



**R-18**

# **CURRICULUM ESSENTIALS**

**Handbook on Outcome Based Education**

**INFORMATION TECHNOLOGY**

**NARULA INSTITUTE OF TECHNOLOGY**

**[WWW.NIT.AC.IN](http://WWW.NIT.AC.IN)**

## Institute Mission

- To establish continuously improving academic ambience in the Institute in order to prepare the students with beyond curriculum knowledge, creativity, innovation, problem solving abilities, teamwork, communication skills etc. for their holistic development.
- To collaborate with Institutes of higher education, Professional Societies, R&D and Industrial organisations for continuous improvement of academic, research environment in the Institute and to build a strong Industry-Institute interface.
- To promote and nurture entrepreneurial and innovative quality of the students providing proper education, training and supportive facilities so that future entrepreneurs emerge with flying colors.
- To strengthen quality and knowledge-base of faculty through faculty development programmes for continuous upgradation to remain in tune with dynamically changing technology.
- To become a responsible contributor in the socio-economic development of the society through excellence in education and research.

## Institute Vision

To make the Institute excellent in technological education and research by imparting equitable, inclusive, ethical, flexible and multidisciplinary knowledge to budding technologists to serve the society.

## Institute Quality Policy

- Adoption of appropriate standards and practices for good governance, to bring in transparency of all operations and thereby improve credibility at all levels.
- Industry-ready professionals to be developed through interactive teaching learning process involving state of the art class rooms, laboratories, libraries, corporate exposure and innovative project work.
- Higher studies/research for faculty & staff to be encouraged for up gradation of knowledge through participation in Quality Improvement Programs, Seminars, Workshops, Webinars etc.
- Laboratory facilities would be upgraded in emerging areas to promote R&D activities including participation in Govt. and Industry funded projects.
- Industrial consultancy to be carried out in an effective manner for developing sense of accomplishment.
- Interaction with Professional Societies would be encouraged for the professional growth and development of the students, faculties and staff for mutual benefit.
- NBA Accreditation for all AICTE approved programs to be obtained at the earliest and maintained on a long-term basis.
- The innovative and entrepreneurial skills of the students to be nurtured through Innovation & Incubation center, finally culminating in start-ups.

## Department Mission

### **B.Tech. in Information Technology**

- M1:** To address multi-various aspects of academic growth in Information Technology
- M2:** To disseminate advanced concepts for pursuing research and development oriented activity in Information and Communication Technology
- M3:** To guide the students to become successful IT Professionals with relevant skills
- M4:** To motivate the students to explore their capabilities for utilizing there intellectual potential

## Department Vision

### **B.Tech. in Information Technology**

To provide an appropriate ambience for creating IT professionals of international standards who would be able to cope with situational challenges in the emerging field of information technology with a new view to serving IT society in particular and human society in general.

# Program Educational Objects (PEOs)

## B.Tech. in Information Technology

- **PEO1.** The graduates of the program will be able to analyze, design and invent computing solutions for multidisciplinary engineering and scientific challenges.
- **PEO2:** The graduates of the program will be able to pursue a successful career in industry, academia, research or public sector by the acquired skill and knowledge as a competent professional.
- **PEO3:** The graduates of the program will be able to exhibit an exceptional and active participation and involvement in Research and Development leading to innovations and optimized solutions.
- **PEO4:** The graduates of the program will be able to engage in lifelong learning for professional advancement and effective communication of the technical information and Perform effectively in multi-disciplinary and multi-cultural environments with valued professionalism and ethical practices within organization and society at national and international level.

## Program outcomes (POs)

### Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **Program Specific Outcomes (PSOs)**

### **B.Tech. in Information Technology**

- PSO1.** Design, develop and maintain state-of-the-art hardware and software system and applications.
- PSO2.** Classify, analyze and extend different aspects of Information Technology for solving real life problems.
- PSO3.** Identify and design solutions for futuristic problems through the proficiency acquired.

# Curriculum Structure

## 1<sup>ST</sup> YEAR, 1<sup>ST</sup> SEMESTER

1 <sup>st</sup> Semester								
				Contact Hours /Week				Credit Points
				L	T	P	Total	
<b>A. THEORY</b>								
1	BS	M 101	Mathematics -I	3	1	0	4	4
2	BS	CH 101/ PH 101	Chemistry (Gr. A) / Physics-I (Gr. B)	3	0	0	3	3
3	ES	EE 101/ EC 101	Basic Electrical Engineering (Gr. A) / Basic Electronics Engineering (Gr. B)	3	0	0	3	3
4	HS	HU 101	English	2	0	0	2	2
<b>Total of Theory</b>							<b>12</b>	<b>12</b>
<b>B. PRACTICAL</b>								
5	BS	CH 191/ PH191	Chemistry Lab (Gr. A) / Physics- I Lab (Gr. B)	0	0	3	3	1.5
6	ES	EE 191/ EC 191	Basic Electrical Engineering Lab (Gr. A) / Basic Electronics Engineering Lab (Gr. B)	0	0	3	3	1.5
7	ES	ME 191/ ME 192	Engineering Graphics & Design (Gr A) / Workshop / Manufacturing Practices (Gr-B)	0	0	3	3	1.5
8	PROJ	PR 191	PROJECT-IA	0	0	1	1	0.5
9	PROJ	PR 192	PROJECT-IB	0	0	1	1	0.5
<b>C. MANDATORY ACTIVITIES / COURSES</b>								
10	MC	MC 181	Induction Program	0	0	0	0	
<b>Total of Theory, Practical &amp; Mandatory Activities/Courses</b>						aa	<b>22</b>	<b>17.5</b>

**1<sup>ST</sup> YEAR, 2<sup>ND</sup> SEMESTER**

2 <sup>nd</sup> Semester								
				Credit Hours /Week				Credit Points
				L	T	P	Total	
<b>A. THEORY</b>								
1	BS	M 201	Mathematics -II	3	1	0	4	4
2	BS	CH 201/ PH 201	Chemistry - (Gr. B) / Physics – I (Gr. A)	3	0	0	3	3
3	ES	EE 201/ EC 201	Basic Electrical Engineering (Gr. B) / Basic Electronics Engineering (Gr. A)	3	0	0	3	3
4	ES	CS 201	Programming for Problem Solving	3	0	0	3	3
5	ES	ME 201	Engineering Mechanics	3	0	0	3	3
<b>Total of Theory</b>							<b>16</b>	<b>16</b>
<b>B. PRACTICAL</b>								
6	ES	CS291	Programming for Problem Solving Lab	0	0	3	3	1.5
7	BS	CH 291/ PH 291	Chemistry Lab (Gr. B) / Physics - I Lab (Gr. A)	0	0	3	3	1.5
8	ES	EE 291/ EC 291	Basic Electrical Engineering Lab (Gr. B) / Basic Electronics Engineering Lab (Gr. A)	0	0	3	3	1.5
9	ES	ME 291/ ME 292	Engineering Graphics & Design (Gr B) / Workshop/Manufacturing Practice (Gr-A)	0	0	3	3	1.5
10	HS	HU 291	Language Lab	0	0	2	2	1
11	PROJ	PR 291	Project-II	0	0	1	1	0.5
12	PROJ*	PR 292	Innovative activities-I	0	0	0	0	0.5
<b>C. MANDATORY ACTIVITIES / COURSES</b>								
13	MC	MC 281	NSS/ Physical Activities/Meditation & Yoga/Photography/ Nature Club	0	0	0	3	
<b>Total of Theory, Practical &amp; Mandatory Activities/Courses</b>							<b>34</b>	<b>24.0</b>

**2<sup>ND</sup> YEAR, 3<sup>RD</sup> SEMESTER**

<b>3rd Semester</b>									
SL No	Type	Code	THEORY	Contact Hours/Week				Credit Points	
				L	T	P	Total		
<b>A. THEORY</b>									
1	PC	IT301	Data Structure and Algorithm	3	0	0	3	3	
2	PC	IT 302	Analog and Digital Electronics	3	0	0	3	3	
3	BS	M (IT)301	Mathematics -III	3	1	0	4	4	
4	BS	PH 301	Physics-II	3	0	0	3	3	
5	ES	M(IT)302	Numerical Methods and Statistics	3	0	0	3	3	
Total of Theory								16	16
<b>B. PRACTICAL</b>									
6	PC	IT391	Data Structure Lab	0	0	3	3	1.5	
7	PC	IT 392	Analog and Digital Electronics Lab	0	0	3	3	1.5	
8	BS	PH391	Physics-II Lab	0	0	3	3	1.5	
9	ES	M(IT)392	Numerical Methods and Statistics Lab	0	0	3	3	1.5	
10	PROJ	PR 391	Project-III	0	0	2	2	1	
11	PROJ*	PR 392	Innovative activities-II	0	0	0	1	0.5	
<b>C. MANDATORY ACTIVITIES / COURSES</b>									
12	MC	MC 381	Behavioural and Interpersonal Skills	0	0	3	3		
Total of Theory, Practical & Mandatory Activities/Courses								33	23.5

**2<sup>ND</sup> YEAR, 4<sup>TH</sup> SEMESTER**

4 <sup>th</sup> Semester								
				Contact Hours /Week				
				L	T	P	Total	
<b>A. THEORY</b>								
1	PC	IT401	Computer Organization & Architecture	3	0	0	3	3
2	PC	IT402	Object Oriented Programming using Java	3	0	0	3	3
3	PC	IT403	Formal Language and Automata Theory	3	0	0	3	3
4	PC	IT404	Communication Engineering & Coding Theory	3	0	0	3	3
5	HS	HU 401	Values & Ethics in Profession	2	0	0	2	2
<b>Total of Theory</b>							<b>14</b>	<b>14</b>
<b>B. PRACTICAL</b>								
6	PC	IT491	Computer Organization & Architecture Lab	0	0	3	3	1.5
7	PC	IT492	Object Oriented Programming Lab	0	0	3	3	1.5
8	PC	IT493	Programming Skill Development Lab	0	0	3	3	1.5
9	PROJ	PR 491	Project-IV	0	0	2	2	1
10	PROJ*	PR 492	Innovative activities-III	0	0	0	0	0.5
<b>C. MANDATORY ACTIVITIES / COURSES</b>								
11	MC	MC 401	Environmental Science	0	0	3	3	
<b>Total of Theory, Practical &amp; Mandatory Activities/Courses</b>							<b>28</b>	<b>20</b>

