



# **BETHLAHEM INSTITUTE OF ENGINEERING**

**KARUNGAL - 629 157, KANYAKUMARI DIST., TAMIL NADU.**

**(Approved by AICTE Vide : FNo. 06/05/TN/E&T/2007/25 dt. 02-06-2008 &**

**Affiliated to Anna University, Chennai)**

**Phone : 04651 - 268466, 268655, Fax : 04651 - 268466**

**E-mail : mail@bethlahem.org, Website : www.bethlahem.org**

## **BETHLAHEM INSTITUTE OF ENGINEERING**



### **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

#### **COURSE OUTCOMES**

**AND**

#### **CO-PO MAPPING**



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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### Anna University Regulation 2017

#### List of Course Names

Sl. No	Course Code	Course Title	L	T	P	C
<b>SEMESTER-I</b>						
1	HS8151	Communicative English	4	0	0	4
2	MA8151	Engineering Mathematics - I	4	0	0	4
3	PH8151	Engineering Physics	3	0	0	3
4	CY8151	Engineering Chemistry	3	0	0	3
5	GE8151	Problem Solving and Python Programming	3	0	0	3
6	GE8152	Engineering Graphics	2	0	4	4
7	BS8161	Physics and Chemistry laboratory	0	0	4	2
8	GE8161	Problem Solving and Python Programming Laboratory	0	0	4	2
<b>SEMESTER-II</b>						
1	HS8251	Technical English	4	0	0	4
2	MA8251	Engineering Mathematics - II	4	0	0	4
3	PH8252	Physics for Information Science	3	0	0	3
4	BE8255	Basic Electrical, Electronics and Measurement Engineering	3	0	0	3
5	GE8291	Environmental Science and Engineering	3	0	0	3
6	CS8251	Programming in C	3	0	0	3
7	GE8261	Engineering Practices Laboratory	0	0	4	2
8	CS8261	C Programming Laboratory	0	0	4	2
<b>SEMESTER-III</b>						
1	MA8351	Discrete Mathematics	4	0	0	4
2	CS8351	Digital Principles and System Design	4	0	0	4
3	CS8391	Data Structures	3	0	0	3



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4	CS8392	Object Oriented Programming	3	0	0	3
5	EC8395	Communication Engineering	3	0	0	2
6	CS8381	Data Structures Laboratory	0	0	4	2
7	CS8383	Object Oriented Programming Laboratory	0	0	4	2
8	CS8382	Digital Systems Laboratory	0	0	4	3
9	HS8381	Interpersonal Skills/Listening &Speaking	0	0	2	1
<b>SEMESTER-IV</b>						
1	MA8402	Probability and Queueing Theory	4	0	0	4
2	CS8491	Computer Architecture	3	0	0	3
3	CS8492	Database Management Systems	3	0	0	3
4	CS8451	Design and Analysis of Algorithms	3	0	0	3
5	CS8493	Operating Systems	3	0	0	3
6	CS8494	Software Engineering	3	0	0	3
7	CS8481	Database Management Systems Laboratory	0	0	4	2
8	CS8461	Operating Systems Laboratory	0	0	4	2
9	HS8461	Advanced Reading and Writing	0	0	2	1
<b>SEMESTER-V</b>						
1	MA8551	Algebra and Number Theory	4	0	0	4
2	CS8591	Computer Networks	3	0	0	3
3	EC8691	Microprocessors and Microcontrollers	3	0	0	3
4	CS8592	Object Oriented Analysis and Design	3	0	0	3
5	CS8501	Theory of Computation	3	0	0	3
6	OMD551	Basics of Biomedical Instrumentation	3	0	0	3
7	EC8681	Microprocessors and Microcontrollers Laboratory	0	0	4	2
8	CS8581	Networks Laboratory	0	0	4	2



