decision Support system and Strategic system	PO1, PO2,PO4,PO5,PO7,PO10,PSO1
5.	CO5: Discover the various security control measures in IT sector	PO1, PO2, PO3,PO4,PO5,PO7,PO10,PSO1,PSO2
6.	CO6: Develop better understanding about latest ecommerce trend	PO1, PO2, PO3,PO4,PO5,PO7,PO10,PSO1,PSO2

**PO and PSO mapping with level of strength for Course Name Electronic Commerce & Applications (Course Code BCO211)**

Course Code_ Course Name	CO's	PO										PSO	
		PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
Electronic Commerce & Applications	CO1	1	1	-	1	1		1	-	-	2	1	-
	CO2	1	1	2	2	2		2	-	-	1	1	-
	CO3	2	2	2	2	2		2	-	-	2	2	2
	CO4	2	1	-	1	1		2	-	-	1	1	-
	CO5	2	2	1	2	2		3	-	-	3	2	2
	CO6	2	2	2	1	2		2	-	-	2	2	2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCO211	Electronic Commerce & Applications	1.6	1.5	1.2	1.5	1.7	-	2			1.8	1.5	1

### *Strength of Correlation*

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*



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**Syllabus: BOL 207 Database management System Lab**


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<b>School: SET</b>		<b>Batch: 2020-2023</b>	
<b>Program: B.Sc.</b>		<b>Current Academic Year: 2020-2020</b>	
<b>Branch: CSE</b>		<b>Semester: IV</b>	
1	Course Code	<b>BOL 207</b>	
2	Course Title	Database Management System Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none"> <li>To Develop efficient SQL programs to access Oracle databases</li> <li>Build database using Data Definition Language Statements</li> <li>Perform operations using Data Manipulation Language statements like Insert, Update and Delete</li> </ul>	
6	Course Outcomes	<p>By the end of this course you will be able to:</p> <p>CO1: Understand the concept of SQL commands in DBMS</p> <p>CO2: Create SQL SELECT statements that retrieve any required data</p> <p>CO3: Perform operations using Data Manipulation Language statements like Insert, Update and Delete</p> <p>CO4: Manipulate your data to modify and summaries your results for reporting</p> <p>CO5: Apply Grouping Clauses on various tuples &amp; relations of database</p> <p>CO6: Develop project based on various SQL commands.</p>	
7	Course Description	An introduction to the design and creation of relational databases. Create database-level applications and tuning robust business applications. Lab sessions reinforce the learning objectives and provide participants the opportunity to gain practical hands-on experience.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Practical based Data types</b>	
		Classification SQL, Data types of SQL/Oracle	CO1,CO2
	<b>Unit 2</b>	<b>Practical based on DDL commands</b>	
		Create table , Alter table and drop table	CO2,CO3
	<b>Unit 3</b>	<b>DML commands and Aggregate functions</b>	
		Introduction about the INSERT, SELECT , UPDATE & DELETE commands.	CO3,CO4
	<b>Unit 4</b>	<b>Practical based on Grouping Clauses GROUP BY ORDER BY &amp; GROUP BY HAVING</b>	
		Briefly explain Group by, order by ,having clauses with examples. Aggregate function: sum, avg, count, max, min	CO5
	<b>Unit 5</b>	<b>Practical based on Sub- queries, JOINS</b>	
		Related example of Sub- queries, Joins and related examples, Views, Trigger	CO5,CO6
	Mode of	Jury/Practical/Viva	

examination			
Weightage Distribution	CA	MTE	ETE
	60%	0%	40%
Text book/s*	1. Korth ,Silberschatz& Sudarshan, Data base Concepts, Tata McGraw-Hill		
Other References	1. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education Inc. 2. Thomas Connolly, Carolyn Begg, Database Systems: A Practical Approach to design, Implementation and Management, Pearson Education, Latest Edition. 3. Jeffrey D. Ullman, Jennifer Windon, A first course in Database Systems, Pearson Education.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Understand the concept of SQL commands in DBMS.	PO1,PO3,PO4,PO8,PO9,PO10,PSO1
2.	CO2: Create SQL SELECT statements that retrieve any required data.	PO1,PO2,PO3,PO4,PO8,PO9,PO10
3.	CO3: Perform operations using Data Manipulation Language statements like Insert, Update and Delete.	PO1,PO2,PO3,PO4,PO8,PO9,PO10
4.	CO4: Manipulate your data to modify and summaries your results for reporting.	PO1,PO2,PO3,PO4,PO8,PO9,PO10,PSO1
5	CO5: Apply Grouping Clauses on various tuples & relations of database	PO1,PO2,PO3,PO4,PO8,PO9,PO10, PSO1
6	CO6: Develop project based on various SQL commands.	PO1,PO2,PO3,PO4,PO5, PO7,PO8,PO9,PO10,PSO1

### **PO and PSO mapping with level of strength for Course Name Database Management Systems (Course Code BOL 207)**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	Computing knowledge	Problem Analysis and Design of solutions:	Modern tool usage:	Technical Skill Development	Societal Concern:	Environment and Sustainability:	Ethics	Individual and team work:	Communication	Life-long learning:	Computer Science	Information Technology
CO1	3	-	3	2	-	-	-	2	2	2	1	-
CO2	3	3	3	2	-	-	-	3	2	2	-	-

CO3	3	3	3	2	-	-	-	3	2	2	-	-
CO4	3	3	3	3	-	-	-	3	2	2	2	-
CO5	3	3	3	2	-	-	-	3	2	2	2	-
CO6	3	3	3	2	2	-	2	3	2	2	3	-

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code/ Name	PO 1	PO2	PO 3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2
<b>BOL 207 DBMS Lab</b>	3	3	3	2.2	2	-	2	2.8	2	2	2	-

*Strength of Correlation: 1. Addressed to Slight (Low=1) extent 2. Addressed to Moderate (Medium=2) extent*

## Syllabus of Problem solving using Python Programming Lab

<b>School:</b>		<b>School of Engineering and technology</b>	
<b>Department</b>		<b>Department of Computer Science and Engineering</b>	
<b>Program:</b>		<b>BSC</b>	
<b>Branch:</b>			
1	Course Code	BOL210	
2	Course Title	Problem solving using Python Programming Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	<p><b>The objective of this course is to:</b></p> <ul style="list-style-type: none"> <li>• Explain the basic syntax of Python Program</li> <li>• Explain various programming constructs –data types, decision structures, control structures in python</li> <li>• Know how to use in-built data structures in python – Lists, Tuples, Dictionary</li> <li>• Know how to use libraries for string manipulation and File handling</li> </ul> <p>Learn the fundamental principles of Object-Oriented Programming</p> <ul style="list-style-type: none"> <li>• Using such knowledge small project can be made</li> </ul>	
6	Course Outcomes	<p>By the end of this course you will be able to:</p> <p>CO1.Demonstrate the environment of python</p> <p>CO2.Develop the program on list, tuple , dictionary etc</p> <p>CO3.Construct program using the concept of function</p> <p>CO4.Apply the Object Oriented Skills in Python</p> <p>CO5.Design a program in order to create package</p> <p>CO6.Build programming skills in core Python.</p>	
7	Course Description	<p>This course starts with an introduction to Python, History of Python and basics syntax for writing Python Program. As the course progresses the study of decision structure, control structure and in-built data structure are studied in detail. This course mainly focuses on OOPs concepts. This course also deals with File handling, and Module concept.</p>	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Practical based on to explore about the Spyder environment.</b>	
		WAP to create a simple calculator using different	

		operators. WAP to create a calculator using if-elif statement. Write a program to find the largest number in a list.	
	<b>Unit 2</b>	<b>Practical related to –list,dictionary</b>	
		Write a program to find the second largest number in a list. Write a program to put even and odd elements in a list into two different lists.	
	<b>Unit 3</b>	<b>Practical related to --functions</b>	
		Write a program to calculate the number of upper case letters and lower case letters in a string. Write a program to check if a string is a pangram or not.	
	<b>Unit 4</b>	<b>. Practical related to –Object oriented prog</b>	
		Write a program to implement polymorphism Write a program to calculate the number of upper case letters and lower case letters in a string	
	<b>Unit 5</b>	<b>Practical related to --packages</b>	
		Write a program to use the function of math and random module. Write a program to plot data using Matplotlib package.	
	Mode of examination	Jury/Practical/Viva	
	Weightage Distribution	CA 60%	MTE 0%
			ETE 40%
	Text book/s*	-	
	Other References		

**PO and PSO mapping with level of strength for Problem solving using Python Programming Lab**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
Problem solving using Python Programming Lab	CO 1	1	1	1	1	-	2	2	-	-	2	1	1
	CO 2	2	1	1	1	-	2	2	-	-	2	1	1
	CO 3	1	2	1	2	-	2	2	-	-	2	1	2
	CO 4	2	2	3	2	2	2	2	-	-	2	2	2
	CO 5	2	2	2	2	2	2	2	-	-	2	2	2
	CO 6	3	3	3	2	2	2	2	--	-	2	3	3

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PS O 1	PS O 2
	Problem solving using Python Programming Lab	1.8	1.8	1.8	1.6	1	2	2	-	-	2	1.6	1.83

### *Strength of Correlation*

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

**FILENAME: ORGANIZATION BEHAVIOUR**

1	Course number	HMM303
2	Course Title	Organizational Behaviour
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
5	Course Objective	To enable the students understand the importance of human element in organization and to provide the student with a conceptual framework based upon behavioral science research, for understanding human work behavior in the organizational setting.
6	Course Outcomes	<ol style="list-style-type: none"> <li>1. Describe the importance of human element in the organization.</li> <li>2. Understand the importance of the study of the discipline of Organizational Behavior.</li> <li>3. To understand how the knowledge about differences in personality make up would help a manager better perceive the human behavior at work.</li> <li>4. To justify the concept of learning and attitude and to assess the significance of the concept of motivation, which attempt to explain the causes of human behavior.</li> <li>5. To list the characteristics that high achievers prefer in a job.</li> <li>6. To contrast between leadership and management and to examine the relationship that activities have with successful and effective leaders.</li> <li>7. To evaluate the conditions under which teams are preferred over individuals and to list the strengths and weaknesses of group decision.</li> <li>8. To analyze the importance of power and political perspective and to understand the importance of effectively managing cultural diversity.</li> <li>9. To rate the reasons why employees as well as the organization resist change and how this change could be introduced in the organizations.</li> <li>10. To estimate the importance of Organizational Development and its various intervention strategies.</li> <li>11. To appraise the concept of Knowledge management and to judge the role of Emotional Intelligence in Business Organization.</li> <li>12. To outline the conflict process and to understand various</li> </ol>

			styles of managing conflict and to explore causes and remedies for Stress.
7	Outline syllabus:		
7.01	HMM303.A	Unit A	Introduction
7.02	HMM303.A1	Unit A Topic 1	Concept, nature, conceptual foundations and importance of OB, Models of OB, Challenges and Opportunities; Theoretical framework.
7.03	HMM303.A2	Unit A Topic 2	Personality: Determinants, traits, types and Theories
7.04	HMM303.A3	Unit A Topic 3	Learning: Concept and theories of learning. Attitude: Concept, Attitude formation, Importance
7.05	HMM303.B	Unit B	Motivation Concepts
7.06	HMM303.B1	Unit B Topic 1	Concept, Early and Contemporary theories
7.07	HMM303.B2	Unit B Topic 2	Motivation: From Concepts to Application
7.08	HMM303.B3	Unit B Topic 3	Importance and theories of leadership, Trait, Behavioural styles; Models
7.09	HMM303.C	Unit C	Group Behaviour
7.10	HMM303.C1	Unit C Topic 1	Theories of Group formation; Formal organizations and Informal groups and their interaction
7.11	HMM303.C2	Unit C Topic 2	Importance of teams, Formation of teams, Team work, Managing interpersonal relationship at work
7.12	HMM303.C3	Unit C Topic 3	Power and Politics-An Introduction; Sources of Power in Organizations-Interpersonal Sources, Organizational Sources; Organizational Politics; Ethics of Power and Politics organizational climate, organizational culture, organizational effectiveness
7.13	HMM303.D	Unit D	Organizational Dynamics
7.14	HMM303.D1	Unit D Topic 1	Concept, Managing resistance to change, Kurt Levin's Theory of Change, Managing across cultures.
7.15	HMM303.D2	Unit D Topic 2	Organizational Development (OD); Basic's of OD Assumptions; OD Interventions strategies.
7.16	HMM303.D3	Unit D Topic 3	Knowledge management and Emotional Intelligence in Business Organisation
7.17	HMM303.E	Unit E	Conflict and Stress Management
7.18	HMM303.E1	Unit E Topic 1	Understanding Stress and its Consequences, Sources of Stress, Management of stress.
7.19	HMM303.E2	Unit E Topic 2	Conflict Management: Sources of conflict, types
7.20	HMM303.E3	Unit E Topic 3	Process and resolution of conflict.
8	Course Evaluation		