**3<sup>RD</sup> YEAR, 5<sup>TH</sup> SEMESTER**

5 <sup>th</sup> Semester								
				Contact Hours /Week				Credit Points
				L	T	P	Total	
<b>A. THEORY</b>								
1	PC	IT501	Design & Analysis of Algorithm	3	0	0	3	3
2	PC	IT502	Software Engineering	3	0	0	3	3
3	PC	IT503	Operating System	3	0	0	3	3
4	HS	HU503	Industrial & Financial Management	2	0	0	2	2
			A. Programming practice with C++					
			B. Artificial Intelligence and Expert System					
			C. Microprocessor Microcontroller					
<b>Total of Theory</b>							<b>14</b>	<b>14</b>
<b>B. PRACTICAL</b>								
6	PC	IT591	Algorithm Lab	0	0	3	3	1.5
7	PC	IT592	Software Engineering Lab	0	0	3	3	1.5
8	PC	IT593	Operating System Lab	0	0	3	3	1.5
			A. Programming practice with C++ Lab					
			B. Artificial Intelligence and Expert SystemLab					
			C. Microprocessor Microcontroller Lab					
10	PROJ	PR 591	Project-V	0	0	2	2	1
11	PROJ*	PR 592	Innovative activities-IV	0	0	0	0	0.5
<b>C. MANDATORY ACTIVITIES / COURSES</b>								
12	MC	MC 501	Constitution of India	3	0	0	3	
<b>Total of Theory, Practical &amp; Mandatory Activities/Courses</b>							<b>31</b>	<b>21.5</b>

**3<sup>RD</sup> YEAR: 6<sup>TH</sup> SEMESTER**

6 <sup>th</sup> Semester								
				Contact Hours /Week				Credit Points
				L	T	P	Total	
<b>A. THEORY</b>								
1	PC	IT601	Database Management System	3	0	0	3	3
2	PC	IT602	Web Technology	3	0	0	3	3
3	PC	IT603	Computer Networking	3	0	0	3	3
			A. E-Commerce and ERP					
			B. Digital Image Processing					
			C. Soft Computing					
<b>Total of Theory</b>							<b>12</b>	<b>12</b>
<b>B. PRACTICAL</b>								
5	PC	IT691	Database System Lab	0	0	3	3	1.5
6	PC	IT692	Web Technology Lab	0	0	3	3	1.5
7	PC	IT693	Computer Networking Lab	0	0	3	3	1.5
			A. E-Commerce and ERP Lab					
			B. Digital Image Processing Lab					
			C. Soft Computing Lab					
9	PROJ	PR 691	Project-VI	0	0	2	2	1
10	PROJ*	PR 692	Innovative activities-V	0	0	0	0	0.5
<b>C. MANDATORY ACTIVITIES / COURSES</b>								
11	MC	MC 681	Technical Lecture Presentation & Group Discussion-I	0	0	3	3	
<b>Total of Theory, Practical &amp; Mandatory Activities/Courses</b>							<b>29</b>	<b>19.5</b>

4<sup>TH</sup> YEAR: 7<sup>TH</sup> SEMESTER

7 <sup>th</sup> Semester								
				Contact Hours /Week				Credit Points
				L	T	P	Total	
<b>A. THEORY</b>								
			A. Cloud Computing					
			B. Computer Graphics and Multimedia					
			C. Distributed System					
			D. Machine Learning					
			A. Cryptography and Network Security					
			B. Data Warehousing and Data Mining					
			C. Advanced Computer Architecture					
			D. Compiler Design					
			A. Sensor Network					
			B. Pattern Recognition					
			C. Internet Technology					
			D. Robotics					
			A. Modeling and Simulation					
			B. Microelectronics and VLSI Design					
			C. Mobile Communication					
			D. Operations Research					
<b>Total of Theory</b>							<b>12</b>	<b>12</b>
<b>B. PRACTICAL</b>								
			A. Cloud Computing Lab					
			B. Computer Graphics and Multimedia Lab					
			C. Distributed System Lab					
			D. Machine Learning using R Programming Lab					
6	PROJ	PR 791	Project-VII	0	0	9	9	4.5
7	PROJ*	PR 792	Innovative activities-VI	0	0	0	0	0.5
<b>C. MANDATORY ACTIVITIES / COURSES</b>								
7	MC	MC 781	Seminar/GD/ Presentation Skill/ ForeignLanguage	0	0	3	3	
<b>Total of Theory, Practical &amp; Mandatory Activities/Courses</b>							<b>27</b>	<b>18.5</b>

4<sup>TH</sup> YEAR: 8<sup>TH</sup> SEMESTER

8 <sup>th</sup> Semester								
				Contact Hours /Week				Credit Points
				L	T	P	Total	
<b>A. THEORY</b>								
1	HS	HU804	Principles of Management	2	0	0	2	2
			A. Block Chain					
			B. Big Data Analytics					
			C. Virtual Reality					
			D. Natural Language Processing					
			A. Bio-Informatics					
			B. Embedded System					
			C. Internet of Things (IoT)					
			D. Deep Learning					
			A. Data Sciences					
			B. Cyber Law and IPR					
			C. Cluster and Grid Computing					
			D. Entrepreneurship Development					
<b>Total of Theory</b>							<b>11</b>	<b>11</b>
<b>B. PRACTICAL</b>								
5	PROJ	PR 891	Project-VIII	0	0	9	9	4.5
<b>C. MANDATORY ACTIVITIES / COURSES</b>								
6	MC	MC 801	Essence of Indian Knowledge Tradition	3	0	0	3	
<b>Total of Theory, Practical &amp; Mandatory Activities/Courses</b>							<b>23</b>	<b>115.5</b>

<b>STREAM</b>	<b>: INFORMATION TECHNOLOGY</b>
<b>SUBJECT NAME</b>	<b>: MATHEMATICS-I</b>
<b>SUBJECT CODE</b>	<b>: M101</b>
<b>YEAR</b>	<b>: FIRST</b>
<b>SEMESTER</b>	<b>: 1<sup>st</sup> Semester</b>
<b>CONTACT HOURS</b>	<b>: 3:1:0</b>
<b>CREDITS</b>	<b>: 4</b>

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Understand and recall the properties and formula related to matrix algebra, differential calculus, integral calculus and vector calculus.
<b>CO2</b>	Determine the solutions of the problems related to matrix algebra, differential calculus, multivariable calculus, vector calculus and infinite series.
<b>CO3</b>	Apply the appropriate mathematical tools of matrix algebra, differential calculus, Integral Calculus, multivariable calculus, vector calculus and infinite series for the solutions of the related problems.
<b>CO4</b>	Analyse different engineering problems linked with matrix algebra, differential calculus, Integral Calculus, multivariable calculus, vector calculus,
<b>CO5</b>	Apply different engineering problems linked with matrix algebra, differential calculus, Integral Calculus, multivariable calculus, vector calculus.

### CO-PO Mapping

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
<b>CO1</b>		3	3	3	-	-	-	-	-	-	-	-	-
<b>CO2</b>		3	3	3	2	-	-	-	-	-	-	-	-
<b>CO3</b>		3	3	3	3	-	-	-	-	-	-	-	-
<b>CO4</b>		3	3	3	3	-	-	-	-	-	-	-	-
<b>CO5</b>		3	3	3	3	-	-	-	-	-	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>M101.1</b>	-	-	2
<b>M101.2</b>	-	-	2
<b>M101.3</b>	-	-	2
<b>M101.4</b>	-	-	2
<b>M101.5</b>	-	-	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Physics –I**  
**SUBJECT CODE** : **PH 101**  
**YEAR** : **FIRST**  
**SEMESTER** : **1<sup>st</sup> Semester**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Describe various types mechanical resonance and its electrical equivalence  
**CO2:** Explain basic principles of Laser, Optical fibers and various types of semiconductors  
**CO3:** Apply superposition to explain interference and diffraction as well as apply wave mechanicsto attainment of Heisenberg’s uncertainty principle  
**CO4:** Analyze importance of light as a carrier of information and examine differentcrystallographic structures according to their co-ordination number and packing factors  
**CO5:** Justify the need of a quantum mechanics as remedy to overcome limitations imposed by classicalphysics

### CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	-	-	-	-	-	-	-	-
CO2	2	3	3	2	-	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
PH101.1	2	-	-
PH101.2	2	-	-
PH101.3	2	-	-
PH101.4	2	-	-
PH101.5	2	-	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Basic Electronics Engineering**  
**SUBJECT CODE** : **EC101**  
**YEAR** : **FIRST**  
**SEMESTER** : **1<sup>st</sup> Semester**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Students able to describe the fundamentals of Semiconductors
<b>CO2</b>	Students able to explain V-I characteristics of P-N Junction Diode, Zener diode, working of diode rectifier, clipper, clamper, and regulator circuit
<b>CO3</b>	Students able to analyze characteristics of Bipolar junction transistor (BJT) under CE, CB, CC mode of operation and it's biasing therein
<b>CO4</b>	Students able to illustrate the operations of JFET, MOSFET and the CS, CD, CG configuration using JFET
<b>CO5</b>	Students able to construct inverting amplifier circuit, non-inverting amplifier circuit, adder circuit, integrator and differentiator circuit using Operational Amplifier IC

### CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>EC101.1</b>	3	-	-
<b>EC101.2</b>	3	-	-
<b>EC101.3</b>	3	-	-
<b>EC101.4</b>	3	-	-
<b>EC101.5</b>	3	-	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **English**  
**SUBJECT CODE** : **HU101**  
**YEAR** : **FIRST**  
**SEMESTER** : **1<sup>st</sup> Semester**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **2**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

**CO1:** Understand and communicate in English in a globalized workplace scenario.

**CO2:** Understand and apply the basic grammatical skills of the English language and develop reading and comprehension skills.

**CO3:** Acquire a working knowledge of writing strategies, formats and templates of professional writing.

**CO4:** Understand and know about and employ formal communication modes in meetings and reports.

**CO5:** Understand and know about and use objective and culturally neutral language in interpersonal and business communication.

### CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
<b>CO1</b>	-	-	-	-	-	2	1	-	1	1	-	-
<b>CO2</b>	-	-	-	-	-	2	1	-	1	1	-	-
<b>CO3</b>	-	-	-	-	-	2	1	-	1	1	-	-
<b>CO4</b>	-	-	-	-	-	2	1	-	1	1	-	-
<b>CO5</b>	-	-	-	-	-	2	1	-	1	1	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>HU101.1</b>	-	2	3
<b>HU101.2</b>	-	2	3
<b>HU101.3</b>	-	2	3
<b>HU101.4</b>	-	2	3
<b>HU101.5</b>	-	2	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Physics I Lab**  
**SUBJECT CODE** : **PH 191**  
**YEAR** : **FIRST**  
**SEMESTER** : **1<sup>st</sup> Semester**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Demonstrate experiments allied to their theoretical concepts.
<b>CO2</b>	Conduct experiments using LASER, Optical fiber, Torsional pendulum.
<b>CO3</b>	Participate as an individual and as a member or leader in groups in laboratory sessions actively.
<b>CO4</b>	Analyse experimental data and graphical representations to communicate effectively in laboratory reports including innovative experiments.
<b>CO5</b>	Develop critical thinking skills to solve real life challenges.

### CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	3	3	3	-	-	-	-	1	-	-	-
<b>CO2</b>	3	3	3	3	-	-	-	-	1	-	-	-
<b>CO3</b>	3	3	3	3	-	-	-	-	1	-	-	-
<b>CO4</b>	3	3	3	3	-	-	-	-	1	-	-	-
<b>CO5</b>	3	3	3	3	-	-	-	-	1	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>PH191.1</b>	-	-	-
<b>PH191.2</b>	-	-	-
<b>PH191.3</b>	-	-	-
<b>PH191.4</b>	-	-	-
<b>PH191.5</b>	-	-	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Basic Electronics Engineering Lab**  
**SUBJECT CODE** : **EC 191**  
**YEAR** : **FIRST**  
**SEMESTER** : **1<sup>st</sup> Semester**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Knowledge of Electronic components such as Resistors, Capacitors, Diodes, Transistors measuring equipment like DC power supply, Multimeter, CRO, Signal generator, DC power supply.
<b>CO2</b>	Analyze the characteristics of Junction Diode, Zener Diode, BJT & FET and different types of Rectifier Circuits.
<b>CO3</b>	Determination of input-offset voltage, input bias current and Slew rate, Common-mode Rejection ratio, Bandwidth and Off-set null of OPAMPs.
<b>CO4</b>	Able to know the application of Diode, BJT & OPAMP.
<b>CO5</b>	Understand working of various electronic circuits knowledge of basic electronic components of the circuits.

### CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	-	-	-	-	1	-	-	-
CO2	3	3	3	3	-	-	-	-	1	-	-	-
CO3	3	3	3	3	-	-	-	-	1	-	-	-
CO4	3	3	3	3	-	-	-	-	1	-	-	-
CO5	3	3	3	3	-	-	-	-	1	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>EC191.1</b>	3	-	2
<b>EC191.2</b>	3	-	2
<b>EC191.3</b>	3	-	2
<b>EC191.4</b>	3	-	2
<b>EC191.5</b>	3	-	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Workshop/Manufacturing Practices**  
**SUBJECT CODE** : **ME 192**  
**YEAR** : **FIRST**  
**SEMESTER** : **1<sup>st</sup> Semester**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

**CO1:** Gain basic knowledge of Workshop Practice and Safety useful for our daily living.

**CO2:** Understand the use of Instruments of a pattern shop like Hand Saw, Jack Plain, Chisels etc.

**CO3:** Apply and performing operations like such as Marking, Cutting etc used in manufacturing processes.

**CO4:** Analyse the various operations in the Fitting Shop using Hack Saw, various files, Scriber, etc to understand the concept of tolerances applicable in all kind of manufacturing.

**CO5:** Get hands on practice of in Welding and apply various machining processes which give a lot of confidence to manufacture physical prototypes in project works.

### CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	3	-	-	-	-	2	-	-	-
CO2	2	3	3	3	-	-	-	-	2	-	-	-
CO3	2	3	3	3	-	-	-	-	2	-	-	-
CO4	2	3	3	3	-	-	-	-	2	-	-	-
CO5	2	3	3	3	-	-	-	-	2	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>ME192.1</b>	2	3	-
<b>ME192.2</b>	2	3	-
<b>ME192.3</b>	2	3	-
<b>ME192.4</b>	2	3	-
<b>ME192.5</b>	2	3	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Mathematics - II**  
**SUBJECT CODE** : **M 201**  
**YEAR** : **FIRST**  
**SEMESTER** : **2<sup>ND</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **4**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Determine and recall the properties and formula related to Ordinary differential equations, Multiple integral, vector integral and Laplace transform.
<b>CO2</b>	Determine the solutions of the problems related to Ordinary differential equations, Multiple integral, vector integral and Laplace transform.
<b>CO3</b>	Apply appropriate mathematical tools of Ordinary differential equations, Multiple integral, vector integral and Laplace transform.
<b>CO4</b>	Analyze engineering problems on Ordinary differential equations, Multiple integral, vector integral and Laplace transform.
<b>CO5</b>	Apply engineering solutions by using Ordinary differential equations, Multiple integral, vector integral and Laplace transform.

### CO-PO Mapping

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>		3	3	3	3	-	-	-	-	-	-	-	-
<b>CO2</b>		3	3	3	3	-	-	-	-	-	-	-	-
<b>CO3</b>		3	3	3	3	-	-	-	-	-	-	-	-
<b>CO4</b>		3	3	3	3	-	-	-	-	-	-	-	-
<b>CO5</b>		3	3	3	3	-	-	-	-	-	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>M201.1</b>	-	-	2
<b>M201.2</b>	-	-	2
<b>M201.3</b>	-	-	2
<b>M201.4</b>	-	-	2
<b>M201.5</b>	-	-	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Chemistry**  
**SUBJECT CODE** : **CH 201**  
**YEAR** : **FIRST**  
**SEMESTER** : **2<sup>ND</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Able to describe the fundamental properties of atoms & molecules, atomic structure and the periodicity of elements in the periodic table
<b>CO2</b>	Able to apply fundamental concepts of thermodynamics in different engineering applications.
<b>CO3</b>	Able to apply the knowledge of water quality parameters, corrosion control & polymers to different industries.
<b>CO4</b>	Able to determine the structure of organic molecules using different spectroscopic techniques.
<b>CO5</b>	Capable to evaluate theoretical and practical aspects relating to the transfer of the production of chemical products from laboratories to the industrial scale, in accordance with environmental considerations.

### CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	2	2	3	-	-	2	-	-	-	-	-
<b>CO2</b>	3	2	2	3	-	-	2	-	-	-	-	-
<b>CO3</b>	3	2	2	3	-	-	2	-	-	-	-	-
<b>CO4</b>	3	2	2	3	-	-	2	-	-	-	-	-
<b>CO5</b>	3	2	2	3	-	-	2	-	-	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>CH201.1</b>	2	-	3
<b>CH201.2</b>	2	-	3
<b>CH201.3</b>	2	-	3
<b>CH201.4</b>	2	-	3
<b>CH201.5</b>	2	-	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Basic Electrical Engineering**  
**SUBJECT CODE** : **EE 201**  
**YEAR** : **FIRST**  
**SEMESTER** : **2<sup>ND</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	To understand Basic Electrical circuits, Power distribution and Safety measures.
<b>CO2</b>	To analyze an apply DC network theorems.
<b>CO3</b>	To analyze and apply concept of AC circuits of single-phase and three-phase.
<b>CO4</b>	To analyze and apply concepts of AC fundamentals in solving AC network problems.
<b>CO5</b>	To understand basic principles of Transformers and Rotating Machines.

### CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	3	3	3	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>EE201.1</b>	3	-	2
<b>EE201.2</b>	3	-	2
<b>EE201.3</b>	3	-	2
<b>EE201.4</b>	3	-	2
<b>EE201.5</b>	3	-	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Programming for Problem Solving**  
**SUBJECT CODE** : **CS 201**  
**YEAR** : **FIRST**  
**SEMESTER** : **2<sup>ND</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Understand the fundamental concept of Computer and mathematical knowledge and apply them in designing and analysing solution to engineering problem.
<b>CO2</b>	Understand the basic concept of C programming and use of data types/operators/input/output function for developing and implementing complete program leading to solution of mathematical and engineering problem.
<b>CO3</b>	Use conditional branching, iteration, recursion and formulate algorithms and programs in solving
<b>CO4</b>	Understand the concept of arrays, pointers, file and dynamic memory allocation and apply it for problem solving and also create new data types using structure, union and enum.
<b>CO5</b>	Understand how to decompose a problem into functions and assemble into a complete program by means of modular programming possibly as a team.

### CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	3	3	3	-	-	-	-	-	-	-	1
<b>CO2</b>	3	3	3	3	-	-	-	-	-	-	-	1
<b>CO3</b>	3	3	3	3	-	-	-	-	-	-	-	1
<b>CO4</b>	3	3	3	3	-	-	-	-	-	-	-	1
<b>CO5</b>	3	3	3	3	-	-	-	-	-	-	-	1

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>CS201.1</b>	2	3	3
<b>CS201.2</b>	2	3	3
<b>CS201.3</b>	2	3	3
<b>CS201.4</b>	2	3	3
<b>CS201.5</b>	2	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Engineering Mechanics**  
**SUBJECT CODE** : **ME 201**  
**YEAR** : **FIRST**  
**SEMESTER** : **2<sup>ND</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	To understand representation of force, moments for drawing free-body diagrams and analyze friction-based systems in static condition
<b>CO2</b>	To locate the centroid of an area and calculate the moment of inertia of a section.
<b>CO3</b>	Apply of conservation of momentum & energy principle for particle dynamics and rigid bodykinetics
<b>CO4</b>	Understand and apply the concept of virtual work, rigid body dynamics and systems under vibration.
<b>CO5</b>	Understand static equilibrium of particles and rigid bodies in two dimensions including the effect of friction.

### CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO2</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO3</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO4</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO5</b>	3	3	3	3	-	-	-	-	-	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>ME 201.1</b>	3	2	-
<b>ME 201.2</b>	3	2	-
<b>ME 201.3</b>	3	2	-
<b>ME 201.4</b>	3	2	-
<b>ME 201.5</b>	3	2	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Programming for Problem Solving Lab**  
**SUBJECT CODE** : **CS 291**  
**YEAR** : **FIRST**  
**SEMESTER** : **2<sup>ND</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **1.5**

### **Course Outcome**

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Understand and propose appropriate command or function in running system or developing program for engineering and mathematical problems depending on the platform used even in changed environment leading to their lifelong learning.
<b>CO2</b>	Identify and propose appropriate data type, arithmetic operators, input/output functions and also conditional statements in designing effective programs to solve complex engineering problem using modern tools.
<b>CO3</b>	Design and develop effective programs for engineering and mathematical problems using iterative statements as well as recursive functions using modular programming approach possibly as a team maintaining proper ethics of collaboration.
<b>CO4</b>	Explain and organize data in arrays, strings and structures and manipulate them through programs and also define pointers of different types and use them in defining self-referential structures and also to construct and use files for reading and writing to and from leading to solution of engineering and mathematical problem.
<b>CO5</b>	Prepare laboratory reports on interpretation of experimental results and analyse it for validating the same maintaining proper ethics of collaboration.

### CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	-	-	-	-	-	-	-	1
CO2	3	3	3	3	-	-	-	-	-	-	-	1
CO3	3	3	3	3	-	-	-	-	-	-	-	1
CO4	3	3	3	3	-	-	-	-	-	-	-	1
CO5	3	3	3	3	-	-	-	-	-	-	-	1

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
CS291.1	2	3	3
CS291.2	2	3	3
CS291.3	2	3	3
CS291.4	2	3	3
CS291.5	2	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Chemistry Lab**  
**SUBJECT CODE** : **CH 291**  
**YEAR** : **FIRST**  
**SEMESTER** : **2<sup>ND</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Able to operate different types of instruments for estimation of small quantities chemicals used in industries and scientific and technical fields.
<b>CO2</b>	Able to analyse and determine the composition of liquid and solid samples working as an individual and also as a team member.
<b>CO3</b>	Able to analyse different parameters of water considering environmental issues.
<b>CO4</b>	Able to synthesize drug and polymer materials.
<b>CO5</b>	Capable to design innovative experiments applying the fundamentals of chemistry

### CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	2	-	-	1	-	1	-	-	-
CO2	3	1	2	2	-	-	1	-	1	-	-	-
CO3	3	1	2	2	-	-	1	-	1	-	-	-
CO4	3	1	2	2	-	-	1	-	1	-	-	-
CO5	3	1	2	2	-	-	1	-	1	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>CH 291.1</b>	-	2	-
<b>CH 291.2</b>	-	2	-
<b>CH 291.3</b>	-	2	-
<b>CH 291.4</b>	-	2	-
<b>CH 291.5</b>	-	2	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Basic Electrical Engineering Laboratory**  
**SUBJECT CODE** : **EE 291**  
**YEAR** : **FIRST**  
**SEMESTER** : **2<sup>ND</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Identify and use common electrical components.
<b>CO2</b>	To develop electrical networks by physical connection of various components and analyze the circuit behavior.
<b>CO3</b>	Apply and analyze the basic characteristics of transformers and electrical machines.
<b>CO4</b>	Determine efficiency of a single-phase transformer by direct load test
<b>CO5</b>	Determine Starting, Reversing and speed control of DC shunt motor and test single-phase Energy Meter.

### CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	3	3	3	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>EE291.1</b>	3	2	2
<b>EE291.2</b>	3	2	2
<b>EE291.3</b>	3	2	2
<b>EE291.4</b>	3	2	2
<b>EE291.5</b>	3	2	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Engineering Graphics & Design**  
**SUBJECT CODE** : **ME 291**  
**YEAR** : **FIRST**  
**SEMESTER** : **2<sup>ND</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Get introduced with Engineering Graphics and visual aspects of design.
<b>CO2</b>	Know and use common drafting tools with the knowledge of drafting standards.
<b>CO3</b>	Apply computer aided drafting techniques to represent line, surface or solid models in different Engineering viewpoints.
<b>CO4</b>	Produce part models; carry out assembly operation and show working procedure of a designed project work using animation.
<b>CO5</b>	Understand the concept of projection and acquire visualization skills, projection of points.

### CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO2</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO3</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO4</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO5</b>	3	3	3	3	-	-	-	-	-	-	-	-

### CO-PSO Mapping

COs	PSO1	PSO2	PSO3
<b>ME 291.1</b>	-	2	2
<b>ME 291.2</b>	-	2	2
<b>ME 291.3</b>	-	2	2
<b>ME 291.4</b>	-	2	2
<b>ME 291.5</b>	-	2	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Lang. Lab. and Seminar Presentation**  
**SUBJECT CODE** : **HU 291**  
**YEAR** : **FIRST**  
**SEMESTER** : **2<sup>ND</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **1**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Able to understand advanced skills of Technical Communication in English through Language Laboratory.
<b>CO2</b>	Able to apply listening, speaking, reading and writing skills in societal and professional life.
<b>CO3</b>	Able to demonstrate the skills necessary to be a competent Interpersonal communicator.
<b>CO4</b>	Able to analyze communication behaviours.
<b>CO5</b>	Able to adapt to multifarious socio-economical and professional arenas with the help of effective communication and interpersonal skills.

### CO-PO Mapping

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>P10</b>	<b>P11</b>	<b>P12</b>
<b>CO1</b>	-	-	-	-	-	-	2	-	3	<b>3</b>	-	2
<b>CO2</b>	-	-	-	-	-	-	2	-	3	<b>3</b>	-	2
<b>CO3</b>	-	-	-	-	-	-	2	-	3	<b>3</b>	-	2
<b>CO4</b>	-	-	-	-	-	-	2	-	3	<b>3</b>	-	2
<b>CO5</b>	-	-	-	-	-	-	2	-	3	<b>3</b>	-	2

### CO-PSO Mapping

<b>COs</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
<b>HU 291.1</b>	2	2	2
<b>HU 291.2</b>	2	2	2
<b>HU 291.3</b>	2	2	2
<b>HU 291.4</b>	2	2	2
<b>HU 291.5</b>	2	2	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Data Structure and Algorithm**  
**SUBJECT CODE** : **IT 301**  
**YEAR** : **2ND**  
**SEMESTER** : **3<sup>RD</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Use different kinds of data structures which are suited to different kinds of applications, and some are highly specialized to specific tasks.
<b>CO2</b>	Manage large amounts of data efficiently, such as large databases and internet indexing services.
<b>CO3</b>	Use efficient data structures which are a key to designing efficient algorithms.
<b>CO4</b>	Use some formal design methods and programming languages which emphasize on data structures, rather than algorithms, as the key organizing factor in software design.
<b>CO5</b>	Store and retrieve data stored in both main memory and in secondary memory.

### CO-PO Mapping

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	3	3	3	--	--	--	--	--	--	--	--
<b>CO2</b>	3	3	3	3	--	--	--	--	--	--	--	--
<b>CO3</b>	3	3	3	3	--	--	--	--	--	--	--	--
<b>CO4</b>	3	3	3	3	--	--	--	--	--	--	--	--
<b>CO5</b>	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO Mapping

<b>COs</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
<b>IT 301.1</b>	3	3	3
<b>IT 301.2</b>	3	3	3
<b>IT 301.3</b>	3	3	3
<b>IT 301.4</b>	3	3	3
<b>IT 301.5</b>	3	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Analog and Digital Electronics**  
**SUBJECT CODE** : **IT 302**  
**YEAR** : **2ND**  
**SEMESTER** : **3<sup>RD</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Understand basic analog and digital electronics, including semiconductor properties, operational amplifiers, combinational and sequential logic and analog-to-digital digital-to-analog conversion techniques.
<b>CO2</b>	Identify different symbols, working principles of basic Digital electronics circuits for data processing application.
<b>CO3</b>	Analyze the characteristics of basic digital circuits.
<b>CO4</b>	Design analog amplifiers, combinational logic devices and sequential logic devices like counters and registers.
<b>CO5</b>	Apply different types of wiring and instruments connections keeping in mind technical Economical, safety issues.

### CO-PO Mapping

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	2	--	--	--	--	--	--	--	--	--	--	1
<b>CO2</b>	--	--	--	--	--	--	--	--	--	--	--	--
<b>CO3</b>	--	2	--	3	--	--	--	--	--	--	--	--
<b>CO4</b>	--	2	3	2	1	1	2	--	--	--	--	--
<b>CO5</b>	--	2	3	2	1	1	2	--	--	--	--	--

### CO-PSO Mapping

<b>COs</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
<b>IT 302.1</b>	2	2	2
<b>IT 302.2</b>	2	2	2
<b>IT 302.3</b>	2	2	2
<b>IT 302.4</b>	2	2	2
<b>IT 302.5</b>	2	2	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Mathematics - III**  
**SUBJECT CODE** : **M (IT) 301**  
**YEAR** : **2ND**  
**SEMESTER** : **3<sup>RD</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Recall the distinctive characteristics of probability distribution.
<b>CO2</b>	Demonstrate the theoretical working of probability distribution, abstract algebra, and graph theory.
<b>CO3</b>	Compute the probability of real-world uncertain phenomena by identifying probability distribution that fits the phenomena.
<b>CO4</b>	Understand Binomial, Poisson and Normal distribution with problem solving.
<b>CO5</b>	Construct the shortest path and minimal spanning tree from a given graph using the algorithms of graph theory.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
<b>CO1</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO2</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO3</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO4</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO5</b>	3	3	3	3	-	-	-	-	-	-	-	-

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>M (IT) 301.1</b>	2	3	3
<b>M (IT) 301 .2</b>	2	3	3
<b>M (IT) 301 .3</b>	2	3	3
<b>M (IT) 301 .4</b>	2	3	3
<b>M (IT) 301 .5</b>	2	3	3

<b>STREAM</b>	<b>: INFORMATION TECHNOLOGY</b>
<b>SUBJECT NAME</b>	<b>: Physics II</b>
<b>SUBJECT CODE</b>	<b>: PH 301</b>
<b>YEAR</b>	<b>: 2ND</b>
<b>SEMESTER</b>	<b>: 3<sup>RD</sup> SEMESTER</b>
<b>CONTACT HOURS</b>	<b>: 3:0:0</b>
<b>CREDITS</b>	<b>: 3</b>

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Explain electromagnetic wave propagation using fundamentals of electrostatics, magnetostatics and electromagnetic theory.
<b>CO2</b>	Apply Schrödinger equation in variety of atomic scale problems including nanomaterials.
<b>CO3</b>	Analyze the importance of superposition principle of quantum mechanics in conceptualization of Quantum bits.
<b>CO4</b>	Justify the importance of Fermi energy level in turning electronic properties of various semiconductors.
<b>CO5</b>	Understand the concept of quantum tunnelling with 1D finite barrier problem.