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9	CS8582	Object Oriented Analysis and Design Laboratory	0	0	4	2
<b>SEMESTER-VI</b>						
1	CS8651	Internet Programming	3	0	0	3
2	IT8076	Softer Testing	3	0	0	3
3	CS8691	Artificial Intelligence	3	0	0	3
4	CS8601	Mobile Computing	3	0	0	3
5	CS8602	Complier Design	3	0	2	4
6	CS8603	Distributed Systems	3	0	0	3
7	CS8661	Internet Programming Laboratory	3	0	4	2
8	CS8662	Mobile Application Development Laboratory	0	0	4	3
9	CS8611	Mini Project	0	0	2	1
10	HS8581	Professional Communication	0	0	2	1
<b>SEMESTER-VII</b>						
1	CS8792	Cryptography and Network Security	3	0	0	3
2	CS8791	Cloud Computing	3	0	0	3
3	MG8591	Principles of Management	3	0	0	3
4	CS8088	Wireless ad-hoc and Sensor Networks	3	0	0	3
5	OGI751	Climate Change and its Impact	3	0	0	3
6	IT8761	Security Laboratory	0	0	4	2
7	CS8711	Cloud Computing Laboratory	0	0	4	2
<b>SEMESTER-VIII</b>						
1	GE8076	Professional Ethics in Engineering	3	0	0	3
2	CS8078	Green computing	3	0	0	3
3	CS8811	Project Work	0	0	20	10



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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Anna university regulation 2017

### Course outcomes and CO-PO mapping

YEAR	I	SEM	01	SUBJECT CODE	HS8151
SUBJECT	COMMUNICATIVE ENGLISH				

The students will be able to:

C01	Share and collect personal information.
C02	Read and write general articles.
C03	Acquire basic grammar and apply in language usage.
C04	Participate in intensive reading and formal writing.
C05	Develop fragments to short essays/group conversations.

### CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	-	-	-	-	-	3	3	-	-	-	-	1
C02	-	2	-	2	-	-	-	-	-	3	-	-	-	-	1
C03	-	-	-	-	-	-	-	-	-	3	-	-	-	-	1
C04	-	2	-	1	-	-	-	-	-	3	-	-	-	-	1
C05	-	-	-	-	-	-	-	-	2	3	-	-	-	-	1
AVG	-	0.8	-	0.6	-	-	-	-	1	3	-	-	-	-	1



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YEAR	I	SEM	01	SUBJECT CODE	MA8151
SUBJECT	ENGINEERING MATHEMATICS I				

The students will be able to:

C01	Explain the different types of Matrices, properties of matrices and Cayley-Hamilton.
C02	Identify the partial differentiation and Lagrange calculation.
C03	Examine the different techniques of integral calculus.
C04	Examine the different kinds of integrals. understand how to find area and volume by using double and triple integrals.
C05	Analyze the different kinds of Linear differential equations by various methods.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	1	1	-	-	1	3	1	-	1	2	1	-
C02	3	3	2	2	-	1	1	-	2	1	-	3	1	-	2
C03	3	2	1	2	2	-	-	2	2	1	1	1	3	-	-
C04	3	3	2	3	-	2	1	-	1	1	-	2	2	2	-
C05	3	2	3	2	1	-	-	1	2	-	-	3	2	-	2
AVG	3	2.4	2	2	0.8	0.6	0.4	0.8	2	0.8	0.2	2	2	0.6	0.8



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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>01</b>	<b>SUBJECT CODE</b>	<b>PH8151</b>
<b>SUBJECT</b>	<b>ENGINEERING PHYSICS</b>				

The students will be able to:

<b>C01</b>	Develop knowledge on the basics of properties of matter and its applications.
<b>C02</b>	Build knowledge on the concepts of waves and optical devices and their applications in fiber optics.
<b>C03</b>	Apply knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers.
<b>C04</b>	Develop knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes.
<b>C05</b>	Illustrate the basics of crystals, their structures and different crystal growth techniques.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>C01</b>	3	2	2	2	2	1	-	-	1	-	-	2	3	-	-
<b>C02</b>	3	3	2	-	2	1	-	-	-	-	-	2	2	-	2
<b>C03</b>	3	2	3	2	2	2	3	-	-	-	-	2	2	1	-
<b>C04</b>	3	2	2	-	2	2	-	-	-	-	-	2	-	1	2
<b>C05</b>	2	3	3	2	2	1	1	-	-	-	-	3	2	-	1
<b>AVG</b>	2.8	2.4	2.4	1.2	2	1.4	0.8	0	0.2	0	0	2.2	1.8	0.4	1