8.1	Course work: 30%	
8.11	Attendance	None
8.12	Homework	Three best out of four assignments ; 20 marks
8.13	Quizzes	Two 30 minute surprise quizzes : 10 marks
8.14	Projects	None
8.15	Presentations	None
8.16	Any other	None
8.2	MTE	One, 20%
8.3	End-term examination: 50%	
9	References	
9.1	Text book	<ul style="list-style-type: none"> <li>Robbins Stephen P. - Organizational Behavior, Pearson Education, 13<sup>th</sup> Edition</li> </ul>
9.2	other references	<ol style="list-style-type: none"> <li>Newstrom, John W. - Organizational Behavior: Human Behavior at Work (Tata Mc Graw Hill, 12<sup>th</sup> Edition)</li> <li>Luthans, Fred - Organizational Behavior (Tata McGraw Hill, 10<sup>th</sup> edition)</li> </ol>

### Mapping of Outcomes vs. Topics

#### FILE NAME : ORGNIZATIONAL BEHAVIOUR

Outcome no. → Syllabus topic↓	1	2	3	4	5	6	7	8	9	10	12
HMM303.A	X										
HMM303.A1	X	X									
HMM303.A2		X									
HMM303.A3			X								
HMM303.B			X								
HMM303.B1				X							
HMM303.B2				X							
HMM303.B3					X						
HMM303.C					X	X					
HMM303.C1							X				
HMM303.C2							X				
HMM303.C3								X			
HMM303.D								X			
HMM303.D1									X		
HMM303.D2									X	X	
HMM303.D3										X	
HMM303.E											X
HMM303.E1											X
HMM303.E2											X
HMM303.E3											X

# TERM-IV

<b>School: SET</b>		<b>Batch : 2020-19</b>		
<b>Program:</b>		<b>Current Academic Year: 2020-19</b>		
<b>Branch: CSE</b>		<b>Semester: IV</b>		
1	Course Code	<b>ARP204</b>	<b>Course Name : Aptitude Reasoning and Business Communication Skills-Intermediate</b>	
2	Course Title	<b>Aptitude Reasoning and Business Communication Skills-Intermediate</b>		
3	Credits	2		
4	Contact Hours (L-T-P)	0-0-4		
Course Status				
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 2 <sup>nd</sup> phase of employability enhancement and skill building activity exercise.		
6	Course Outcomes	<p><b>CO1:</b> <i>At the end of the session a student would have learned what is VMOSA (Vision, Mission, Values and Ethics) and Communication Process. This would help students understand and interpret the deeper meaning of life.</i></p> <p><b>CO2:</b> <i>At the end of the session a student would have learned Communication Styles and flexing and 4 social styles of communication which will lead to effective and meaningful communication process along with Listening Styles &amp; Listening Skills</i></p> <p><b>CO3:</b> <i>At the end of the session a student would have learned the Art of giving feedback and probing skills that will help in improving peer to peer and business communication by giving meaningful feedbacks and probing skills to understand, assess and evaluate real life situations better</i></p> <p><b>CO4:</b> <i>At the end of the session a student would have learned business writing skills and non-verbal communication process to make an impression in written communication process in office or otherwise coupled with positive body language and non-verbal communication</i></p> <p><b>CO5:</b> <i>At the end of the session a student would have learned MTI (Mother Tongue Influence) Reduction attributes that will help to eliminate the influence of mother tongue in one's speech leading to meaningful communication levels and proficiencies.</i></p> <p><b>CO6:</b> <i>At the end of the 2nd Level proficiency program in Quant &amp; Aptitude Reasoning abilities a student will be able to coherently reason real life situations, will have more pronounced aptitudinal abilities that will help a student deal with real life situations more effectively</i></p>		
7	Course Description	This course bundle allows students to build vision, mission and strategy statements while exposing them to various models of communication along with MTI reduction and the 2nd level of quant, aptitude and reasoning abilities		
8	Outline syllabus – ARP204			CO MAPPING
	<b>Unit 1</b>	<b>Communicate to Conquer</b>		
	A	VMOSA (Vision, Mission, Values and Ethics)  Business Communication - Verbal Communication Skills   Barriers in communication   Basics of effective		CO1

		communication – PRIDE Model	
	B	Different styles of communication & style flexing (Based on the 4 social styles-Analytical, Driving, Expressive, Amiable)   Importance of Listening & practice of Active Listening   The Art of Giving Feedbacks  Feedback Skills   Asking fact finding questions- Probing Skills	CO3,CO2
	C	Email Etiquette   Business Writing Skills  Telephone Etiquette Skills ( Telephone Handling Skills )   Non Verbal Communication-Kinesics, Proxemics, Paralanguage   MTI Reduction Program   Verbal Abilities - 2	CO4, CO5
	<b>Unit 2</b>	<b>Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical</b>	
	A	Coding Decoding , Ranking & Their Comparison Level-2	CO6
	B	Series, Blood Relations & Number Puzzle	CO6
	<b>Unit 3</b>	<b>Quantitative Aptitude</b>	
	A	Number System Level 2	CO6
	B	Vedic Maths Level-2   Probability   Permutation & Combination	CO6
	C	Percentage, Profit & Loss ,Partnership, Simple Interest & Compound Interest	CO6
	<b>Weightage Distribution</b>	( CA )Class Assignment/Free Speech Exercises / JAM – 60%   (ETE) Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 40%	
	<b>Text book/s*</b>	Wiley's Quantitative Aptitude-P Anand   <b>Quantum CAT</b> – <b>Arihant Publications</b>   <b>Quicker Maths- M. Tyra</b>   <i>Power of Positive Action</i> (English, Paperback, Napoleon Hill)   <i>Streets of Attitude</i> (English, Paperback, Cary Fagan, Elizabeth Wilson) <i>The 6 Pillars of self-esteem and awareness</i> – Nathaniel Brandon   <i>Goal Setting</i> (English, Paperback, Wilson Dobson	

<b>School:</b>		<b>School of Engineering and technology</b>	
<b>Department</b>		<b>Department of Computer Science and Engineering</b>	
<b>Program:</b>		<b>BCA</b>	
<b>Branch:</b>		<b>-</b>	
1	Course Code	BCA013	
2	Course Title	BCA013_Information Security and Cyber Laws	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
Course Status			
5	Course Objective	Introduce to Information Security theories, techniques & applications that are often required.	
6	Course Outcomes	On successful completion of this module students will be able to: <b>CO1:</b> Demonstrate basic concepts of information security & Apply different symmetric and asymmetric key ciphers <b>CO2:</b> Apply basic mathematical methods of modular arithmetic. <b>CO3:</b> Illustrate types and objectives of virus <b>CO4:</b> Evaluate the different type of intrusion detection and firewall design principles. <b>CO5:</b> Apply the principles in real life application. <b>CO6:</b> Distinguish between correct or incorrect data practices.	
7	Course Description	This course introduces basic concepts of Information security & public key cryptography. Also imparts the knowledge of types of virus & system security.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>	
	A	Information Security Concepts, Elements of security, security policy, security techniques, Models, terminology	CO1,CO5, CO6
	B	encryption methods, cryptography, cryptanalysis & steganography	CO1,CO2, CO5
	C	Mathematics of cryptography- GCD, Euclidian , Extended Euclidian algorithm	CO1,CO2
	<b>Unit 2</b>	<b>Symmetric key Cryptosystem</b>	
	A	Introduction to symmetric key cryptography, Substitution Cipher	CO1,CO2
	B	Mono-alphabetic substitution cipher:- Caesar cipher, additive and multiplicative cipher	CO1,CO2
	C	Polyalphabetic substitution cipher- playfair cipher, hill cipher, Transposition cipher- rail fence cipher, column cipher	CO1,CO2, CO6
	<b>Unit 3</b>	<b>Public key cryptosystem &amp; Authentication</b>	
	A	Public key cryptosystem, authentication , application , symmetric vs asymmetric cryptosystem	CO1,CO2
	B	RSA-key generation , encryption and decryption	CO1,CO2
	C	Authentication – introduction , methods-password based, two factor, biometrics, MD2	CO1,CO2

	<b>Unit 4</b>	<b>Virus</b>		
	A	Malicious software- virus, worms, zombie, logic bombs, trapdoors, spyware, Trojan horse		CO3, CO5, CO6
	B	Phases of virus and worm propagation		CO3, CO5, CO6
	C	Types of virus , worms, Attacks –Hoax , backdoor, brute force, denial of service, distributed denial of service, spoofing , sniffing, replay, traffic analysis		CO3,CO6
	<b>Unit 5</b>	<b>System Security</b>		
	A	Intruders, intrusion detection , introduction detection system, password management		CO4, CO5, CO6
	B	Anomaly based intrusion detection system , rule based intrusion detection system		CO4, CO5, CO6
	C	Firewalls- firewall design principles, firewall types		CO4, CO5, CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	<ol style="list-style-type: none"> <li>1. V. Pachghare” cryptography and Information security”- PHI</li> <li>2. Behrouz A. Forouzan, “Cryptography And Network Security”- McGraw Hill</li> </ol>		
	Other References	<ol style="list-style-type: none"> <li>1. Bruce Schneier, “Applied Cryptography”, John Wiley &amp; Sons Inc, 2001.</li> <li>2. William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, Fourth Edition</li> </ol>		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> Demonstrate basic concepts of information security & Apply different symmetric and asymmetric key ciphers	PO1, PO2, PO4, PO5, PO7, PO8, PO9, PO10, PSO2
2.	<b>CO2:</b> Apply basic mathematical methods of modular arithmetic.	PO1, PO2, PO3, PO4, PO6, PO10, PSO2
3.	<b>CO3:</b> Illustrate types and objectives of virus	PO1, PO4, PO5, PO7, PO8 PO10, PSO2
4.	<b>CO4:</b> Evaluate the different type of intrusion detection and firewall design principles.	PO1, PO2, PO3, PO5, PO7 PO10, PSO2,
5.	<b>CO5:</b> Apply the principles in real life application.	PO1, PO2, PO5, PO7, PO8, PO9, PO10, PSO2
6.	<b>CO6:</b> Distinguish between correct or incorrect data practices.	PO1, PO2, PO3, PO6, PO8, PO9, PO10, PSO2

**PO and PSO mapping with level of strength for Course Name BCA013\_Information Security and Cyber Laws**

C SE	C os	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	PO 10	PS O2
	CO1	3	2		3	3		3	3	3	3	2
	CO2	2	3	3	3		3				3	3
	CO3	2	3			2		3	2		3	3
	CO4	2	3	3		2		3			3	3
	CO5	2	2			3		3	3	2	2	3
	CO6	3	2	3			3		3	2	2	2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO2
	BCA013_Information Security and Cyber Laws	2.3	2.5	3	3	2.5	3	3	2.75	2.3	2.6	2.6