### CO-PO Mapping:

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	2	2	3	--	--	--	--	--	--	--	--
<b>CO2</b>	3	2	2	3	--	--	--	--	--	--	--	--
<b>CO3</b>	3	2	2	3	--	--	--	--	--	--	--	--
<b>CO4</b>	3	2	2	3	--	--	--	--	--	--	--	--
<b>CO5</b>	3	2	2	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

<b>COs</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
<b>PH 301.1</b>	3	-	-
<b>PH 301 .2</b>	3	-	-
<b>PH 301. 3</b>	3	-	-
<b>PH 301 .4</b>	3	-	-
<b>PH 301 .5</b>	3	-	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Numerical Methods and Statistics**  
**SUBJECT CODE** : **M (IT) 302**  
**YEAR** : **2ND**  
**SEMESTER** : **3<sup>RD</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Recall the distinctive principles of numerical analysis and the associated error measures.
<b>CO2</b>	Understand the theoretical workings of numerical techniques.
<b>CO3</b>	Apply numerical methods used to obtain approximate solutions to intractable mathematical problems such as interpolation, integration, the solution of linear and nonlinear equations, and the solution of ordinary differential equations.
<b>CO4</b>	Select appropriate numerical methods to apply to various types of problems in engineering and science in consideration of the mathematical operations involved, accuracy requirements, and available computational resources.
<b>CO5</b>	Interpret complex statistical findings using the understanding of inferential statistics.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
<b>CO1</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO2</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO3</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO4</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO5</b>	3	3	3	3	-	-	-	-	-	-	-	-

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>M (IT) 302.1</b>	3	3	2
<b>M (IT) 302.2</b>	3	3	2
<b>M (IT) 302.3</b>	3	3	2
<b>M (IT) 302.4</b>	3	3	2
<b>M (IT) 302.5</b>	3	3	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Data Structure Lab**  
**SUBJECT CODE** : **IT391**  
**YEAR** : **2ND**  
**SEMESTER** : **3<sup>RD</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Understand the concept of dynamic memory management, data types, basic data structures.
<b>CO2</b>	Be able to design and analyze the time and space efficiency and complexity analysis of the data structure
<b>CO3</b>	Introduce the concept of data structures through ADT.
<b>CO4</b>	Choose the appropriate linear and non-linear data structure and algorithm design method for a specified application design.
<b>CO5</b>	Analyze the complexity of the problems.

### CO-PO Mapping:

		<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>		3	3	3	3	--	--	--	--	--	--	--	--
<b>CO2</b>		3	3	3	3	--	--	--	--	--	--	--	--
<b>CO3</b>		3	3	3	3	--	--	--	--	--	--	--	--
<b>CO4</b>		3	3	3	3	--	--	--	--	--	--	--	--
<b>CO5</b>		3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

<b>COs</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
<b>IT391.1</b>	-	3	3
<b>IT391.2</b>	-	3	3
<b>IT391.3</b>	-	3	3
<b>IT391.4</b>	-	3	3
<b>IT391.5</b>	-	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Analog and Digital Electronics Lab**  
**SUBJECT CODE** : **IT392**  
**YEAR** : **2ND**  
**SEMESTER** : **3<sup>RD</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Examine the characteristics of analog electronic circuit devices such as BJTs and FETs, amplifiers
<b>CO2</b>	Make use of different basic logic gates and universal gates
<b>CO3</b>	Implement the combinational circuits in digital electronics using basic logic gates
<b>CO4</b>	Construct sequential circuits like registers and counters using flip-flops and basic gates
<b>CO5</b>	Realization of Synchronous and Asynchronous counter.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	--	--	--	2	--	--	--	--	--	--	--	--
<b>CO2</b>	2	--	--	2	--	--	--	--	--	--	--	1
<b>CO3</b>	--	2	2	--	--	--	--	--	--	--	--	--
<b>CO4</b>	--	3	2	--	--	1	--	--	--	--	--	--
<b>CO5</b>	1	2	3	--	--	--	--	--	--	--	--	1

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>IT392.1</b>	3	3	-
<b>IT392.2</b>	3	3	-
<b>IT392.3</b>	3	3	-
<b>IT392.4</b>	3	3	-
<b>IT392.5</b>	3	3	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Physics II Lab**  
**SUBJECT CODE** : **PH 391**  
**YEAR** : **2ND**  
**SEMESTER** : **3<sup>RD</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	demonstrate experiments allied to their theoretical concepts
<b>CO2</b>	conduct experiments using semiconductors , dielectric and ferroelectrics
<b>CO3</b>	classify various types of magnetic materials
<b>CO4</b>	participate as an individual, and as a member or leader in groups in laboratory sessions actively
<b>CO5</b>	analyze experimental data from graphical representations , and to communicate effectively them in Laboratory reports including innovative experiments

### CO-PO Mapping:

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	3	3	3	--	--	--	--	1	--	--	--
<b>CO2</b>	3	3	3	3	--	--	--	--	1	--	--	--
<b>CO3</b>	3	3	3	3	--	--	--	--	1	--	--	--
<b>CO4</b>	3	3	3	3	--	--	--	--	1	--	--	--
<b>CO5</b>	3	3	3	3	--	--	--	--	1	--	--	--

### CO-PSO MAPPING:

<b>COs</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
<b>PH391.1</b>	-	-	2
<b>PH391 .2</b>	-	-	2
<b>PH391 .3</b>	-	-	2
<b>PH391 .4</b>	-	-	2
<b>PH391 .5</b>	-	-	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Numerical Methods and Statics Lab**  
**SUBJECT CODE** : **M(IT)392**  
**YEAR** : **2ND**  
**SEMESTER** : **3<sup>RD</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Understand the theoretical workings of numerical techniques with the help of C/ Matlab
<b>CO2</b>	Execute basic command and scripts in a mathematical programming language
<b>CO3</b>	Apply the programming skills to solve the problems using multiple numerical approaches.
<b>CO4</b>	Analyze if the results are reasonable, and then interpret and clearly communicate the results.
<b>CO5</b>	Understand and measurement of Central Tendency Dispersion-variance, Standard deviation.

### CO-PO Mapping:

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO2</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO3</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO4</b>	3	3	3	3	-	-	-	-	-	-	-	-
<b>CO5</b>	3	3	3	3	-	-	-	-	-	-	-	-

### CO-PSO MAPPING:

<b>COs</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
<b>M(IT)392.1</b>	3	3	-
<b>M(IT)392.2</b>	3	3	-
<b>M(IT)392.3</b>	3	3	-
<b>M(IT)392.4</b>	3	3	-
<b>M(IT)392.5</b>	3	3	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Behavioral & Interpersonal Skills**  
**SUBJECT CODE** : **MC-381**  
**YEAR** : **2ND**  
**SEMESTER** : **3<sup>RD</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### **Course Outcome**

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	It will equip the student to handle workplace interpersonal communication in an effective manner.
<b>CO2</b>	To enable students with strong oral and written interpersonal communication skills.
<b>CO3</b>	To prepare students to critically analyze workplace situations and take appropriate decisions.
<b>CO4</b>	To make students campus ready through proper behavioral and interpersonal grooming.
<b>CO5</b>	Integration of enhanced skill set to design and frame team based Project Report and Presentation.

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Computer Organization & Architecture**  
**SUBJECT CODE** : **IT401**  
**YEAR** : **2ND**  
**SEMESTER** : **4<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Understand the organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O unit of digital computer system.
CO2	Identify the structure and functioning of a digital computer including its overall system architecture, operating system, and digital components.
CO3	Analyze various design techniques of CPU, Memory, pipelining, ALU, interconnecting I/O devices and microprogramming in order to achieve multiprocessing.
CO4	Develop and Design quantitative performance evaluation of computer systems.
CO5	Understand the concept of Pipelining, Pipeline optimization techniques, Instruction-level parallelism, structural hazards, techniques for handling hazards and Exception handling.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>IT 401.1</b>	3	2	3
<b>IT 401.2</b>	3	2	3
<b>IT 401.3</b>	3	2	3
<b>IT 401.4</b>	3	2	3
<b>IT 401.5</b>	3	2	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Object Oriented Programming using JAVA**  
**SUBJECT CODE** : **IT402**  
**YEAR** : **2ND**  
**SEMESTER** : **4<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

CO1:	Understand the key concepts of object oriented programming and have an ability to design Object Oriented programs.
CO2:	Analyze complex programming problems and optimize the solutions.
CO3:	Evaluate and analyze different solution based on object oriented concepts.
CO4:	Apply the concepts of object oriented programming for implementing solution of dynamic problems in the field of Information Technology.
CO5	Able to develop web base application in the Java platform.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 402.1	2	3	3
IT 402.2	2	3	3
IT 402.3	2	3	3
IT 402.4	2	3	3
IT 402.5	2	3	3

<b>STREAM</b>	<b>: INFORMATION TECHNOLOGY</b>
<b>SUBJECT NAME</b>	<b>: Formal Language and Automata Theory</b>
<b>SUBJECT CODE</b>	<b>: IT403</b>
<b>YEAR</b>	<b>: 2ND</b>
<b>SEMESTER</b>	<b>: 4<sup>TH</sup> SEMESTER</b>
<b>CONTACT HOURS</b>	<b>: 3:0:0</b>
<b>CREDITS</b>	<b>: 3</b>

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

CO1:	Analyze situations in related areas of theory in computer science.
CO2:	Model, compare and analyze different computational models using combinatorial methods.
CO3:	Apply rigorously formal mathematical methods to prove properties of languages, grammars and Automata.
CO4:	Construct algorithms for different problems and argue formally about correctness on different restricted Machine models of computation.
CO5:	Identify limitations of some computational models and possible methods of proving them.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>IT 403.1</b>	3	3	3
<b>IT 403.2</b>	3	3	3
<b>IT 403.3</b>	3	3	3
<b>IT 403.4</b>	3	3	3
<b>IT 403.5</b>	3	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Communication Engineering & Coding Theory**  
**SUBJECT CODE** : **IT404**  
**YEAR** : **2ND**  
**SEMESTER** : **4<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Able to understand basics of communication system and coding schemes.
CO2	Able to apply the basic concept of PCM systems and baseband transmission schemes.
CO3	Able to analyze and evaluate band pass signaling schemes.
CO4	Able to Create spectral characteristics of band pass signaling schemes and asses noise performance.
CO5	Understand the basics concept of Information Theory FEC, ARQ and CRC