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YEAR	I	SEM	01	SUBJECT CODE	CY8151
SUBJECT	ENGINEERING CHEMISTRY				

The students will be able to:

C01	Illustrate the various water quality parameters and propose suitable methods for water treatment.
C02	Identify and apply the basic concepts of nanoscience and nanotechnology for the production of nanomaterials to be applied for engineering and technological needs.
C03	Adapt sound knowledge about phase rule and composites for the selection of materials.
C04	Analyze and classify the available fuels for their appropriate use in industry.
C05	Recognize the available forms of energy resources and their judicious use in energy sectors by providing due emphasis for attaining sustainable energy.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	2	-	2	2	2	-	-	-	-	2	2	-	2
C02	3	-	2	-	3	2	2	-	-	2	-	-	2	-	-
C03	3	-	2	-	3	2	1	-	-	2	-	-	1	-	3
C04	2	-	3	-	-	2	3	-	-	-	-	2	-	-	2
C05	3	-	3	-	2	2	3	-	-	-	-	3	2	-	2
AVG	2.4	0.2	2.4	-	2	2	2.2	-	-	0.8	-	1.4	1.4	-	1.8





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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>01</b>	<b>SUBJECT CODE</b>	<b>GE8151</b>
<b>SUBJECT</b>	<b>PROBLEM SOLVING AND PYTHON PROGRAMMING</b>				

The students will be able to:

<b>C01</b>	Explain the principles of problem solving techniques.
<b>C02</b>	Develop simple python programs.
<b>C03</b>	Develop programs based on control flow.
<b>C04</b>	Analyze compound data using lists, tuples, dictionaries.
<b>C05</b>	Design files, modules & packages.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>C01</b>	3	3	3	3	-	-	-	-	3	1	3	-	-	3	2
<b>C02</b>	3	3	3	3	-	-	-	-	3	1	3	-	-	1	2
<b>C03</b>	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
<b>C04</b>	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
<b>C05</b>	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
<b>AVG</b>	3	3	3	3	1.2	-	-	-	3	1	3	-	-	2.6	2



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YEAR	I	SEM	01	SUBJECT CODE	GE8152
SUBJECT	ENGINEERING GRAPHICS				

The students will be able to:

C01	Construct the conic curves, involutes and cycloid.
C02	Design the projection of points, lines and planes located in different quadrants.
C03	Design the projection of sectioned solids and develop surfaces of a given objects.
C04	Design the projection of solids and Produce orthographic projection of engineering components.
C05	Create pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	1	-	2	-	-	-	-	-	-	1	-	-	1	-	-
C02	1	-	2	-	-	-	-	-	-	1	-	-	1	-	-
C03	1	-	2	-	-	-	-	-	-	1	-	-	1	2	-
C04	1	-	2	-	-	-	-	-	-	1	-	-	1	2	-
C05	1	-	2	-	-	-	-	-	-	1	-	-	1	2	-
AVG	1	-	2	-	-	-	-	-	-	1	-	-	1	1.2	-



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YEAR	I	SEM	01	SUBJECT CODE	BS8161
SUBJECT	PHYSICS AND CHEMISTRY LABORATORY				

The students will be able to:

C01	Demonstrate different experiments to test basic understanding of physics concepts applied in optics.
C02	Relate different experiments to test basic understanding of physics concepts applied in thermal physics.
C03	Demonstrate different experiments to test basic understanding of physics concepts in properties of matter.
C04	Develop practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
C05	Examine the determination of molecular weight of a polymer by viscometer.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	3	-	-	-	-	2	-	1	3	1	-
C02	3	3	3	1	3	2	-	2	-	-	-	1	1	-	1
C03	3	3	3	1	3	-	-	-	1	-	-	1	-	1	-
C04	3	3	3	-	-	2	-	-	-	-	-	-	-	-	-
C05	3	3	3	-	-	-	-	-	1	-	-	1	-	1	1
AVG	3	3	3	1	1.8	0.8	-	0.4	0.4	0.4	-	0.8	0.8	0.6	0.4



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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>01</b>	<b>SUBJECT CODE</b>	<b>GE8161</b>
<b>SUBJECT</b>	<b>PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</b>				

The students will be able to:

<b>C01</b>	Develop simple algorithms, Pseudo code, flowchart for simple problems.
<b>C02</b>	Develop and execute simple Python programs.
<b>C03</b>	Build programs in Python using conditionals statement and loop statement.
<b>C04</b>	Develop simple programs using functions and use Python data structures to implement programs.
<b>C05</b>	Create files, packages and modules in python.