***Strength of Correlation***

1. Addressed to ***Slight (Low=1) extent***
2. Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

## Syllabus for Essentials of Digital Marketing

<b>School:</b>		<b>School of Engineering and technology</b>		
<b>Department</b>		<b>Department of Computer Science and Engineering</b>		
<b>Program:</b>		<b>BCA</b>		
<b>Branch:</b>		<b>CSE</b>		
1	Course Code	BCA 314		
2	Course Title	<b>Essentials of Digital Marketing</b>		
3	Credits	3		
4	Contact Hours (L-T-P)	3	0	0
	Course Status	Departmental Elective		
5	Course Objective	The objectives of this Course are : <ol style="list-style-type: none"> <li>1. Today's marketer has to be aware of the digital Market interventions and this course has been designed keeping in mind the requirement of industry on one end and competence enhancement on the other.</li> <li>2. At the end of this course you will be equipped with the skill to understand and initiate digital marketing.</li> </ol>		
6	Course Outcomes	After Successful completion of this course the student will be able to: CO1: infer digital marketing practices, inclination of digital consumers and their behaviors. CO2: discover various search engine optimization techniques for digital marketing analysis. CO3: determine the value of integrated marketing campaigns across SEO, Paid Search, Social, Mobile, Email, Display Media, Marketing Analytics. CO4: develop understanding of the latest digital practices for social media marketing and promotions CO5: distinguish among the different technology used in Digital Marketing CO6: construct insights on building organizational competency by way of digital marketing practices and cost considerations.		
7	Course Description	The primary objective of this module is to examine and explore the role and importance of digital marketing in today's rapidly changing business environment. It also focuses on how digital marketing can be utilized by organizations and how its effectiveness can be measured.		
8	Outline syllabus			CO Mapping
	<b>Unit 1</b>	<b>Introduction to Digital Marketing</b>		
	A	What is digital marketing		CO1



	B	Aligning Internet with Business Objectives			
	C	User Behaviour & Navigation			
	<b>Unit 2</b>	<b>Search Engine Optimisation</b>			
	A	Stakeholders in Search			CO2
	B	On & off-page Optimisation			
	C	Meta Tags, Layout, Content updates Inbound Links & Link Building			
	<b>Unit 3</b>	<b>Web Site Analytics</b>			
	A	Goal Configuration & Funnels			CO3
	B	Intelligence Reporting			
	C	Conversions, Bounce Rate, Traffic Sources, Scheduling			
	<b>Unit 4</b>	<b>Social Media Marketing</b>			
	A	What is Social Media Marketing?			CO4,CO6
	B	Overview of Facebook, Twitter, LinkedIn, Blogging, Youtube and Flickr			
	C	Building Brand Awareness Using Social Media			
	<b>Unit 5</b>	<b>Digital Marketing Strategy</b>			
	A	Understanding strategy			CO5,CO6
	B	Email Marketing , Affiliate marketing Mobile Marketing ,			
	C	Display Advertising			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	Digital Marketing: Global Strategies from the World's Leading Experts <u>Jerry Wind</u> , <u>Vijay Mahajan</u>			
	Other References	1. The Essentials of Digital Marketing Kathryn Waite and Rodrigo Perez-Vega			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1. infer digital marketing practices, inclination of digital consumers and their behaviors.	PO1,PO2,PO7,PO10 PSO1,PSO2
2.	CO2. : discover various search engine optimization techniques for digital marketing analysis.	PO1,PO2,PO3,PO4,PO7,PO10, PSO1,PSO2

3.	CO3. determine the value of integrated marketing campaigns across SEO, Paid Search, Social, Mobile, Email, Display Media, Marketing Analytics.	PO1,PO2,PO3,PO4,PO7,PO10, PSO1,PSO2
4.	CO4. develop understanding of the latest digital practices for social media marketing and promotions	PO1,PO2,PO3,PO4,PO7,PO10, PSO1,PSO2
5.	CO5. distinguish among the different technology used in Digital Marketing	PO1,PO2, PO4,PO7,PO10, PSO1,PSO2
6.	CO6. construct insights on building organizational competency by way of digital marketing practices and cost considerations.	PO1,PO2,PO3,PO4,PO7,PO10, PSO1,PSO2

**PO and PSO mapping with level of strength for Essentials of Digital Marketing (Course Code BCA 314)**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCA 314_ Essentials of Digital Marketing	CO1	1	2					1			2	2	2
	CO2	2	2	2	2			1			2	2	2
	CO3	2	2	2	2			2			2	3	3
	CO4	1	2	1	1			2			2	3	3
	CO5	1	1		1			1			2	2	1
	CO6	1	2	1	1			1			2	2	2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCA 314	Essentials of Digital Marketing	1.5	1.8	1	1.2			1.4			2	2.4	2.1

**Strength of Correlation**

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

<b>School:</b>		<b>School of Engineering and technology</b>	
<b>Department</b>		<b>Department of Computer Science and Engineering</b>	
<b>Program:</b>		<b>B Sc</b>	
<b>Branch:</b>		<b>CS &amp; IT</b>	
1	Course Code	BCO011	
2	Course Title	<b>Data Encoding and Compression</b>	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
Course Status		Departmental Elective	
5	Course Objective	<ul style="list-style-type: none"> <li>• Provide students with an overview of the methodologies and approaches to data encoding</li> <li>• Gain insight into the challenges and limitations of different data encoding techniques and with practice on applying data coding solutions</li> <li>• Prepare students for research in the area of data encoding and compression related applications</li> </ul>	
6	Course Outcomes	<p>On successful completion of this module students will be able to:</p> <p>CO1: demonstrate mathematical preliminaries and lossy and lossless compression.          CO2: apply the simple lossless encoding techniques.          CO3: illustrate the fundamentals of information theory          CO4: apply various lossless compression standards with image and video compression.          CO5: illustrate the concept of various algorithms for compressing image and video          CO6: apply the techniques Data Encoding and Compression in real life application</p>	
7	Course Description	This course introduces concept of data encoding and compression, encompassing the fundamental principles, to analyze the encoding, identify the appropriate compression, and choose the relevant algorithms to apply.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>	
	A	Mathematical Preliminaries	CO1, CO6
	B	Lossy and Lossless compression	CO1, CO6
	C	Application of compression	CO1, CO6
	<b>Unit 2</b>	<b>Simple lossless encoding</b>	
	A	Run length encoding Huffman coding	CO2, CO6
	B	LZW coding, Run length encoding,	CO2, CO6
	C	Arithmetic coding	CO2, CO6
	<b>Unit 3</b>	<b>Fundamentals of Information Theory</b>	
	A	Concepts of entropy, probability models	CO3, CO6
	B	Markova models, Fundamentals of coding theory,	CO3, CO6
	C	Algorithmic information theory & Minimum description	CO3, CO6
	<b>Unit 4</b>	<b>Lossless Compression standards</b>	

	A	zip, gzip,			CO4, CO6
	B	bzip, unix compress			CO4, CO6
	C	GIF, JBIG			CO4, CO6
	<b>Unit 5</b>	<b>Image &amp; Video compression</b>			
	A	Basis functions and transforms from an intuitive point			CO5, CO6
	B	JPEG, MPEG, Vector Quantization			CO5, CO6
	C	case study of WinZip, WinRar			CO5, CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	1. Introduction to Data Compression, 3rd Edition, Khalid Sayood, Morgan Kauffman			
	Other References	Internet			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: demonstrate mathematical preliminaries and lossy and lossless compression.	PO1, PO2, PO3, PO4, PO6, PO10, PSO2
2.	CO2: apply the simple lossless encoding techniques.	PO1, PO2, PO5, PO7, PO8, PO9, PO10, PSO1, PSO2
3.	CO3: illustrate the fundamentals of information theory	PO1, PO4, PO5, PO7, PO8, PO10, PSO1, PSO2
4.	CO4: apply various lossless compression standards with image and video compression.	PO1, PO2, PO5, PO7, PO8, PO9, PO10, PSO1, PSO2
5.	CO5: illustrate the concept of various algorithms for compressing image and video	PO1, PO4, PO5, PO7, PO8, PO10, PSO1, PSO2
6.	CO6: apply the techniques Data Encoding and Compression in real life application	PO1, PO2, PO5, PO7, PO8, PO9, PO10, PSO1, PSO2

**PO and PSO mapping with level of strength for Course Name Data encoding and compression (Course Code BCO011)**

<b>BCO011 Data encoding and compression</b>	C	P	P	P	P	P	P	P	P	P	P	P	P
	o	O	O	O	O	O	O	O	O	O	O	S	S
	s	1	2	3	4	5	6	7	8	9	10	11	12
	CO1	2	3	3	3	-	3	-	-	-	3	-	3
	CO2	2	2	-	-	3	-	3	3	2	2	2	2
	CO3	2	3	-	-	2	-	3	2	-	3	3	3
	CO4	2	2	-	-	3	-	3	3	2	2	2	3
CO5	2	3	-	-	2	-	3	2	-	3	1	1	
CO6	2	2	-	-	3	-	3	1	2	2	2	2	

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
<b>BCO011</b>	<b>Data encoding and compression</b>	2	2.5	3	3	2.6	3	3	2.2	2	2.5	2	2.3

<b>School: SET</b>		<b>Batch : 2020</b>	
<b>Program:BCA</b>		<b>Current Academic Year: 2020-20</b>	
<b>Branch:CS/IT</b>		<b>Semester:2</b>	
1	Course Code	BCO012	Course Name: Graph Theory
2	Course Title	Graph Theory	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	UG	
5	Course Objective	Objective of this course is to: <ol style="list-style-type: none"> <li>1. Explain basic concepts in graph theory,</li> <li>2. Define how graphs serve as models for many standard problems,</li> <li>3. Discuss the concept of graph, tree, Euler graph and cut set and</li> <li>4. Learn and apply concepts in the applications of graphs in science, business and industry.</li> </ol>	
6	Course Outcomes	Students will be able to: CO1: Define basics of types of graphs and trees and its applications in the society. CO2: Understand and demonstrate the basic concepts of graphs, connected and disconnected graphs. CO3: Interpret the fundamentals and representations of graphs and trees and to relate them with the use in computer science applications. CO4: Apply graph-theoretic algorithms to solve the real time problems using minimal spanning trees etc. CO5: Discover the advanced properties and concepts of graphs such as cut-sets and circuits in graph CO6: Examine a graph using matrices to cater their application in real world.	
7	Course Description	The course will cover the fundamental concepts of Graph Theory: simple graphs, digraphs, Eulerian and Hamiltonian graphs, trees, networks, paths and cycles, Cut-sets and circuit.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>	
	A	Introduction: Finite and Infinite graphs, Incidence & Degree, Isolated vertex, Pendant Vertex	CO1
	B	Null Graph, Various types of graph, sub graphs, handshaking lemma	CO1
	C	special properties of graphs and various operations on graphs, walks, Path, and circuits connected graph	CO1, CO3
	<b>Unit 2</b>	<b>Trees</b>	
	A	Disconnected graphs and Components, Euler graphs, Operations on graphs more on Euler Graphs	CO2
	B	Hamiltonian paths and cycles, Trees, some properties	CO2, CO3

		of trees	
C		pendant Vertices in a tree, Distance and centers in a tree	CO2
<b>Unit 3</b>		<b>Binary Trees</b>	
A		Basic terminology related to Rooted and Binary trees	CO3
B		Importance of binary tree, Binary search tree	CO3
C		Finding spanning tree of a graph, algorithms to find spanning trees in a weighted graph (Kruskal& Prim)	CO3, CO4
<b>Unit 4</b>		<b>Cut-Sets</b>	
A		Cut-Set, Some Properties of Cut-Set, All Cut-Sets in a graph, concept of planar graph	CO5
B		Fundamental Circuits & Cut-Sets, Connectivity and separability.	CO5
C		Planar graphs, detection of planar graphs, Eulers formula.	CO5, CO6
<b>Unit 5</b>		<b>Matrix representation of graphs</b>	
A		Directed graphs, types of directed graphs.	CO1, CO2, CO6
B		Matrix representation of graph, incidence matrix A(G), sub matrices of A(G), Rank of A(G),	CO5, CO6
C		Circuit matrix, fundamental circuit matrix and finding their Ranks, Relationship among Af , Bf , and Cf and its deduction.	CO5, CO6
Mode of examination		Theory	
Weightage Distribution	CA	MTE	ETE
	30%	20%	50%
Text book/s*	1. Deo, N, <i>Graph theory with applications to Engineering and Computer Science</i> , Prentice Hall India		
Other References	1. Wilson R J, <i>Introduction to Graph Theory</i> , Pearson Education 2. Harary, F, <i>Graph Theory</i> , Narosa 3. Bondy& Murthy, <i>Graph theory and application</i> . Addison Wesley.		