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>IT 404.1</b>	3	3	3
<b>IT 404.2</b>	3	3	3
<b>IT 404.3</b>	3	3	3
<b>IT 404.4</b>	3	3	3
<b>IT 404.5</b>	3	3	3

<b>STREAM</b>	<b>: INFORMATION TECHNOLOGY</b>
<b>SUBJECT NAME</b>	<b>: Values &amp; Ethics in Profession</b>
<b>SUBJECT CODE</b>	<b>: HU 401</b>
<b>YEAR</b>	<b>: 2ND</b>
<b>SEMESTER</b>	<b>: 4<sup>TH</sup> SEMESTER</b>
<b>CONTACT HOURS</b>	<b>: 2:0:0</b>
<b>CREDITS</b>	<b>: 3</b>

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

CO1:	Able to understand the core values that shape the ethical behaviour of an engineer and Exposed awareness on professional ethics and human values.
CO2:	Able to understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories.
CO3:	Able to understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
CO4:	Able to aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.
CO5:	Able to acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	--	--	--	--	--	1	1	1	1	2	--	--
CO2	--	--	--	--	--	1	1	3	1	2	--	--
CO3	--	--	--	--	--	3	2	3	--	1	--	--
CO4	--	--	--	--	--	3	2	1	--	--	---	--
CO5	--	--	--	--	--	3	2	2	--	1	3	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>HU 401.1</b>	-	-	2
<b>HU 401.2</b>	-	-	2
<b>HU 401.3</b>	-	-	2
<b>HU 401.4</b>	-	-	2
<b>HU 401.5</b>	-	-	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Computer Organization and Architecture Lab**  
**SUBJECT CODE** : **IT491**  
**YEAR** : **2ND**  
**SEMESTER** : **4<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

CO1:	Remember the basic designing principles of digital electronics circuits.
CO2:	Demonstrate Hardware Description Language (HDL) in order to implement skills in designing Architectural solutions and describing designs using VHDL.
CO3:	Apply fundamentals of digital design and extend the learning to design sequential circuits.
CO4:	Analyze & examine the digital circuit design using Simulation tool.
CO5:	Design and implement ALU and CPU with interfacing.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>IT 491.1</b>	3	3	-
<b>IT 491.2</b>	3	3	-
<b>IT 491.3</b>	3	3	-
<b>IT 491.4</b>	3	3	-
<b>IT 491.5</b>	3	3	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Object Oriented Programming Lab**  
**SUBJECT CODE** : **IT492**  
**YEAR** : **2ND**  
**SEMESTER** : **4<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

CO1:	Apply object-oriented programming concepts in designing programs.
CO2:	Analyze different dimensions of a problem and provide optimal solutions.
CO3:	Evaluate and analyze different solution based on object-oriented concepts.
CO4:	Implement solutions of real-life problems in the field of Information Technology.
CO5:	Implement new features of Java for developing innovative projects

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 492.1	3	2	3
IT 492.2	3	2	3
IT 492.3	3	2	3
IT 492.4	3	2	3
IT 492.5	3	2	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Programming Skill Development Lab**  
**SUBJECT CODE** : **IT493**  
**YEAR** : **2ND**  
**SEMESTER** : **4<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Understand basic of Python Programming Language.
CO2	Analyze problems and design effective solutions of them.
CO3	Apply the best features of Python to program real life problems.
CO4	Implement optimal solution of a given problem.
CO5	Implement new features to develop innovative project using Python.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>IT 493.1</b>	3	2	3
<b>IT 493.2</b>	3	2	3
<b>IT 493.3</b>	3	2	3
<b>IT 493.4</b>	3	2	3
<b>IT 493.5</b>	3	2	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Environmental Science**  
**SUBJECT CODE** : **MC 401**  
**YEAR** : **2ND**  
**SEMESTER** : **4<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

<b>CO1</b>	Describe the structure and function of environment and different types of environmental pollution.
<b>CO2</b>	Identify all types of resources and learn the quality parameter to maintain proper balance.
<b>CO3</b>	Demonstrate environmental problems like global warming, acid rain, natural and manmade disasters.
<b>CO4</b>	Demonstrate the controlling method of environmental pollution and apply their knowledge for environment management.
<b>CO5</b>	Apply the method of synthesis of green chemistry and find green solution.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	--	--	--	--	2	--	--	--	--	--
CO2	3	2	--	--	--	--	--	--	--	--	--	--
CO3	2	3	2	--	--	2	2	--	--	--	--	--
CO4	2	3	2	--	--	2	3	--	--	--	--	--
CO5	2	3	--	--	--	2	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>MC 401.1</b>	2	2	2
<b>MC 401.2</b>	2	2	2
<b>MC 401.3</b>	2	2	2
<b>MC 401.4</b>	2	2	2
<b>MC 401.5</b>	2	2	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Design and Analysis of Algorithm**  
**SUBJECT CODE** : **IT 501**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Understanding the time complexity of the basic algorithms for the classic problems in various domains.
- CO2:** Apply the classic algorithms to solve different problems.
- CO3:** Evaluate existing algorithms by calculating the time complexity.
- CO4:** Design algorithm to solve various problems in different domains.
- CO5:** Understanding the concept of NP-complete and Approximation Algorithms.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 501.1	3	3	3
IT 501.2	3	3	3
IT 501.3	3	3	3
IT 501.4	3	3	3
IT 501.5	3	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Software Engineering**  
**SUBJECT CODE** : **IT 502**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Ability to analysis and design of complex systems and meet ethical standards, legalResponsibilities.
- CO2:** Ability to apply software engineering principles, techniques and develop, maintain,Evaluate large-scale software systems.
- CO3:** To produce efficient, reliable, robust and cost-effective software solutions and performindependent research and analysis.
- CO4:** Ability to work as an effective member or leader of software engineering teams and manage time, processes and resources effectively by prioritizing competing demandsto achieve personal and team goals.
- CO5:** Understand the computer-aided software engineering (CASE)-environment and benefit.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 502.1	3	3	3
IT 502.2	3	3	3
IT 502.3	3	3	3
IT 502.4	3	3	3
IT 502.5	3	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Operating System**  
**SUBJECT CODE** : **IT 503**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Understand competence in recognizing and using operating system features.
- CO2:** Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions and shared memory regions.
- CO3:** Analyze important algorithms eg. Process scheduling and memory management algorithms.
- CO4:** Categorize the operating system's resource management techniques, dead lock management techniques, memory management techniques.
- CO5:** Analyze theory and implementation of different operating system aspect and the structure and basic architectural components involved in operating system.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 503.1	3	3	3
IT 503.2	3	3	3
IT 503.3	3	3	3
IT 503.4	3	3	3
IT 503.5	3	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Programming Practice with C++**  
**SUBJECT CODE** : **IT 504A**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Understand the basic concept of object-oriented programming.
- CO2:** Apply the concept of object-oriented programming concept using C++ and analyse the different features of object-oriented programming in this context.
- CO3:** Implement Object Oriented Programs using templates and exceptional handling concepts.
- CO4:** Implementation of the diagram in Unified Modeling Language with static and dynamic diagram.
- CO5:** Evaluate concept of C++ to design different small to big scale project.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>IT 504A.1</b>	3	3	3
<b>IT 504A.2</b>	3	3	3
<b>IT 504A.3</b>	3	3	3
<b>IT 504A.4</b>	3	3	3
<b>IT 504A.5</b>	3	3	3

<b>STREAM</b>	<b>: INFORMATION TECHNOLOGY</b>
<b>SUBJECT NAME</b>	<b>: Artificial Intelligence</b>
<b>SUBJECT CODE</b>	<b>: IT 504B</b>
<b>YEAR</b>	<b>: 3<sup>RD</sup></b>
<b>SEMESTER</b>	<b>: 5<sup>TH</sup> SEMESTER</b>
<b>CONTACT HOURS</b>	<b>: 3:0:0</b>
<b>CREDITS</b>	<b>: 3</b>

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Understand various AI search algorithms (uninformed, informed, heuristic, constraintsatisfaction).
- CO2:** Apply facts, rules, and concepts of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving.
- CO3:** Analyze working knowledge of reasoning in the presence of incomplete and/or uncertain information.
- CO4:** Evaluate and create knowledge representation, reasoning, and machine learning techniques for the solution of real-world problems.
- CO5:** Apply artificial intelligence techniques to real world problems to develop intelligent system with selecting from suitable range of techniques.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 504B.1	3	3	3
IT 504B.2	3	3	3
IT 504B.3	3	3	3
IT 504B.4	3	3	3
IT 504B.5	3	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Microprocessor & Microcontroller**  
**SUBJECT CODE** : **IT 504C**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system.
- CO2:** Describe the general architecture of a microcomputer system and architecture & organization of 8085 & 8086 Microprocessor and understand the difference between 8085 and advanced microprocessor.
- CO3:** Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.
- CO4:** Recognize 8051 micro controller hardware, input/output pins, ports, external memory, counters and timers, instruction set, addressing modes, serial data i/o, interrupts
- CO5:** Understand and realize the Interfacing of memory & various I/O devices with 8085 Microprocessor.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 504C.1	3	3	3
IT 504C.2	3	3	3
IT 504C.3	3	3	3
IT 504C.4	3	3	3
IT 504C.5	3	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Industrial & Financial Management**  
**SUBJECT CODE** : **HU 503**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **2:0:0**  
**CREDITS** : **2**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Explain and describe various technology-based business models.  
**CO2:** Understand dynamics of value creation, value proposition, and value capture in industrial enterprises.  
**CO3:** Select, interpret and use different costing techniques as a basis for decisions in various business situations.  
**CO4:** Understand the basic principles of financial accounting and reporting.  
**CO5:** Produce and interpret an industrial company's Annual Statement, at a basic level.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	-	-	-	-	-	1	1	1	1	1	-	-
<b>CO2</b>	-	-	-	-	-	1	1	1	1	1	-	-
<b>CO3</b>	-	-	-	-	-	1	1	1	1	1	-	-
<b>CO4</b>	-	-	-	-	-	1	1	1	1	1	-	-
<b>CO5</b>	-	-	-	-	-	1	1	1	1	1	-	-