## CO-PO MAPPING

<b>COs</b>	<b>P01</b>	<b>P02</b>	<b>P03</b>	<b>P04</b>	<b>P05</b>	<b>P06</b>	<b>P07</b>	<b>P08</b>	<b>P09</b>	<b>P010</b>	<b>P011</b>	<b>P012</b>	<b>PS01</b>	<b>PS02</b>	<b>PS03</b>
<b>C01</b>	3	3	3	3	-	-	-	-	3	1	3	-	3	3	2
<b>C02</b>	3	3	3	3	-	-	-	-	3	1	3	-	1	1	2
<b>C03</b>	3	3	3	3	2	-	-	-	3	1	3	-	3	3	2
<b>C04</b>	3	3	3	3	2	-	-	-	3	1	3	-	3	3	2
<b>C05</b>	3	3	3	3	2	-	-	-	3	1	3	-	3	2	2
<b>AVG</b>	3	3	3	3	1.2	-	-	-	3	1	3	-	2.6	2.4	2



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YEAR	I	SEM	02	SUBJECT CODE	HS8251
SUBJECT	TECHNICAL ENGLISH				

The students will be able to:

C01	Develop the ability to comprehend and respond to scientific and technical talks.
C02	Develop proficiency in reading and interpreting longer technical texts and graphs
C03	Build the skills required for effective technical writing, including process descriptions and sequence words.
C04	Demonstrate proficiency in composing various professional documents such as emails, job applications, and analytical essays.
C05	Build competence in participating in group discussions and writing reports for different purposes in professional contexts.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	-	-	-	-	-	-	3	-	-	1	-	-
C02	-	-	-	2	-	-	-	-	-	3	-	-	1	-	-
C03	-	-	-	2	-	-	-	-	-	3	-	-	1	-	-
C04	-	2	-	-	-	-	-	-	-	3	-	-	1	-	-
C05	-	-	-	-	-	-	-	-	3	3	-	-	-	-	2
AVG	-	0.4	-	0.8	-	-	-	-	0.6	3	-	-	0.8	-	0.4



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YEAR	I	SEM	02	SUBJECT CODE	MA8251
SUBJECT	ENGINEERING MATHEMATICS II				

The students will be able to:

C01	Solve the Eigen values and eigenvectors diagonalization of a matrix, symmetric matrices, Positive definite matrices and similar matrices.
C02	Solve the gradient divergence and curl of a vector point function and related identities.
C03	Analyze the standard techniques of complex variable theory in particular analytic function and its property.
C04	Apply the complex integration techniques and contour integration techniques which can be used in real integrals.
C05	Relate Laplace transform and inverse transform of simple functions with constant coefficients.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	3	2	2	-	-	1	1	1	-	-	2	1	-
C02	3	3	2	2	-	1	-	2	-	2	2	-	1	-	2
C03	3	2	1	2	2	-	-	2	2	1	2	1	2	-	-
C04	3	3	2	3	-	1	2	-	1	2	-	2	1	2	-
C05	3	2	3	2	2	-	-	1	2	-	-	3	2	-	1
AVG	3	2.4	2.2	2.2	1.2	0.6	0.6	0.8	1.6	0.4	2.2	1.6	1.6	0.6	0.6



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YEAR	I	SEM	02	SUBJECT CODE	PH8252
SUBJECT	PHYSICS FOR INFORMATION SCIENCE				

The students will be able to:

C01	Develop the knowledge on classical and quantum electron theories, and energy band structures.
C02	Build knowledge on basics of semiconductor physics and its applications in various devices.
C03	Construct the knowledge on magnetic properties of materials and their applications in data storage.
C04	Summarize the functioning of optical materials for optoelectronics.
C05	Summarize the basics of quantum structures and basics of quantum computing.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	1	-	1	-	1	-	-	1	-	1	2	1	-
C02	3	3	2	-	3	-	1	-	-	1	-	1	1	1	2
C03	3	3	2	-	1	-	2	-	-	1	-	1	2	1	1
C04	3	2	1	-	1	-	-	-	-	1	-	1	2	-	-
C05	3	3	2	-	-	-	1	-	-	1	-	2	1	1	2
AVG	3	2.4	1.6	-	1.2	-	0.8	-	-	1	-	1.2	1.6	0.8	1