### **CO and PO Mapping**

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Define basics of types of graphs and trees and its applications in the society.	PO1, PO2, PSO1
2.	CO2: Understand and demonstrate the basic concepts of graphs, connected and disconnected graphs.	PO1, PSO1, PSO2
3.	CO3: Interpret the fundamentals and representations of graphs and trees and to relate them with the use in computer science	PO1, PO2, PSO2

	applications.	
4.	CO4: Apply graph-theoretic algorithms to solve the real time problems using minimal spanning trees etc.	PO3, PO4, PSO2, PSO3
5	CO5: Discover the advanced properties and concepts of graphs such as cut-sets and circuits in graph	PO1, PO2, PO3, PO4, PSO1
6	CO6: Examine a graph using matrices to cater their application in real world.	PO1, PO2, PSO1

**PO and PSO mapping with level of strength for Course Name Graph Theory(Course Code BCO 012)**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	3	3	2	2	3	2	-	-	1	1	2	1
CO2	3	3	2	3	2	2	-	-	1	1	2	1
CO3	3	2	2	3	2	1	-	-	1	1	2	2
CO4	3	2	2	3	3	2	-	-	1	1	2	2
CO5	3	2	2	3	2	2	-	-	2	1	1	2
Co6	3	2	2	3	3	2	-	-	1	1	1	2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCO012	Graph Theory	3	2.3	2	2.8	2.5	1.83	-	-	1.17	1	1.67	1.67

***Strength of Correlation***

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*



<b>School: SET</b>		<b>Batch :2020 onwards</b>	
<b>Program: B.Sc.</b>		<b>Current Academic Year: 2020-21</b>	
<b>Branch: CS &amp; IT</b>		<b>Semester:4</b>	
1	Course Code	BCO212	Course Name: <b>Basics of Computer Network</b>
2	Course Title	Introduction to Computer Network	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	UG	
5	Course Objective	The students will be introduced to the basic concepts and fundamentals of computer networks along with the study of individual layers of reference model.	
6	Course Outcomes	<b>Students will be able to:</b> <b>CO1:</b> Classify the basic network infrastructure to learn the overall function of networking systems and transmission mediums. <b>CO2:</b> Demonstrate and differentiate types of networks & working of all layers of the OSI Reference Model and TCP/IP model . <b>CO3:</b> Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission <b>CO4:</b> Illustrate the network layer and transport layer including IP Addressing, routing , TCP and UDP services. <b>CO5:</b> Explain the functionality of application layer. <b>CO6:</b> Outline the cryptography and network security.	
7	Course Description	This course provides detailed concepts of computer networking .Familiarize the student with the basic taxonomy and terminology of the computer networking area.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction:</b>	
	A	Overview, networks in daily life, Network Topologies- Bus, Star, Ring, Mesh, Hybrid	CO1
	B	Connecting devices-Hub, Amplifier, Repeater, Router, Switch, Gateway, Modem, Multiplexers	CO1
	C	Transmission Media- Coaxial cables, twisted pair cables- Unshielded, shielded, Modes of Transmission-Simplex, half duplex and Full duplex	CO1
	<b>Unit 2</b>	<b>Reference Models</b>	
	A	Network Architecture and structure, OSI reference model and detailed functions of each layer ,	CO1,CO2
	B	TCP/IP protocol Suite	CO1, CO2
	C	Types of networks- LAN, MAN, WAN, Broadcast, Point to Point, Peer to peer Networks	CO1,CO2
	<b>Unit 3</b>	<b>Data Link Layer</b>	

	A	Framing , Errors in communication, Types of Error-Single Bit error, Burst error	CO3						
	B	Flow Control- simplex protocol and stop and Wait protocol	CO2,CO3						
	C	Random Access- Aloha, CSMA	CO2,CO3						
	<b>Unit 4</b>	<b>Network Layer&amp; Transport Layer</b>							
	A	IPV4 addressing basics and Header format	CO4						
	B	Transport layer Basics, Process to Process delivery, TCP services and header format	CO4						
	C	UDP: services, features, header format	CO4						
	<b>Unit 5</b>	<b>Application Layer</b>							
	A	DNS namespace, distribution of namespace, DNS in internet, resolution	CO5						
	B	Email Architecture, services and Features Network Security: Definition of -symmetric, Asymmetric Cryptography	CO5, CO6						
	C	Digital signature, Message Digest	CO6						
	Mode of examination	Theory							
	Weightage Distribution	<table border="1"> <tr> <td>CA</td> <td>MTE</td> <td>ETE</td> </tr> <tr> <td>30%</td> <td>20%</td> <td>50%</td> </tr> </table>	CA	MTE	ETE	30%	20%	50%	
CA	MTE	ETE							
30%	20%	50%							
	Text book/s*	1. Forouzan, B., “Communication Networks”, TMH, Latest Edition							
	Other References	2. Tanenbaum, A.S.” Computer Networks”, 4th Edition, PHI 3. W. Stallings, “Data and Computer Communication” Macmillan Press							

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> Classify the basic network infrastructure to learn the overall function of networking systems and transmission mediums.	PO1, PO2, PO3,PO4 PSO2
2.	<b>CO2:</b> Demonstrate and differentiate types of networks & working of all layers of the OSI Reference Model and TCP/IP model .	PO1, PO2, PO3,PO4 PSO2
3.	<b>CO3:</b> Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission	PO1, PO2, PO3,PO4 PSO2
4	<b>CO4:</b> Illustrate the network layer and transport layer including IP Addressing, routing , TCP and UDP services.	PO1, PO2, PO3,PO4 PSO2
5	<b>CO5:</b> Explain the functionality of application layer.	PO1, PO2, PO3,PO4 PSO2
6.	<b>CO6:</b> Outline the cryptography and network security.	PO1, PO2, PO3,PO4 PSO2

**PO and PSO mapping with level of strength for Course Name BCO212\_Introduction to Computer Network**

B.Sc.	CoS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	CO1	3	2	2	2	--	--	--	--	--	--	--	--
CO2	3	2	2	2	---	---	--	---	---	---	---	---	2
CO3	3	2	2	2	---	---	--	---	---	---	---	---	2
CO4	3	2	2	2	---	---	--	---	---	---	---	---	2
CO5	3	2	2	2	--	--	--	--	--	--	--	--	2
CO6	3	2	2	2	--	--	--	--	--	--	--	--	2
AVG.	3	2	2	2		--	--	--	--	--	--	--	2

## 2.1 Template A1: Syllabus for Theory Courses (SAMPLE)

<b>School:</b>		<b>School of Engineering and technology</b>		
<b>Department</b>		<b>Department of Computer Science and Engineering</b>		
<b>Program:</b>		<b>BSC</b>		
<b>Branch:</b>				
1	Course Code	BCO203		
2	Course Title	BCO214_Web Designing and its Application		
3	Credits	3		
4	Contact Hours (L-T-P)	3-0-0		
	Course Status	Core /Elective/Open Elective		
5	Course Objective	To develop skills in analyzing the usability of a web and understand fundamentals of tools and technology of web design.		
6	Course Outcomes	CO1: Define the basic terminology of web Application CO2: Demonstrate telnet server and login remotely using putty. CO3: Identify SMTP components and its working. CO4: Analyze FTP server for sharing files over network and establish session between FTP client and server. CO5: Determine and discuss the security risk of a Web application CO6: Elaborate the usage of different web technologies in real life.		
7	Course Description	This course is an overview of the modern Web technologies used for the Web development. The purpose of this course is to give students the basic understanding of how things work in the Web world.		
8	Outline syllabus		CO Mapping	
	<b>Unit 1</b>	<b>Introduction to web</b>		
	A	Introduction to Web: History of Internet, WWW, Client or Browser, website, internet browsers, Hypertext, Web server		CO1
	B	Locating resource on internet- URI, URL, URN, ISP, Gateways		CO1
	C	Basic features of HTTP, Working of HTTP, HTTP response code, social networks, search engines, Video Conferencing, e-Commerce, m-Commerce.		CO1
	<b>Unit 2</b>	<b>Web Architecture</b>		
	A	Web Architecture: Server, Type of server, database server, mail server, web server		CO1
	B	Components of web, usage of Web, client-server architecture, Domain Name System		CO1
	C	Type of DNS servers, Example of DNS query and response, Wildcards, Negative response caching, Zone maintenance and transfers		CO1
	<b>Unit 3</b>	<b>Email and Telnet</b>		
	A	Mail structure, Composition of mail, component of Email, Working of email		CO2,CO3

	B	Concept of remote login, remote Login methods, Setting environment for putty, login to remote system using putty		CO2,CO3
	C	SMTP-components ,working of SMTP,SMTP protocol stack, SMTP headers, SMTP forwarding, SMTP relays, interoperation, how SMTP uses DNS		CO2,CO3
	<b>Unit 4</b>	<b>FTP</b>		
	A	FTP: FTP protocol, Usage of FTP, anonymous ftp, Setting FileZilla server and client		CO4
	B	FTP commands: Access control commands, Transfer Parameter Commands, FTP Service Commands, FTP command arguments		CO4
	C	FTP replies, Reply Codes by Function Groups, Numeric Order List of Reply Codes, sequencing of commands and replies		CO4
	<b>Unit 5</b>	<b>Security</b>		
	A	<b>Security:</b> Security requirements, confidentiality, authenticity, integrity, plain text, cipher text		CO5,CO6
	B	Models of security, Security threats, types of threats, Steganography		CO5,CO6
	C	Cryptography, Symmetric Cryptography, Asymmetric Cryptography, ceaser Cipher, Playfair algorithm, RSA Algorithm		CO5,CO6
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Douglas Comer “The Internet Book - Pearson Education”, Asia		
	Other References	4. Douglas E. Comer “Internetworking with TCP/IP”, Volume-I, PHI. 5. P.K. Sinha, “Introduction of Basic Computer”		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Define the basic terminology of web Application	PO1,PO3,PO5,PO10
2.	CO2: Demonstrate telnet server and login remotely using putty.	PO1,PO4,PO10
3.	CO3: Identify SMTP components and its working.	PO1,PO4,PO10
4.	CO4: Analyze FTP server for sharing files over network and establish session between ftp client and server.	PO1,PO4,PO10,PSO2
5.	CO5: Determine and discuss the security risk of a Web application	PO1,PO3,PO5,PO10,PSO2
6.	CO6: Elaborate the usage of different web technologies in real life.	PO1,PO2,PO3,PO4,PO5,PO10,PSO1,PSO2

**PO and PSO mapping with level of strength for Course Name BCO214\_Web Designing and its Application**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCO214_Web Designing and its Application	CO1	1		2		2					2		
	CO2	1			2						2		
	CO3	1			2						2		
	CO4	1			2						2		1
	CO5	1		2		2					2		3
	CO6	1	1	2	2	2					2	1	2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
	BCO214_Web Designing and its Application	1	1	2	2	2	0	0	0	0	2	1	2

### *Strength of Correlation*

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

School:		School of Engineering and technology	
Department		Department of Computer Science and Engineering	
Program:		B.Sc.	
Branch:			
1	Course Code	BOL 212	
2	Course Title	BOL212_Introduction to Computer Network Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory/Elective	
5	Course Objective	The students will be introduced to the basic concepts and fundamentals of computer networks along with the study of individual layers of reference model.	
6	Course Outcomes	Students will be able to: CO1: Explain the basic concepts of computer network. CO2: Illustrate and differentiate working of all layers of the OSI Reference Model and TCP/IP model CO3: Analyze fundamental issues driving network design including error control, IP addressing, access control, flow and congestion control CO4: Compare working of various routing algorithms CO5: Test various network security algorithms CO6: Examine various cryptographic Algorithms	
7	Course Description	To familiarize with the basic taxonomy and terminology of computer networking area.	
8	Outline syllabus		CO Mapping
	Unit 1	Introduction	
	A	Introduction to basic Linux networking commands. (Commands like ipconfig, getmac, tracert, pathping, arp, ping, netstat, finger etc.)	CO1
	B	Study of different types of Network cables and Practically implement the cross-wired cable and straight through cable using clamping tool.	CO1
	C	Install and configure Network Devices: HUB, Switch and Routers.	CO1
	Unit 2	Reference Models	
	A	Connect the computers in Local Area Network	CO1,CO2
	B	Configure Host IP, Subnet Mask and Default Gateway in a System in LAN (TCP/IP Configuration).	CO1, CO2
	C	Establish Peer to Peer network connection using two systems using Switch and Router in a LAN.	CO1,CO2
	Unit 3	Data Link Layer	
	A	Configure Internet connection and use IPCONFIG, PING / Tracer and Net stat utilities to debug the network issues.	CO3
	B	Transfer files between systems in LAN using FTP	CO2,CO3