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>HU 503.1</b>	2	2	2
<b>HU 503.2</b>	2	2	2
<b>HU 503.3</b>	2	2	2
<b>HU 503.4</b>	2	2	2
<b>HU 503.5</b>	2	2	2

<b>STREAM</b>	<b>: INFORMATION TECHNOLOGY</b>
<b>SUBJECT NAME</b>	<b>: Constitution of India</b>
<b>SUBJECT CODE</b>	<b>: MC 501</b>
<b>YEAR</b>	<b>: 3<sup>RD</sup></b>
<b>SEMESTER</b>	<b>: 5<sup>TH</sup> SEMESTER</b>
<b>CONTACT HOURS</b>	<b>: 3:0:0</b>
<b>CREDITS</b>	<b>: 3</b>

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Develop human values, create awareness about law ratification and significance of Constitution
- CO2:** Comprehend the Fundamental Rights and Fundamental Duties of the Indian Citizen to implant morality, social values and their social responsibilities.
- CO3:** Create understanding of their Surroundings, Society, Social problems and their suitable solutions.
- CO4:** Familiarize with distribution of powers and functions of Local Self Government.
- CO5:** Realize the National Emergency, Financial Emergency and their impact on Economy of the country.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	2	3	-	-	-	2
CO2	-	-	-	-	-	3	2	3	-	-	-	2
CO3	-	-	-	-	-	3	2	3	-	1	-	2
CO4	-	-	-	-	-	3	2	3	-	1	-	2
CO5	-	-	-	-	-	3	2	3	-	1	-	2

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
HU 503.1	2	2	2
HU 503.2	2	2	2
HU 503.3	2	2	2
HU 503.4	2	2	2
HU 503.5	2	2	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Design Analysis of Algorithm Lab**  
**SUBJECT CODE** : **IT 591**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

After completion of this course student will be able to

- CO1:** Able to Argue the correctness of algorithms using inductive proofs and Analyze worst-case running times of algorithms using asymptotic analysis.
- CO2:** Able to explain important algorithmic design paradigms (divide-and-conquer, greedy method, dynamic-programming and Backtracking) and apply when an algorithmic design situation calls for it.
- CO3:** Able to Explain the major graph algorithms and Employ graphs to model engineering problems, when appropriate.
- CO4:** Able to Compare between different data structures and pick an appropriate data structure for a design situation.
- CO5:** Write rigorous correctness proofs for algorithms. Demonstrate a familiarity with major algorithms and data structures.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 591.1	3	2	3
IT 591.2	3	2	3
IT 591.3	3	2	3
IT 591.4	3	2	3
IT 591.5	3	2	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Software Engineering Lab**  
**SUBJECT CODE** : **IT 592**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Ability to apply software engineering principles, techniques and develop, maintain, evaluate large-scale software systems.
- CO2:** Ability to analysis and design of complex systems and meet ethical standards, legal responsibilities.
- CO3:** To produce efficient, reliable, robust and cost-effective software solutions andperform independent research and analysis.
- CO4:** Ability to work as an effective member or leader of software engineering teams and manage time, processes and resources effectively by prioritizing competingdemands to achieve personal and team goals.
- CO5:** Able to track the progress of a project, also prepare SRS document, design document, test cases and software configuration management and risk management related document.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	1	--
CO2	3	3	3	3	--	--	--	--	--	--	1	--
CO3	3	3	3	3	--	--	--	--	--	--	1	--
CO4	3	3	3	3	--	--	--	--	--	--	1	--
CO5	3	3	3	3	--	--	--	--	--	--	1	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 592.1	3	2	3
IT 592.2	3	2	3
IT 592.3	3	2	3
IT 592.4	3	2	3
IT 592.5	3	2	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Operating System Lab**  
**SUBJECT CODE** : **IT 593**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Describe the important computer system resources and the role of operating system in their management policies and algorithms.
- CO2:** Understand the process management policies and scheduling of processes by CPU
- CO3:** Evaluate the requirement for process synchronization and coordination handled by operating system
- CO4:** Understand the basics of operating systems like kernel, shell, types and views of operating systems.
- CO5:** Apply the various features of Operating system like Unix, Linux, windows etc.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 593.1	3	3	-
IT 593.2	3	3	-
IT 593.3	3	3	-
IT 593.4	3	3	-
IT 593.5	3	3	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Programming Practice with C++ Lab**  
**SUBJECT CODE** : **IT 594A**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Apply the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.
- CO2:** Understand dynamic memory management techniques using pointers, constructors, destructors.
- CO3:** Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
- CO4:** Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
- CO5:** Demonstrate the use of various OOPs concepts and C++ features with the help of programs.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 594A.1	3	3	-
IT 594A.2	3	3	-
IT 594A.3	3	3	-
IT 594A.4	3	3	-
IT 594A.5	3	3	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Artificial Intelligence Lab**  
**SUBJECT CODE** : **IT 594B**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Understand and recognize various AI search algorithms and AI tools.
- CO2:** Apply the fundamentals of knowledge representation, inference and theorem proving using
- CO3:** Analyze working knowledge of reasoning in the presence of incomplete and/or uncertain information.
- CO4:** Evaluate and create knowledge representation, reasoning, and machine learning techniques for the solutions of real-world problems.
- CO5:** Identify and Apply Artificial Intelligence concepts to solve real world problems.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 594B.1	3	3	-
IT 594B.2	3	3	-
IT 594B.3	3	3	-
IT 594B.4	3	3	-
IT 594B.5	3	3	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Microprocessor and Microcontroller Lab**  
**SUBJECT CODE** : **IT 594C**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **5<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Able to solve small assignments using the 8085 basic instruction sets and memory mapping through trainer kit and simulator.
- CO2:** Able to write 8085 assembly language programs like Addition, Subtraction, Multiplication, Square, Complement, Look up table, Copying a block of memory, Shifting, Packing and unpacking of BCD numbers, Ascending order, Descending order etc. using trainer kit.
- CO3:** Able to validate the interfacing technique using 8255 trainer kit through subroutine calls and IN/OUT instructions like glowing LEDs accordingly, stepper motor rotation etc.
- CO4:** Able to test fundamental of 8051 programs using the trainer kit.
- CO5:** Develop testing and experimental procedures on Microprocessor and Microcontroller analyze their operation under different cases.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>IT 594C.1</b>	3	3	-
<b>IT 594C.2</b>	3	3	-
<b>IT 594C.3</b>	3	3	-
<b>IT 594C.4</b>	3	3	-
<b>IT 594C.5</b>	3	3	-

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Database Management System**  
**SUBJECT CODE** : **IT 601**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Understand Database Management System, explain fundamental elements of a database management system, compare the basic concepts of relational data model, entity-relationship model, file organization and use appropriate index structure.
- CO2:** Apply efficient query optimization techniques, suitable transaction management, concurrency control mechanism and recovery management techniques.
- CO3:** Evaluate a database design and improve the design by normalization.
- CO4:** Design entity-relationship diagrams to represent simple database application scenarios, translate entity-relationship diagrams into relational tables, populate a relational database and formulate SQL queries on the data.
- CO5:** Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 601.1	3	3	3
IT 601.2	3	3	3
IT 601.3	3	3	3
IT 601.4	3	3	3
IT 601.5	3	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Web Technology**  
**SUBJECT CODE** : **IT 602**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Understand and evaluate web application architecture, technologies and frameworks.
- CO2:** Apply the knowledge of web technology in developing web applications
- CO3:** Evaluate different solutions in field of web application development.
- CO4:** Able to write a server-side java application called JSP to catch form data sent from client and store it on database
- CO5:** Implement small to large scale project to provide live solution in web application development fields

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 602.1	2	3	2
IT 602.2	2	3	2
IT 602.3	2	3	2
IT 602.4	2	3	2
IT 602.5	2	3	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **COMPUTER NETWORKING**  
**SUBJECT CODE** : **IT 603**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

**CO1:** Understand the network model and architecture

**CO2:** Apply different networking concepts for implementing network solution.

**CO3:** Analyse different networking functions and features for identifying optimal solutions

**CO4:** Communicate effectively in a variety of professional contexts.

**CO5:** Evaluate and implement routing algorithms for implanting solution for the real-lifeproblems

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 603.1	3	3	3
IT 603.2	3	3	3
IT 603.3	3	3	3
IT 603.4	3	3	3
IT 603.5	3	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **E-commerce and ERP**  
**SUBJECT CODE** : **IT 604A**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Understand the policy issues related to privacy, intellectual property rights, and establishing identity those are germane to electronic commerce along with the Internet and related technologies.
- CO2:** Comprehend the underlying economic mechanisms and driving forces of E-Commerce.
- CO3:** Analyse the impact that electronic commerce is facing and outlines the different digital transaction process and basic concepts of e-commerce.
- CO4:** Identify different technologies and IT support used in ERP and apply different tools used in ERP.
- CO5:** Understand the role of information systems in organizations, the strategic management processes, and the implications for the management with various information systems work together to accomplish the information objectives of an organization.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 604A.1	3	3	3
IT 604A.2	3	3	3
IT 604A.3	3	3	3
IT 604A.4	3	3	3
IT 604A.5	3	3	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **DIGITAL IMAGE PROCESSING**  
**SUBJECT CODE** : **IT 604B**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Understand the fundamental concepts of a digital image processing system.  
**CO2:** Analyze images in the spatial as well as frequency domain using various transformation techniques for improving the image quality.  
**CO3:** Evaluate the techniques for image enhancement and image restoration.  
**CO4:** Implement various image compression, segmentation and representation techniques  
**CO5:** Assess the performance of image processing algorithms and systems.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 604B.1	2	3	2
IT 604B.2	2	3	2
IT 604B.3	2	3	2
IT 604B.4	2	3	2
IT 604B.5	2	3	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Soft computing**  
**SUBJECT CODE** : **IT 604C**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **3:0:0**  
**CREDITS** : **3**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

**CO1:** Develop intelligent systems leveraging the paradigm of soft computing techniques.

**CO2:** Implement, evaluate and compare solutions by various soft computing approaches for finding the optimal solutions.