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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>02</b>	<b>SUBJECT CODE</b>	<b>BE255</b>
<b>SUBJECT</b>	<b>BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING</b>				

The students will be able to:

<b>C01</b>	Discover the electric circuit parameters for simple problems.
<b>C02</b>	Explain the working principle and applications of electrical machines.
<b>C03</b>	Explain the different energy sources, protective devices and their field applications.
<b>C04</b>	Analyze the characteristics of analog electronic devices.
<b>C05</b>	Explain the operating principles of measuring instruments.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>C01</b>	3	3	3	2	3	2	-	-	2	-	3	2	2	-	2
<b>C02</b>	3	3	3	2	-	2	-	-	2	-	-	2	2	-	2
<b>C03</b>	3	3	2	2	2	-	-	-	1	-	-	2	2	-	2
<b>C04</b>	3	3	3	3	3	2	-	-	3	-	3	3	2	-	2
<b>C05</b>	3	3	2	1	1	-	-	-	1	-	-	2	2	1	-
<b>AVG</b>	3	3	2.6	2	1.8	1.2	-	-	1.8	-	1.2	2.2	2	0.2	1.6





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YEAR	I	SEM	02	SUBJECT CODE	GE8291
SUBJECT	ENVIRONMENTAL SCIENCE AND ENGINEERING				

The students will be able to:

C01	Extend knowledge to protect environment.
C02	Determine the value of environment at infant stage.
C03	Identify ignorance and misconceptions about environment.
C04	Build a lifestyle that would reduce environmental disasters.
C05	Analyze the importance of clean environment and healthy society.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	2	-	-	2	3	-	2	3	-	2	3	-	-
C02	2	-	2	-	2	-	2	-	3	-	-	-	2	-	2
C03	-	-	-	2	-	-	2	-	1	2	-	1	3	1	-
C04	1	-	2	3	2	2	2	-	-	2	-	-	-	1	2
C05	-	-	-	2	3	3	-	1	-	-	-	-	2	-	1
AVG	0.6	0	1.2	1.4	1.4	1.4	1.8	0.2	1.2	1.4	0	0.2	2	0.4	1



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YEAR	I	SEM	02	SUBJECT CODE	CS8251
SUBJECT	PROGRAMMING IN C				

The students will be able to:

C01	Illustrate the basics of C program.
C02	Create simple C programs using arrays and strings.
C03	Develop programs based on functions and pointers.
C04	Analyze compound data using structures.
C05	Illustrate the process of files.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	-	-	-	-	-	1	2	1	2	2	2	1
C02	3	3	3	-	-	-	-	-	1	2	1	2	2	3	1
C03	3	3	3	-	-	-	-	-	1	2	1	2	2	3	1
C04	3	-	3	-	-	-	-	-	-	-	1	2	2	3	1
C05	3	-	3	-	-	-	-	-	1	-	1	-	2	3	2
AVG	3	1.8	3	-	-	-	-	-	0.8	1.2	1	1.6	2	2.8	1.2



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YEAR	I	SEM	02	SUBJECT CODE	GE8261
SUBJECT	ENGINEERINGB PRACTICES LABORATORY				

The students will be able to:

C01	Explain all the fundamental concepts involving Electrical Engineering.
C02	Create various electrical joints in common household electrical wire work.
C03	Construct simple common household equipment.
C04	Test simple electronic circuits.
C05	Develop simple electronic components on PCB.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	2	3	2	-	-	2	-	3	2	2	-	2
C02	3	-	3	2	-	2	-	-	2	-	-	2	2	-	2
C03	3	3	2	2	2	-	-	-	1	-	-	2	2	-	-
C04	3	3	3	3	3	2	-	-	3	-	3	3	2	-	-
C05	-	3	2	1	1	-	-	-	1	-	-	2	2	-	-
AVG	2.4	2.4	2.6	2	1.8	1.2	-	-	1.8	-	1.2	2.2	2	-	0.8