		Configuration, install Print server in a LAN and share the printer in a network.	
	C	Configure a Network topology-1& 2 using packet tracer software	CO2,CO3
	Unit 4	Network Layer& Transport Layer	
	A	Implement bit stuffing and de-stuffing.	CO4
	B	Write a Program to simulate Distance vector routing.	CO4
	C	Write a program to simulate the stop- and-wait protocol.	CO4
	Unit 5	Application Layer	
	A	Write a program to implement DES for encryption.	CO5
	B	Using RSA algorithm encrypts a text data and decrypts the same.	CO5, CO6
	C	Open Ended Project	CO6
	Mode of examination	Jury/Practical/Viva	
	Weightage Distribution	CA	MTE
		60%	0%
		ETE	40%
	Text book/s*	Tanenbaum, A.S.” Computer Networks”, 4 <sup>th</sup> Edition, PHI	
	Other References	1. Forouzan, B., “Communication Networks”, TMH, Latest Edition 2. W. Stallings, “Data and Computer Communication” Macmillan Press	

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Explain the basic concepts of computer network.	PO1, PO2, PO3, PO10, PSO2
2.	CO2: Illustrate and differentiate working of all layers of the OSI Reference Model and TCP/IP model	PO1,PO2, PO4,PO6,PO10,PSO2
3.	CO3: Analyze fundamental issues driving network design including error control, IP addressing, access control, flow and congestion control	PO1,PO2,PO3,PO5,PO8,PO10, PSO2
4.	CO4: Compare working of various routing algorithms	PO1,PO2, PO4, PO7,PO9,PO10,PSO2
5.	CO5: Test various network security algorithms	PO1,PO2,PO3,PO5,PO6,PO8,P O10,PSO2
6.	CO6: Examine various cryptographic Algorithms	PO1,PO2, PO4,PO7, PO9,PO10,PSO2

PO and PSO mapping with level of strength for Course Name BOL212\_Introduction to Computer Network Lab

Course Code_ Course Name	CO's	P	P	P	PO	P	P	P	P	P	P	PS	PS
		O	O	O	4	O	O	O	O	O	O	O	O2



		1	2	3		5	6	7	8	9	10	11	
BOL212_Introduction to Computer Network Lab	CO1	2	2	2							3		3
	CO2	3	3		3		2				3		2
	CO3	2	3	3		3			3		3		3
	CO4	3	3		3			3		2	3		3
	CO5	3	2	2		3	3		3		3		2
	CO6	3	3		3			3		3	3		2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	PS O 1	PS O 2
	BOL212_Introduction to Computer Network Lab	2.6	2.6	1.1	1.6	1	.8	1	1	.8	3		2.5

#### *Strength of Correlation*

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

<b>School: SET</b>		<b>Batch:</b>		
<b>Program: BTECH</b>		<b>Current Academic Year:</b>		
<b>Branch: CSE</b>		<b>Semester:</b>		
1	Course Code	BOL214		
2	Course Title	BOL214_Web Designing and its Application Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-2		
	Course Status			
5	Course Objective	The objective of this course is to provide a foundation of technologies and technical skills in web development. Based upon the development of a web, this course provides an insight of computer and networking technologies, and hands on experience in web programming.		
6	Course Outcomes  (same as theory course)	CO1: Develop the HTML programs CO2: Use Html5 features for web page development CO3: Design the web page using CSS3 CO4: Develop xml programs CO5: Apply validation on user data access. CO6: Develop a website using html5, csss, xml, javascript		
7	Course Description	This course is an overview of the modern Web technologies used for the Web development. The purpose of this course is to give students the basic understanding of how things work in the Web world from the technology point of view as well as to give the basic overview of the different technologies.		
8				CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>		
		Program related to Html		CO1
	<b>Unit 2</b>	<b>HTML5</b>		
		Program realated to html5		CO3
	<b>Unit 3</b>	<b>CSS</b>		
		Program related to CSS		CO3
	<b>Unit 4</b>	<b>XML</b>		
		Programs related to xml		CO2
	<b>Unit 5</b>	<b>Java Script</b>		
		Program related to javascript		CO5,CO6
	Mode of examination	Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	-		

	Other References		
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**PO and PSO mapping with level of strength for Course Name BOL214\_Web Designing and its Application Lab**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO 3
BOL214_ Web Designing and its Application Lab	CO1			2		2				3			2			
	CO2			2		2				3						
	CO3			2		2				3			2	2	3	
	CO4			2		2				3						
	CO5			2		2				3						
	CO6	3	3	3		2	3	2		3		2	3	3	3	2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
	BOL214_Web Designing and its Application Lab	3	3	2.16		2	3	2		3		2	2.33	2.5	3	2

**Strength of Correlation**

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

# TERM-V

<b>School: SET</b>		<b>Batch : 2020</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2020-20</b>	
<b>Branch: CS/IT</b>		<b>Semester: V</b>	
1	Course Code	BCA 021	Course Name
2	Course Title	<b>Client Server Computing</b>	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	<ul style="list-style-type: none"> <li>● Provide students with an overview of the methodologies and approaches to client server computing</li> <li>● Gain insight into the components of Client Server Application</li> <li>● Provide the students with practice of client server systems</li> <li>● Prepare students for research in the area of client server computing and related applications</li> <li>● Enhance students communication and problem solving skills</li> </ul>	
6	Course Outcomes	<p>Students will be able to:</p> <p><b>CO1:</b> To understand and implement client server computing</p> <p><b>CO2:</b> To understand the client server components</p> <p><b>CO3:</b> To identify the application area of client server computing</p> <p><b>CO4:</b> To know how to develop client server network and data storage is used in client server architecture.</p> <p><b>CO 5:</b>To understand basic network and Internet protocols including sockets, stream and packet protocols such as TCP, UDP, HTTP, FTP and SMTP protocols for creating simple two tier client server applications;</p> <p><b>CO 6:</b> To Identify multi-tier client server computing systems with remote and web services protocols for creating distributed client server systems;</p>	
7	Course Description	This course introduces advanced aspects of data warehousing and data mining, encompassing the principles, to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Client/Server Computing</b>	
	A	Architecture of Client Server Computing , Single system image, Client Server architecture	CO1, CO2
	B	Mainframe-centric client server computing, downsizing and client server computing	CO1, CO2
	C	Preserving mainframe applications investment through porting, client server development tools, and advantages of client server computing.	CO1, CO2
	<b>Unit 2</b>	<b>Components of Client/Server application</b>	
	A	The client: services, request for services, RPC, windows services, fax, print services, remote boot services, other remote	CO1, CO2,

		services, Utility Services & Other Services, Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE), Common Object Request Broker Architecture (CORBA)	
	B	<b>The server:</b> Detailed server functionality, the network operating system, available platforms	CO1, CO2
	C	Network operating system, Different platforms of OS, Introduction to server operating system.	CO1, CO2
	<b>Unit 3</b>	<b>Client/Server Network</b>	
	A	<b>Client/Server Network:</b> Connectivity, Communication interface technology, Interposes communication, wide area network technologies, Network topologies (Token Ring, Ethernet, FDDI, CDDI) network management	CO1, CO2, CO3
	B	<b>Client-Server system development:</b> Software, Client-Server System Hardware: Network Acquisition, PC-level processing unit, Macintosh, notebooks	CO1, CO2, CO3
	C	UNIX workstation, x-terminals, Server hardware.	CO1, CO2, CO3
	<b>Unit 4</b>	<b>Client Server Systems Development</b>	
	A	Services and Support, system administration, Availability, Reliability, Serviceability	CO1, CO2, CO3
	B	Software Distribution, Performance, Network management, Help Disk, Remote Systems Management Security	CO1, CO2, CO3
	C	LAN and Network Management issues. Training, Training advantages of GUI Application, System Administrator Training, Database Administrator Training, End-user training.	CO1, CO2, CO3
	<b>Unit 5</b>	<b>Data Storage</b>	
	A	Magnetic disk, magnetic tape, CD-ROM, WORM, Optical disk, mirrored disk, fault tolerance	CO1, CO2, CO3 CO4
	B	RAID, RAID-Disk network interface cards. Network protection devices, Power Protection Devices, UPS	CO1, CO2, CO3 CO4
	C	The future of client server Computing Enabling Technologies, The transformational system.	CO1, CO2, CO3 CO4
	Mode of examination	Theory	
	Weightage Distribution	CA	MTE
		30%	20%
	Text book/s* Other References	1. Patrick Smith & Steave Guengerich, "Client / Server Computing", PHI 2. Dawna Travis Dewire, "Client/Server Computing", TMH	
		3. Majumdar & Bhattacharya, "Database management System", TMH 4. Korth, Silberchatz, Sudarshan, "Database Concepts", McGraw Hill 5. Elmasri, Navathe, S.B, "Fundamentals of Data Base System", Addison Wesley	

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> To understand and implement client server computing	PO1,PO2,PO3,PSO1
2.	<b>CO2:</b> To understand the client server components	PO1, PO2, PO3, PO4, PSO1
3.	<b>CO3:</b> To identify the application area of client server computing	PO1,PO2,PO4, PSO1 PSO3
4.	<b>CO4:</b> To know how to develop client server network and data storage is used in client server architecture.	PO1, PO2,PO3,PO5 PSO1
5.	<b>CO 5:</b> To understand basic network and Internet protocols including sockets, stream and packet protocols such as TCP, UDP, HTTP, FTP and SMTP protocols for creating simple two tier client server applications.	PO2, PO4, PO5, PSO2
6.	<b>CO 6:</b> To Identify multi-tier client server computing systems with remote and web services protocols for creating distributed client server systems.	PO1,PO2,PO3,PO4, PSO1, PSO2

### **PO and PSO mapping with level of strength for Course Name Client-Server Computing (Course Code BCA 021)**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
Client-Server Computing_BCA 021	CO1	2	3	1										1		
	CO2	2	2	2	3									2		
	CO3	2	3		2									1		3
	CO4	3	1	2		2								2		
	CO5		2		1	2									2	
	CO6	2	3	1	2									2	3	

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
		2	2.33	1	1.33	.66								1.33	0.83	0.5

<b>School: SET</b>		<b>Batch : 2020 onwards</b>	
<b>Program: B.Sc.</b>		<b>Current Academic Year: 2020-21</b>	
<b>Branch:CS &amp; IT</b>		<b>Semester: V</b>	
1	Course Code	BCO022	Course Name: B.Sc.
2	Course Title	Introduction to Distributed System	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	This course provides an introduction to the fundamentals of distributed computer systems with Various issues and challenges.	
6	Course Outcomes	Students will be able to: CO1: Identify the core concepts of distributed systems. CO2:Examine how existing systems have applied the concepts of distributed systems in designing large system. CO3: Demonstrate the various synchronization algorithm. CO4: Apply these concepts to develop distributed transactions in large systems. CO5: Compare the different methods for concurrency protocol. CO6: Illustrate the security protocols in distributed systems in order to relate better with real world systems.	
7	Course Description	This course introduces the concepts of distributed operating system, algorithms and design issues and challenges in Distributed system, identify the problems, and choose the relevant models and algorithms to apply.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction to Distributed System</b>	
	A	Introduction: definition, characteristics and challenges of distributed systems,	CO1, CO2
	B	architectural models (client-server)Time: Physical and logical time, event ordering,	CO1, CO2
	C	clock synchronization, message delivery ordering	CO1, CO3
	<b>Unit 2</b>	<b>Synchronization</b>	
	A	Limitation of Distributed system	CO2, CO3
	B	absence of global clock, shared memory,	CO2, CO3
	C	Logical clocks ,Lamport's& vectors logical clocks.	CO2, CO3
	<b>Unit 3</b>	<b>Distributed Algorithm</b>	
	A	classification of Agreement Problem, Byzantine agreement problem,	CO4
	B	Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem,	CO4