**CO3:** Recognize the feasibility of applying a soft computing methodology for a particular problem.

**CO4:** Design the methodology to solve optimization problems using fuzzy logic, genetic algorithms and neural networks.

**CO5:** Design hybrid system to revise the principles of soft computing in various applications

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 604C.1	2	3	2
IT 604C.2	2	3	2
IT 604C.3	2	3	2
IT 604C.4	2	3	2
IT 604C.5	2	3	2

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Database Management System Lab**  
**SUBJECT CODE** : **IT 691**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

**CO1:** Design and implement a database schema for a given problem-domain.

**CO2:** Apply the normalization techniques for development of application software to realistic problems.

**CO3:** Create and maintain tables using PL/SQL Course Outcome.

**CO4:** Populate and query a database.

**CO5:** Application development using PL/SQL & front-end tools.

### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	--
CO2	3	3	3	3	--	--	--	--	--	--	--	--
CO3	3	3	3	3	--	--	--	--	--	--	--	--
CO4	3	3	3	3	--	--	--	--	--	--	--	--
CO5	3	3	3	3	--	--	--	--	--	--	--	--

### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 691.1	3	2	3
IT 691.2	3	2	3
IT 691.3	3	2	3
IT 691.4	3	2	3
IT 691.5	3	2	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Web Technology Lab**  
**SUBJECT CODE** : **IT 692**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Apply the knowledge of web technology in developing web applications.
- CO2:** Create web pages using XHTML and Cascading Style Sheets.
- CO3:** Build dynamic web pages using JavaScript (Client side programming).
- CO4:** Analyze a web page and identify its elements and attributes.
- CO5:** Implement small to large scale project to provide live solution in web application development fields.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	1
CO2	3	3	3	3	--	--	--	--	--	--	--	1
CO3	3	3	3	3	--	--	--	--	--	--	--	1
CO4	3	3	3	3	--	--	--	--	--	--	--	1
CO5	3	3	3	3	--	--	--	--	--	--	--	1

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 692.1	3	2	3
IT 692.2	3	2	3
IT 692.3	3	2	3
IT 692.4	3	2	3
IT 692.5	3	2	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Computer Networking Lab**  
**SUBJECT CODE** : **IT 693**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Understand and apply different network commands.
- CO2:** Analyze different networking functions and features for implementing optimal solutions.
- CO3:** Apply Transmission Media, Flow Control and Error Detection & Correction.
- CO4:** Understand fundamental concepts in Routing, Addressing & working of Transport Protocols.
- CO5:** Understand Wireless LANs & Wireless Sensor Networks Operation.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	--	--	--	--	--	1
CO2	3	3	3	3	--	--	--	--	--	--	--	1
CO3	3	3	3	3	--	--	--	--	--	--	--	1
CO4	3	3	3	3	--	--	--	--	--	--	--	1
CO5	3	3	3	3	--	--	--	--	--	--	--	1

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
<b>IT 693.1</b>	3	2	3
<b>IT 693.2</b>	3	2	3
<b>IT 693.3</b>	3	2	3
<b>IT 693.4</b>	3	2	3
<b>IT 693.5</b>	3	2	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **E-Commerce and ERP Lab**  
**SUBJECT CODE** : **IT 694A**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

**CO1:** Understand the concept of PHP framework.

**CO2:** Analyzing different client and server-side components for developing application.

**CO3:** Apply and concept for developing MVC application.

**CO4:** Apply and implement the solution to real life problem using PHP concepts.

**CO5:** Apply different technologies used in ERP and apply different tools used in ERP.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	1	--	--	--	1	--
CO2	3	3	3	3	--	--	1	--	--	--	1	--
CO3	3	3	3	3	--	--	1	--	--	--	1	--
CO4	3	3	3	3	--	--	1	--	--	--	1	--
CO5	3	3	3	3	--	--	1	--	--	--	1	--

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 694A.1	3	-	3
IT 694A.2	3	-	3
IT 694A.3	3	-	3
IT 694A.4	3	-	3
IT 694A.5	3	-	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Digital Image Processing Lab**  
**SUBJECT CODE** : **IT 694B**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

- CO1:** Apply enhancing operations on the image using spatial filters and frequency domain filters.
- CO2:** Analyse the characteristics of the image using different transformation techniques.
- CO3:** Estimate the efficiency of the compression techniques on the images.
- CO4:** Implement different segmentation operations of images.
- CO5:** Compose various Morphological operations on binary images and Generate their transformed images.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	--	--	1	--	--	--	1	--
CO2	3	3	3	3	--	--	1	--	--	--	1	--
CO3	3	3	3	3	--	--	1	--	--	--	1	--
CO4	3	3	3	3	--	--	1	--	--	--	1	--
CO5	3	3	3	3	--	--	1	--	--	--	1	--

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 694B.1	3	-	3
IT 694B.2	3	-	3
IT 694B.3	3	-	3
IT 694B.4	3	-	3
IT 694B.5	3	-	3

**STREAM** : **INFORMATION TECHNOLOGY**  
**SUBJECT NAME** : **Soft Computing Lab**  
**SUBJECT CODE** : **IT 694C**  
**YEAR** : **3<sup>RD</sup>**  
**SEMESTER** : **6<sup>TH</sup> SEMESTER**  
**CONTACT HOURS** : **0:0:3**  
**CREDITS** : **1.5**

### Course Outcome

On successful completion of the learning sessions of the course, the learner will be able to:

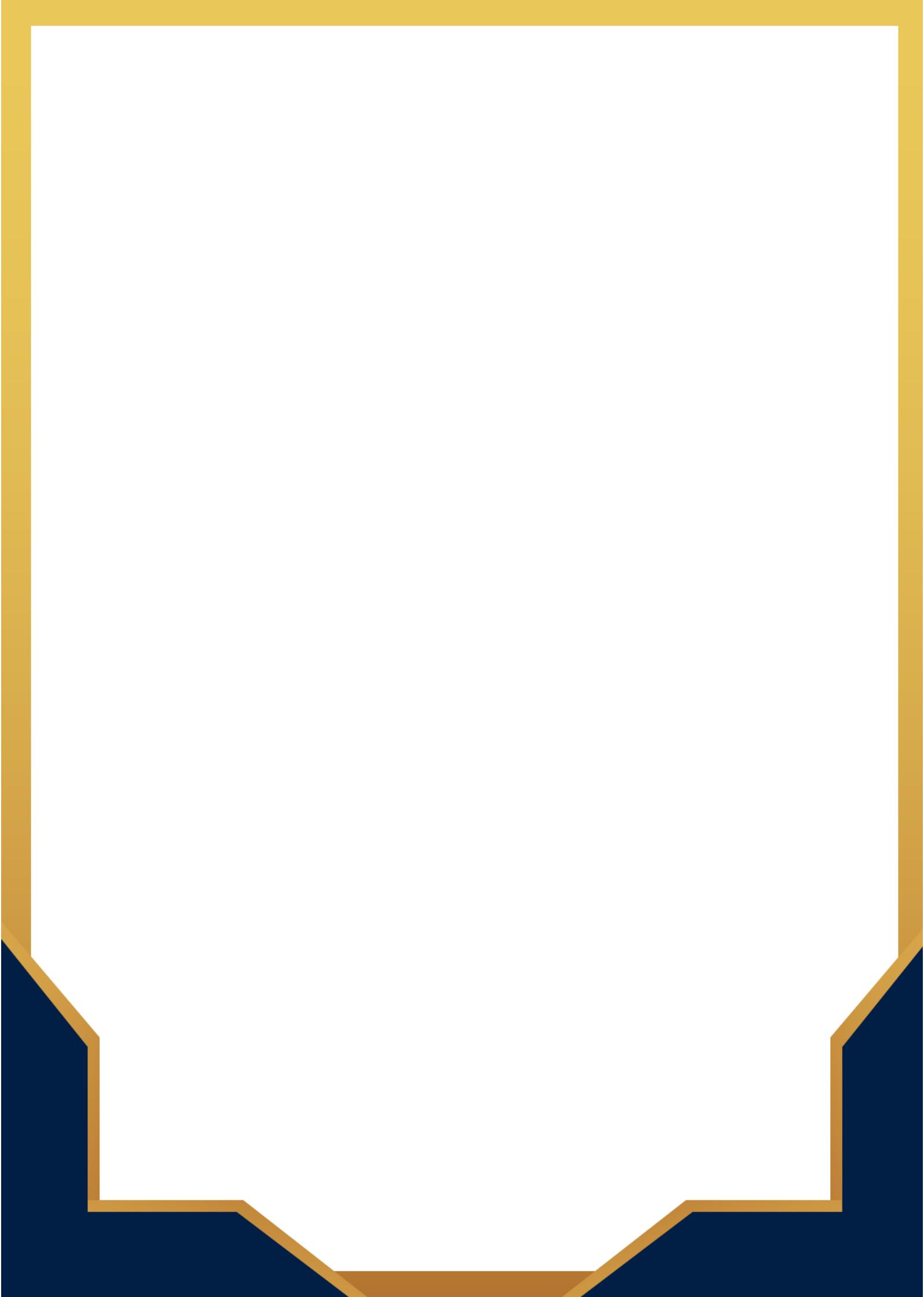
- CO1:** Understand importance of soft computing techniques and tools.  
**CO2:** Understand different soft computing techniques like Genetic Algorithms, FuzzyLogic, Neural Networks and their combination.  
**CO3:** Implement algorithms based on soft computing techniques.  
**CO4:** Implement best practices and techniques for computing efficiently.  
**CO5:** Apply soft computing techniques to solve engineering or real-life problems.

#### CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO1	3	3	3	3	--	--	1	--	--	--	1	--
CO2	3	3	3	3	--	--	1	--	--	--	1	--
CO3	3	3	3	3	--	--	1	--	--	--	1	--
CO4	3	3	3	3	--	--	1	--	--	--	1	--
CO5	3	3	3	3	--	--	1	--	--	--	1	--

#### CO-PSO MAPPING:

COs	PSO1	PSO2	PSO3
IT 694C.1	3	-	3
IT 694C.2	3	-	3
IT 694C.3	3	-	3
IT 694C.4	3	-	3
IT 694C.5	3	-	3



# NARULA INSTITUTE OF TECHNOLOGY



81, Nilgunj Rd, Agarpara, Kolkata, West Bengal 700109  
www.nit.ac.in | 033 2563 8888