	C	Application of Agreement problem, Atomic Commit in Distributed Database system.		CO4
	<b>Unit 4</b>	<b>Distributed Transactions</b>		
	A	<b>Transactions and Concurrency Control:</b> Transactions, Nested transactions,		CO4,CO5
	B	Locks, Optimistic Concurrency control, Timestamp ordering,		CO4,CO5
	C	Comparison of methods for concurrency control.		CO4,CO5
	<b>Unit 5</b>	<b>Security</b>		
	A	Security protocol in distributed system		CO5,CO6
	B	main threats and techniques for ensuring security (secure channels & firewalls		CO5,CO6
	C	Fault tolerance and availability		CO5,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill		
	Other References	1. Ramakrishna,Gehrke," Database Management Systems", Mc Grawhill 2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Education. 3. Tenanuanbaum, Steen," Distributed Systems", PHI. 4. Gerald Tel, "Distributed Algorithms", Cambridge University Press.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>CO1:</b> Identify the core concepts of distributed systems.	PO1, PO2, PO3,PO4 PSO2
2.	<b>CO2:</b> Examine how existing systems have applied the concepts of distributed systems in designing large system.	PO1, PO2, PO3,PO4 PSO2
3.	<b>CO3:</b> Demonstrate the various synchronization algorithm	PO1, PO2, PO3,PO4 PSO2
4.	<b>CO4:</b> Apply these concepts to develop distributed transactions in large systems.	PO1, PO2, PO3,PO4 PSO2
5.	<b>CO5:</b> Compare the different methods for concurrency protocol.	PO1, PO2, PO3,PO4 PSO2
6.	<b>CO6:</b> Illustrate the security protocols in distributed systems in order to relate better with real world systems.	PO1, PO2, PO3,PO4 PSO2

**PO and PSO mapping with level of strength for Course Name Introduction to Distributed System (BCO022)**

B.Sc.	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	
	CO1	3	2	2	2	--	--	--	--	--	--	--	--	2
	CO2	3	2	2	2	---	---	--	---	---	---	---	---	2
	CO3	3	2	2	2	---	---	--	---	---	---	---	---	2
	CO4	3	2	2	2	---	---	--	---	---	---	---	---	2
	CO5	3	2	2	2	--	--	--	--	--	--	--	--	2
	CO6	3	2	2	2	--	--	--	--	--	--	--	--	2
	AVG.	3	2	2	2		--	--	--	--	--	--	--	2

## COMPUTER GRAPHICS

<b>School: SET</b>		<b>Batch : 2020 onwards</b>	
<b>Program: BCA (MM)</b>		<b>Current Academic Year:</b>	
<b>Branch: CSE</b>		<b>Semester: II</b>	
1	Course Code	<b>BCO031</b>	Course Name: <b>Computer Graphics</b>
2	Course Title	Computer Graphics	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	core	
5	Course Objective	The main objective of this module is to introduce to the students the concepts of computer graphics. It starts with an overview of interactive computer graphics, two-dimensional system and mapping, then it presents the most important drawing algorithm, two-dimensional transformation; Clipping and an introduction to 3-D graphics.	
6	Course Outcomes	Students will be able to: <b>CO1: Illustrate</b> the applications and techniques of Computer Graphics and current trends <b>CO2: Design</b> various object to create various application. <b>CO3: Select</b> methods for the representation and transformation of graphical images and pictures. <b>CO4: Describe</b> the fundamentals of 2D and 3D <b>CO5: Apply</b> 2D and 3D transformations, projection and viewing contrast <b>CO6: Examine</b> various animation types and algorithmic concepts to apply the animated effects.	
7	Course Description	Computer Graphics is a study of the hardware and software principles of interactive raster graphics. Topics include an introduction to the basic concepts, 2-D and 3-D modeling and transformations, viewing transformations, projections, rendering techniques, graphical software packages and graphics systems.	
8	Outline syllabus	CO Mapping	
	<b>Unit 1</b>	<b>Introduction (Graphic System Primitives)</b>	
	A	Concept of computer graphics, Application areas, and Display devices-CRT	CO1, CO2
	B	Raster scan and Random scan display, Color display techniques	CO1, CO2,CO3
	C	Frame buffer and display file, Interactive input devices	CO1, CO2, CO3
	<b>Unit 2</b>	<b>Raster Algorithms</b>	
	A	Line drawing algorithms -- DDA and Bresenham's algorithm	CO1, CO2, CO3,CO6
	B	Circle generation algorithm—Midpoint & Bresenham's algorithm, ellipses and other curves generation	CO1, CO2, CO3,CO6
	C	Area filling-Inside and Outside test, Scan line	CO1, CO2, CO3,CO6

		algorithm, aliasing techniques	
<b>Unit 3</b>	<b>Two-dimensional Transformation</b>		
A	Basic transformations-Translation, rotation		CO1,CO2,CO3,CO4,CO5
B	scaling and reflection, coordinate system		CO3,CO4,CO5
C	windowing and clipping-point, line and polygon clipping, Segments		CO3,CO4,CO5
<b>Unit 4</b>	<b>Three-dimensional Transformation</b>		
A	Basic transformations-Translation, rotation, scaling and reflection		CO1, CO2,CO3,CO4,CO5
B	Parallel & Perspective Projection, Types of Parallel & Perspective Projection		CO3,CO4,CO5
C	3-d clipping, segments		CO3,CO4,CO5
<b>Unit 5</b>	<b>Hidden surface removal Algorithm and Animation</b>		
A	Z-Buffer, Painter's Algorithm, Warnock's Algorithm, Scan line Algorithm.		CO1,CO2,CO4,CO5
B	Introduction to Animation, Principles of Animation		CO1,CO2,CO4,CO5,CO6
C	Types of Animation: 2D animation, 3D animation., Typography Animation, Clay animation, Sand Animation, Flip book Animation		CO1, CO2, CO6
Mode of examination	Theory		
Weightage Distribution	CA	MTE	ETE
	30%	20%	50%
Text book/s*	1.Hearn, M. Baker, "Computer Graphics – C Version", 2nd Edition, Pearson Education, 2002		
Other References	1. D. Rogers, J. Adams, "Mathematical Elements for Computer Graphics", 2 <sup>nd</sup> Edition, Tata McGraw-Hill Publication, 2002.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>Illustrate</b> the applications and techniques of Computer Graphics and current trends	PO1, PO2, PO3, PO4,PO5, PO6, PO9, PO10,PSO1,PSO2
2.	<b>Design</b> various object to create various application.	PO1, PO2, PO3,PO4, PO8, PO9, PO10, PSO1,PSO2
3.	<b>Select</b> methods for the representation and transformation of graphical images and pictures.	PO1,PO2,PO3,PO5, PO7,PO8,PO10, PSO1,PSO2,
4.	Describe the fundamentals of 2D and 3D	PO1, PO2, PO3, PO4,PO5,PO10

5.	<b>Apply</b> 2D and 3D transformations, projection and viewing contrast	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PSO1, PSO2
6.	<b>Examine</b> various animation types and algorithmic concepts to apply the animated effects	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO9, PO10, PSO1, PSO2

**PO and PSO mapping with level of strength for Computer Graphics (Course Code BCO031)**

Course Objectives	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	3	3	2	2	2	3	-	-	2	3	2	2
CO2	3	3	3	3	-	-	-	3	2	3	3	3
CO3	2	2	3	-	3	-	3	3	-	3	3	3
CO4	3	3	3	2	1	-	-	3	3	3	3	3
CO5	2	2	3	3	3	3	3	3	3	3	3	3
CO6	3	3	3	2	-	3	3	2	2	2	3	3
	2.6	2.6	2.8	2	1.5	1.5	1.5	2.3	2	2.8	2.8	2.8

### Multimedia & Animation

<b>School: SET</b>		<b>Batch : 2020 onwards</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2020</b>	
<b>Branch: CS/IT</b>		<b>Semester: V</b>	
1	Course Code	BCO032	
2	Course Title	BCO032_Multimedia & Animation	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	This course emphasizes the design and implementation of 2D animation for a wide variety of multimedia products.	
6	Course Outcomes	<p>On successful completion of the course students will be able to:</p> <p>CO1: <b>Illustrate</b> the concepts Multimedia, Multimedia Hardware and Software.</p> <p>CO2: <b>Discover</b> different approaches in Multimedia and Animation.</p> <p>CO3: <b>Analyse</b> The concept of 2D and 3D animation.</p> <p>CO4: <b>Apply</b> Audio, and Video Production Techniques to an Animation Project.</p> <p>CO5: <b>Choose</b> layout and designing principles for animation.</p> <p>CO6: <b>Demonstrate</b> the use of digitized sound, video control, and scanned images</p>	
7	Course Description	Multimedia is the combined use of text, graphics, sound, animation, and video. A primary objective of this workshop is to teach participants how to develop multimedia programs. Another objective is to demonstrate how still images, sound, and video can be digitized on the computer.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction to Multimedia</b>	
	A	What is multimedia, Components of multimedia, usage of multimedia, design principles of multimedia, Multimedia hardware and Multimedia software	CO1, CO2
	B	Multimedia operating system: Concepts of Operating system, Types of Multimedia Operating system	CO1, CO2
	C	Multimedia communication systems and types	CO1, CO2
	<b>Unit 2</b>	<b>Image and Video</b>	
	A	Image: Creation of image (BMP & vector), image colour models, Image file format, Image compression.	CO1,CO2, CO6
	B	Video: video broadcast standard (PAL, NTSC),	CO1,CO2,

		shooting and editing video.	CO4,CO6						
	C	Video file formats. Video tips, video compression: MPEG standards.	CO1,CO2, CO4,CO6						
	<b>Unit 3</b>	<b>Animation</b>							
	A	Principle of Animation. Animation techniques: cell animation, computer animation.	CO2,CO3, CO5						
	B	Kinematics, morphing, anti-aliasing, animation files formats.	CO2, CO5						
	C	Different animation packages: Acrobat Photoshop, flash.	CO2, CO5						
	<b>Unit 4</b>	<b>2D Animation</b>							
	A	Introduction to 2D animation: Drawing concept, Colour theory & basics, Incorporating sound into 2D animation	CO2, CO3, CO4, CO6						
	B	Drawing concept and colour theory & basics, Incorporating sound into 2D animation	CO2, CO3, CO4, CO6						
	C	Introduction to 3D Animation: Techniques of 3D animation, Create, Edit and working with 3D Animation Graph	CO2, CO3, CO4, CO6						
	<b>Unit 5</b>	<b>Layout &amp; Designing</b>							
	A	Basic of sketching still and assignment of basic drawing, composition of basic elements.	CO1, CO2, CO5						
	B	Work in different media, such as drawing, collage and painting	CO1, CO2, CO5, CO6						
	C	Pixel and resolution: vector and bitmap Graphics.	CO1, CO2, CO5, CO6						
	Mode of examination	Theory							
	Weightage Distribution	<table border="1"> <tr> <td>CA</td> <td>MTE</td> <td>ETE</td> </tr> <tr> <td>30%</td> <td>20%</td> <td>50%</td> </tr> </table>	CA	MTE	ETE	30%	20%	50%	
CA	MTE	ETE							
30%	20%	50%							
	Text book/s*	1. Multimedia Making It Work-by Tay Vaughan, Tata Mcgrwa Hills. 2. Multimedia Systems: John F, Koegel Buford Pearson.							
	Other References	1. Multimedia In Action-James E Shuman-Vikas Publishing House 2. Multimedia basic-Volumes-1 Technology.							

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<i>Illustrate</i> the concepts Multimedia, Multimedia Hardware and Software.	PO1, PO2, PO3, PO4, PO10, PSO1,PSO2
2.	<i>Discover</i> different approaches in Multimedia and Animation.	PO1, PO2, PO3, PO4,PO5, PO6, PO7,PO10, PSO1,

		PSO2
3.	<i>Analyse:</i> The concept of 2D and 3D animation.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PSO1, PSO2
4.	<i>Apply</i> Audio, and Video Production Techniques to an Animation Project.	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO9, PO10, PSO1, PSO2
5.	<i>Choose</i> layout and designing principles for animation.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PSO1, PSO2
6.	<i>Demonstrate</i> the use of digitized sound, video control, and scanned images	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PSO1, PSO2

**PO and PSO mapping with level of strength for BCO032\_Multimedia & Animation**

Course Objectives	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	3	1	1	1	-	-	-	-	-	3	1	1
CO2	3	1	2	2	1	3	2	-	-	3	3	1
CO3	2	2	2	3	3	1	-	2	-	-	3	2
CO4	2	3	3	3	3	2	2	2	3	2	3	3
CO5	2	2	3	1	3	1	3	3	3	2	3	1
CO6	2	3	3	1	2	3	3	-	3	-	3	1
	2.33	2	2.33	1.83	2	1.66	1.66	1.16	1.5	1.66	2.66	1.5



## 2.1 BCA 209 Introduction to Software Engineering

<b>School:</b>		<b>School of Engineering and technology</b>	
<b>Department</b>		<b>Department of Computer Science and Engineering</b>	
<b>Program:</b>		<b>BSc CS/IT</b>	
<b>Branch:</b>		<b>Computer Science and Engineering</b>	
1	Course Code	<b>BCO209</b>	
2	Course Title	Introduction to Software Engineering	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core /Elective/Open Elective	
5	Course Objective	The objective of this course is to provide fundamental knowledge of software engineering, and make student aware of best software engineering practices, and contemporary software engineering tools.	
6	Course Outcomes	Students will be able to: CO1: Compare various software development life cycle models CO2: Apply requirement engineering techniques to develop SRS for a project. CO3: Classify various design techniques CO4: Categorize testing strategies for a software system CO5: Explain quality and maintenance concepts CO6: Create and deliver quality software as an individual or as part of a multidisciplinary team.	
7	Course Description	This course covers the fundamentals of software engineering, including understanding system requirements, finding appropriate engineering compromises, effective methods of design, testing, maintenance and quality.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Software engineering and Process model</b>	
	A	Definition, Significance challenges and Software Myths in software engineering, Software Components, Software Characteristics, Software Crisis, Software applications	CO1
	B	Software Development Methodologies: Waterfall model, prototyping model, Incremental model	CO1
	C	Spiral model, V model, RAD model, Agility, Extreme Programming (XP)	CO1
	<b>Unit 2</b>	<b>Requirement Engineering</b>	
	A	Requirement Elicitation: Interviews, Brain Storming Sessions, Feasibility study	CO2
	B	Functional & Non Functional Requirements, Known Requirements, Unknown Requirements, Undreamt Requirement	CO2
	C	Requirement Documentation: Characteristics of SRS, Document SRS according to IEEE standards	CO2

<b>Unit 3</b>	<b>Software Design</b>			
A	<b>System Design:</b> System Design, Problem Partitioning, Functional vs. Object- Oriented approach , Top-Down and Bottom-Up design			CO3
B	design concepts: Abstraction, Modularity , Software Architecture, Low level design, Design structure chart, pseudocode, Information Hiding, Data Flow diagrams			CO3
C	decision table, Cohesion and Coupling measures and types			CO3
<b>Unit 4</b>	<b>Software Testing</b>			
A	Fundamental of testing: Objectives, principles, Terminologies: Error, Mistake, Bug, Fault and Failure			CO4
B	Levels of testing: Unit Testing, Integration Testing, System Testing, Acceptance Testing: Alpha & Beta Testing, Integration techniques			CO4,CO6
C	White Box Testing, Black Box Testing, Verification and Validation, Debugging			CO4,CO6
<b>Unit 5</b>	<b>Software Maintenance and Quality</b>			
A	Introduction to Maintenance, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance			CO5,CO6
B	Quality Concepts: Quality, Quality Control, Cost of Quality, Software Quality Assurance , SQA plan			CO5,CO6
C	The ISO 9000 Quality Standards, Capability Maturity Model, CASE Tools			CO5,CO6
Mode of examination	Theory/Jury/Practical/Viva			
Weightage Distribution	CA	MTE	ETE	
	30%	20%	50%	
Text book/s*	1. Pressman R S, “Software Engineering: A Practitioners Approach”, McGraw Hill.			
Other References	1. Jalote, Pankaj, “Software Engineering”New Delhi: Narosa (Latest Ed.) 2. Schaum’s Series, “Software Engineering” TMH			

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Compare various software development life cycle models	PO1,PO2,PO5,PO8,PO9,PSO1,PSO2
2.	CO2: Apply requirement engineering techniques to develop SRS for a project.	PO1,PO2,PO4,PO5,PO8,PO9,PSO1,PSO2
3.	CO3: Classify various design techniques	PO1,PO2,PO4,PO5,PO8,PO9,PSO1,PSO2
4.	CO4: Categorize testing strategies for a software system	PO1,PO2,PO4,PO5,PO8,PO9,PSO1,PSO2
5.	CO5: Explain quality and maintenance concepts	PO1,PO2,PO4,PO5,PO8,PO9,PSO1,PSO2
6.	CO6: Create and deliver quality software as an individual or as part of a multidisciplinary team.	PO1,PO2,PO3,PO4,PO5,PO6,PO7,PO8,PO9,PO10, PSO1,PSO2

### PO and PSO mapping with level of strength for Course Name Introduction to Software Engineering (Course Code BCO209)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCO209_Introduction to software Engineering	CO1	3	2	-	-	2	-	-	3	3	-	3	2
	CO2	3	3	-	2	3	-	-	3	3	-	3	2
	CO3	3	3	-	1	3	-	-	3	3	-	3	2
	CO4	3	3	-	2	2	-	-	3	3	-	3	2
	CO5	3	3	-	1	2	-	-	3	3	-	3	2
	CO6	3	3	2	2	2	2	2	3	3	3	3	2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCA209	Introduction to Software Engineering	3	2.8	2	1.6	2.3	2	2	3	3	3	3	2

### Strength of Correlation

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

<b>School: SET</b>		<b>Batch : 2020</b>	
<b>Program: BCA</b>		<b>Current Academic Year: 2020-20</b>	
<b>Branch:</b>		<b>Semester: VI</b>	
1	Course Code	BCO304	Course Name: BCA
2	Course Title	Introduction to PHP	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status		
5	Course Objective	To design & develop secure web pages using server side scripting (frontend and backend)	
6	Course Outcomes	On successful completion of the course, the student will: CO1: Define the basic concepts of PHP. CO2: Understand how server-side programming works on the web CO3: Apply PHP script to handle HTML forms CO4: Discover PHP programs that use various PHP library functions, and that manipulate files and directories. CO5: Appraise and solve various database tasks using the PHP language CO6: Develop Websites for Small business and organization or for individual	
7	Course Description	This course introduces Concepts for PHP and learns Form handling, Session Management. How we can develop dynamic websites. It will also help students to build applications according to their problem statements.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>PHP Basics</b>	
	A	Introduction to PHP , Working with PHP, Why PHP?, Basic Syntax of PHP	CO1,CO2
	B	PHP statement terminator and case insensitivity, Embedding PHP in HTML	CO1,CO2
	C	Comments, Variables, Assigning value to a variable, Constants, Managing Variables, Understanding variable scope, Global Variables, Static Variables	CO1,CO2
	<b>Unit 2</b>	<b>Operators, Control Structures and Functions in PHP</b>	
	A	Arithmetic Operators, Bit-wise Operators, Comparison Operators, Logical Operators, Concatenation Operator, Incrementing/Decrementing Operator, Ternary Operator	CO1,CO2,CO6
	B	Conditional Control Structures: If statement, If- else statement, If- else if statement, Nested If, Switch statement, Looping Control Structures: For loop, While loop, Do- While loop, For-each	CO1,CO2,CO6
	C	Functions, User-Defined function, Function Definition,	CO1,CO2,CO4

		Function with arguments, Function with return value, Call by value and call by references, Built-in functions in PHP.		
	<b>Unit 3</b>	<b>Array and Form Handling</b>		
	A	Array: single, multi dimensional, numeric array, associative array		CO6
	B	Accessing form elements using GET and POST, Assigning value to form elements		CO3,CO6
	C	Form validation: validation, required, validate url, dealing with uploaded file, error handling		CO3,CO6
	<b>Unit 4</b>	<b>File Handling &amp; Session Management</b>		
	A	Opening files in different modes, handling file open error		CO4,CO6
	B	File Operation: Reading & writing data on web page from file, deleting file, renaming file		CO4,CO6
	C	Session Management: introduction, creation, destroying and login session management		CO4,CO6
	<b>Unit 5</b>	<b>PHP Database Connectivity</b>		
	A	SQL Basic query: create, insert, select, delete, update, truncate, drop		CO5,CO6
	B	Introduction to database, database connectivity		CO5,CO6
	C	Retrieving records, retrieving fields from record, closing connection		CO5,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Peter MacIntyre, Rasmus Lerdorf, Kevin Tatroe, "Programming PHP", O'Reilly Publication		
	Other References	<ol style="list-style-type: none"> <li>1. Steven Holzner, "Php: The Complete Reference", TMH publication</li> <li>2. Ivan Bayross, "Web Enabled Commercial Applications Development Using HTML, JavaScript, DHTML and PHP", 4<sup>th</sup> revised Edition, BPB Publication</li> </ol>		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Define the basic concepts of PHP.	PO1,PO2,PO3,PO4,PO5,PO8,PO10,PSO1
2.	CO2: Understand how server-side programming works on the web	PO3,PO4,PO10,PSO2
3.	CO3: Apply PHP script to handle HTML forms	PO3,PO4,PO8,PO10
4.	CO4: Discover PHP programs that use various PHP library functions, and that manipulate files and directories.	PO3,PO4,PO10
5.	CO5: Appraise and solve various database tasks using the PHP language	PO3,PO4,PO8,PO10,PSO2
6.	CO6: Develop Websites for Small business and organization or for individual	PO1,PO2,PO3,PO4,PO5,PO8,PO10,PSO1,PSO2

### **PO and PSO mapping with level of strength for Course Name Introduction to PHP(Course Code BCO304)**

CSE	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
	CO1	2	2	2	2	2				3		2	1
CO2				2	1						2		1
CO3				2	1				2		2		
CO4				2	1						2		
CO5				2	1				1		2		3
CO6	2	2	2	2	3	3	1		3		3	3	2

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<b>School: SET</b>		<b>Batch:</b>		
<b>Program: BTECH</b>		<b>Current Academic Year:</b>		
<b>Branch: CSE</b>		<b>Semester:</b>		
1	Course Code	BOL 304		
2	Course Title	Introduction to PHP Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-2		
	Course Status			
5	Course Objective	This course introduces the open source Web scripting language PHP and helps in building dynamic Web applications. It defines the Semantics and syntax of the PHP language		
6	Course Outcomes  (same as theory course)	CO1: Define regular expressions including modifiers and operators. CO2: Demonstrate PHP programs that use various PHP library functions CO3: Develop PHP scripts to handle HTML forms. CO4: Analyze and solve various database tasks using the PHP language. CO5: Determine the PHP script to validate form data. CO6: Solve common Web application tasks by writing PHP programs.		
7	Course Description	This course discusses the practical problems that PHP solves. It helps in developing server-side cross-platform HTML-embedded scripts to implement dynamic Web pages that interact with databases and files.		
8				CO Mapping
	<b>Unit 1</b>	<b>PHP Basics</b>		
		Program related to Basics of PHP		CO1
	<b>Unit 2</b>	<b>Operators, Control Structures and Functions in PHP</b>		
		Program related to Operators, Control Structures and Functions in PHP		CO2
	<b>Unit 3</b>	<b>Array and Form Handling</b>		
		Program related to Array and form handling in PHP		CO3,CO5
	<b>Unit 4</b>	<b>File Handling &amp; Session Management</b>		
		Program related to file handling and session management in PHP		CO2
	<b>Unit 5</b>	<b>PHP Database Connectivity</b>		
		Program related to Database connectivity in PHP		CO4,CO6
	Mode of examination	Jury/Practical/Viva		
	Weightage Distribution	CA 60%	MTE 0%	ETE 40%
	Text book/s*	Peter MacIntyre, Rasmus Lerdorf, Kevin Tatroe, "Programming PHP", O'Reilly Publication		
	Other References	3. Steven Holzner, "Php: The Complete Reference", TMH publication 4. Ivan Bayross, "Web Enabled Commercial Applications Development Using HTML, JavaScript, DHTML and		

		PHP", 4 <sup>th</sup> revised Edition, BPB Publication	
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**CO and PO Mapping**

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Define regular expressions including modifiers and operators.	PO1,PO2,PO3,PO4,PO10
2.	CO2: Demonstrate PHP programs that use various PHP library functions	PO1,PO2,PO3,PO4,PO10
3.	CO3: Develop PHP scripts to handle HTML forms.	PO1,PO3,PO4,PO8,PO10
4.	CO4: Analyze and solve various database tasks using the PHP language.	PO1,PO3,PO4,PO8,PO10,PSO1
5.	CO5: Determine the PHP script to validate form data.	PO3,PO4,PO8,PO10
6.	CO6: Solve common Web application tasks by writing PHP programs.	PO1,PO2,PO3,PO4,PO5,PO8,PO10,PSO1,PSO2

**PO and PSO mapping with level of strength for Course Name Introduction to PHP Lab (Course Code BCP372)**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCP372 - Introduction to PHP Lab	CO1	2	2	2	2						2		
	CO2	2	2	2	2						2		
	CO3	1		2	2				1		2		
	CO4	1		2	3				1		2	2	
	CO5			2	2				1		2		
	CO6	2	1	2	3	3			3		3	2	2

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
		1.6	1.67	2	2.3	3	0	0	1.5	0	2.7	2	2



### List of Experiments

- Write a PHP program to print a message.
- Write a PHP program to find a square of a number.
- Write a PHP program to swap two numbers without using 3rd variable.
- Write a PHP program to find the area of rectangle, square, circle using predefined value.
- Write a PHP program to find factorial of a number
- Write a PHP program to print Fibonacci series upto 17.
- Write a PHP program to implement calculator.
- Write a PHP program to find the smallest number from an array.
- Write a PHP program to arrange the numbers in ascending order.
- Write a PHP program to make a login form and check the input using another PHP page.
- Write a PHP program to find the sum of all elements in a multidimensional array using for loop.
- Write a PHP program to validate a form input.
- Write a PHP program of file handling (reading a file line by line until end of file
- Write a PHP program for uploading a file in PHP.
- Write a program to read input data, from table and display all these information in tabular form on output screen.

# TERM-VI

<b>School: SET</b>		<b>Batch : 2020 onwards</b>	
<b>Program: B.Tech.</b>		<b>Current Academic Year: 2020</b>	
<b>Branch: CSE</b>		<b>Semester:</b>	
1	Course Code	BCA043	Course Name- Introduction to AIML
2	Course Title	Introduction to AIML	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	The course objective to provide a foundation in artificial intelligence techniques for planning, with an overview of the wide spectrum of different problems and approaches, including their underlying theory and their applications	
6	Course Outcomes	<p>After Successful completion of this course the student will be able to:</p> <p>CO1-<b>Demonstrate</b>: fundamental understanding of artificial intelligence (AI)</p> <p>CO2- <b>Illustrate</b>: various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models</p> <p>CO3- <b>Apply</b>: Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning</p> <p>CO4- <b>Analyze</b>: Mathematical models and apply them to a range of AI problems</p> <p>CO5-<b>Choose</b>: AI planning technology for projects in different application domains</p> <p>CO6- <b>Compare</b>: performance of different learning algorithms</p>	
7	Course Description	This course will offer skill development in the use of software to develop storyboards and 2-dimentional animation including creating, importing and sequencing media elements to create multi-media presentations. Emphasis will be on conceptualization, creativity, and visual aesthetics.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>	
	A	Foundation of AI, Goals of AI, History and AI course line,	CO1, CO2
	B	Introduction to Intelligent Agents; Environment; Structure of Agent,	CO1, CO2
	C	AI Solutions Vs Conventional Solutions; a philosophical approach; a practical approach.	CO1, CO2
	<b>Unit 2</b>	<b>PROBLEM SOLVING AGENTS</b>	
	A	Problem solving using Search Techniques; Problems; Solutions; Optimality,	CO1, CO2, CO3
	B	Informed Search Strategies; Greedy Best-First; A* Search; Heuristic	CO1, CO2,

	Functions,		CO3
C	Uninformed Search Strategies; BFS; DFS; DLS; UCS; IDFS; BDS. Local Search algorithms: Hill Climbing, genetic Algorithms.		CO1, CO2, CO3
<b>Unit 3</b>	<b>KNOWLEDGE &amp; REASONING</b>		
A	Knowledge-Based Agents; clause form, First-Order Logic; Syntax-Semantics in FOL;		CO1, CO2, CO3, CO4
B	Representation revisited, ; Simple usage; Inference Procedure; Inference in FOL;		CO1, CO2, CO3, CO4
C	Forward Chaining; Backward Chaining; Resolution		CO1, CO2, CO3, CO4
<b>Unit 4</b>	<b>LEARNING</b>		
A	Common Sense Vs Learning; Components; Representations; Forms of learning, Feedback, Learning Types: Supervised; Unsupervised;		CO3, CO4, CO5
B	Reinforcement Learnings, Decision trees,		CO3, CO4, CO5
C	Artificial Neural Networks: Introduction, types of networks; Single Layer and Multi-Layer n/w.		CO3, CO4, CO5
<b>Unit 5</b>	<b>PLANNING AND APPLICATIONS</b>		
A	Introduction and Planning in Context State-Space Search: Heuristic Search and STRIPS Plan-Space Search and HTN Planning Graph plan and Advanced Heuristics Plan Execution and Applications		CO4,CO5, CO6
B	Robotics – Hardware; Vision; Navigation based case studies,		CO4,CO5, CO6
C	Water jug problem and similar case studies		CO4,CO5, CO6
Mode of examination	Theory		
Weightage Distribution	CA	MTE	ETE
	30%	20%	50%
Text book/s*	ARTIFICIAL INTELLIGENCE - SIE by RICH, McGraw Hill		
Other References	Russell, S., & Norvig, P. Artificial intelligence: a modern approach. Third Edition. Pearson new international edition. 2014.		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	<b>Demonstrate:</b> fundamental understanding of artificial intelligence (AI)	PO1, PO2, PO6, PO9, PO10

2.	<b>Illustrate:</b> various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models	PO1, PO2, PO3, PO4, PO5, PO7, PO10
3.	<b>Apply:</b> Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8
4.	<b>Analyze:</b> Mathematical models and apply them to a range of AI problems	PO1, PO2, PO3, PO4, PO8, PO9, PO10
5.	<b>Choose:</b> AI planning technology for projects in different application domains	PO1, PO2, PO3, PO8, PO9, PO10
6.	<b>Compare:</b> performance of different learning algorithms	PO1, PO2, PO3, PO4, PO5, PO6, PO7

**PO and PSO mapping with level of strength for Introduction to AIML (Course Code BCA043)**

Course Objectives	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	3	3	-	-	-	2	-	-	3	3	2	2
CO2	3	3	3	3	3	-	3	-	-	3	2	1
CO3	2	2	3	3	3	3	3	3	-	-	1	2
CO4	2	2	3	3	-	-	-	3	3	3	2	3
CO5	2	2	3	-	-	-	-	3	3	3	1	1
CO6	2	3	2	3	3	3	3	-	-	-	2	1
	2.4	2.5	2.3	2	1.5	1.4	1.5	1.5	1.5	2	1.7	1.7

## BCO106: System Analysis and Design

<b>School:</b>		<b>School of Engineering and technology</b>	
<b>Department</b>		<b>Department of Computer Science and Engineering</b>	
<b>Program:</b>		<b>BSc</b>	
<b>Branch:</b>		<b>CS/IT</b>	
1	Course Code	BCO051	
2	Course Title	System Analysis and Design	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core /Elective/Open Elective	
5	Course Objective	This course aims to introduce techniques of system used by analysts, designers to manage projects, analyze and document systems, design new systems and implement their plans.	
6	Course Outcomes	Student will be able to CO1: Explain what systems are and how they are developed. CO2: Outline different information systems and role of system analyst CO3: Analyze system planning and information gathering techniques CO4: Compare various tools for system design and development CO5: Select appropriate maintenance and security measures for error free system CO6: Solve business problems through analyzing the requirements of information systems and designing such systems by applying analysis and design techniques.	
7	Course Description	This module introduces the students to the concepts and skills of system analysis and design. It includes coverage of Types of system, role of system analysts, Tools for system development , Implementation, maintenance and system security.	
8	Outline syllabus		CO Mapping
	<b>Unit 1</b>	<b>Basic Concept of Systems</b>	
	A	Definition and Concepts; Elements of a System: Input, Output Processor, Control, Feedback, Environment, Boundaries and Interface; Characteristics of a System	CO1
	B	Types of systems -Physical and Abstract System, Open and Closed Systems, Man-made Systems; Information and its categories	CO1
	C	System Development and its various phases, approaches to improve the system development	CO1
	<b>Unit 2</b>	<b>Information system and its documentation</b>	

	A	Information systems : TPS, OAS, MIS, DSS, ESS		CO2
	B	Role and need of system analyst, System Analyst as an agent of change.		CO2
	C	System documentation: Types of documentation and their importance.		CO2
	<b>Unit 3</b>	<b>System Planning and Information Gathering</b>		
	A	Initial Investigations, Identification of user needs, Project Identification and Selection; Needs of Information Gathering, Determination of requirements,		CO3,CO6
	B	Information gathering tools: interviews, group communication, questionnaires, presentations and site visits.		CO3,CO6
	C	Feasibility study, Types of feasibility study, Cost-Benefit Analysis: Tools and Techniques.		CO3,CO6
	<b>Unit 4</b>	<b>Tools for system development</b>		
	A	Data Flow Diagram (DFD), Logical and Physical DFDs, Developing DFD		CO4,CO6
	B	System Flowcharts and Structured charts, Structured English, Decision trees and Decision tables		CO4,CO6
	C	System Design Module specifications, Module Coupling and cohesion, Top-down and bottom-up design		CO4,CO6
	<b>Unit 5</b>	<b>Implementation and Maintenance</b>		
	A	Input and Output Input design: Input data, Input media and devices; Output design; Form Design: Classification of forms, Requirements of Form design		CO5,CO6
	B	Need of System Testing, Types of System Testing, Quality Assurance, Maintenance activities and issues		CO5,CO6
	C	Security Threats, Risk Analysis, Control measures, System Audit, Disaster Recovery Planning		CO5,CO6
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Elias M. Awad, System Analysis & Design, Galgotia.		
	Other References	Perry Edwards: System Analysis & design Mc Graw Hill		

### CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Explain what systems are and how they are developed.	PO1,PO2,PO4,PO7,PO9,PO10,PSO2
2.	CO2: Outline different information systems and role of system analyst	PO1,PO2,PO3,PO4,PO7,PO8,PO9,PO10,PSO2

3.	CO3: Analyze system planning and information gathering techniques	PO1,PO2,PO4,PO7,PO8,PO9,PO10, PSO1,PSO2
4.	CO4: Compare various tools for system design and development	PO1,PO2,PO3,PO4,PO7,PO8,PO9,PO10 ,PSO2
5.	CO5: Select appropriate maintenance and security measures for error free system	PO1,PO2,PO3,PO4,PO7,PO8,PO9,PO10 ,PSO2
6.	CO6: Solve business problems through analyzing the requirements of information systems and designing such systems by applying analysis and design techniques.	PO1,PO2,PO3,PO4,PO5,PO6,PO7,PO8, PO9,PO10,PSO1,PSO2

**PO and PSO mapping with level of strength for Course Name System Analysis and Design(Course Code BCO051)**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCO051_ System Analysis and Design	CO1	1	2	-	1	-	-	1	-	1	2	-	3
	CO2	2	3	1	1	-	-	2	2	3	3	2	3
	CO3	2	3	-	1	-	-	2	2	3	3	2	3
	CO4	2	3	3	1	-	-	2	2	3	3	2	3
	CO5	2	3	1	1	-	-	2	2	3	3	2	3
	CO6	3	3	3	1	3	3	3	3	3	3	3	3

*Average of non-zeros entry in following table (should be auto calculated).*

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
BCO51	System Analysis and Design												

**Strength of Correlation**

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