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YEAR	I	SEM	02	SUBJECT CODE	CS8261
SUBJECT	C PROGRAMMING LABORATORY				

The students will be able to:

C01	Illustrate the knowledge on C programming constructs.
C02	Develop programs in C using basic constructs.
C03	Develop programs in C using arrays.
C04	Develop programs and applications in C using strings, pointers, functions.
C05	Develop applications in C using structures.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	2	-	-	-	-	-	-	-	3	2	3	3
C02	3	2	2	2	-	-	-	-	-	-	-	3	2	3	3
C03	3	2	2	2	-	-	-	-	-	-	-	3	2	3	3
C04	3	2	2	2	2	-	-	-	-	-	-	3	2	3	3
C05	3	2	2	2	2	-	-	-	-	-	-	3	2	3	3
AVG	3	2	2	2	0.8	-	-	-	-	-	-	3	2	3	3



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YEAR	II	SEM	03	SUBJECT CODE	MA8351
SUBJECT	DISCRETE MATHEMATICS				

The students will be able to:

C01	Recognize the concept of logic, propositions and proofs.
C02	Create the mathematical induction and knowing the generating function.
C03	Analyze the various kinds of graphs and their properties.
C04	Analyze the groups and the kinds of groups and their properties.
C05	Evaluate the concept of Lattices and the Boolean Algebra.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	-	-	-	-	2	1	-	1	2	2	-
C02	3	2	2	2	-	-	-	-	1	2	-	1	1	1	-
C03	2	3	1	2	-	-	-	-	1	1	-	1	2	1	-
C04	3	2	2	1	-	-	-	-	1	1	-	1	1	1	-
C05	2	2	3	1	-	-	-	-	1	1	-	1	2	2	-
AVG	2.6	2.4	2	1.6	-	-	-	-	1.2	1.2	-	1	1.6	1.4	-



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YEAR	II	SEM	03	SUBJECT CODE	CS8351
SUBJECT	DIGITAL PRINCIPLES AND SYSTEM DESIGN				

The students will be able to:

C01	Analyze Boolean functions using KMap.
C02	Design and Analyze Combinational Circuits.
C03	Design and Analyze Sequential Circuits.
C04	Create designs using Programmable Logic Devices.
C05	Develop HDL code for combinational and Sequential Circuits.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	-	-	-	-	-	-	1	-	-	1	-	-	-
C02	3	2	3	-	-	-	-	-	1	-	-	3	-	-	-
C03	3	2	3	-	-	-	-	-	1	-	-	3	-	-	-
C04	3	3	3	-	-	-	-	-	1	-	-	3	-	-	-
C05	3	1	-	-	2	-	1	1	1	-	-	1	-	-	-
AVG	3	1.8	1.8	0	0.4	0	0.2	0.2	1	0	0	2.2	0	0	0



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YEAR	II	SEM	03	SUBJECT CODE	CS8391
SUBJECT	DATA STRUCTURES				

The students will be able to:

C01	Develop algorithms to implement linear data structures such as Array, Linked implementation of lists.
C02	Generate the programs for applications using stacks and queues.
C03	Apply tree data structure in real world applications.
C04	Design algorithms for nonlinear data structure such as graph and its applications.
C05	Summarize various searching, sorting and hashing techniques.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	3	1	-	-	-	-	-	-	-	-	2	2	-
C02	3	3	3	1	-	-	-	-	-	-	-	-	2	2	-
C03	3	2	3	1	-	-	-	-	-	-	-	-	3	2	-
C04	3	2	3	1	-	-	-	-	-	-	-	-	3	3	3
C05	3	3	3	1	3	-	-	-	-	-	-	-	1	3	3
AVG	3	2.4	3	1	0.6	0	0	0	0	0	0	0	2.2	2.4	1.2



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<b>YEAR</b>	<b>II</b>	<b>SEM</b>	<b>03</b>	<b>SUBJECT CODE</b>	<b>CS8392</b>
<b>SUBJECT</b>	<b>OBJECT ORIENTED PROGRAMMING</b>				

The students will be able to:

<b>C01</b>	Apply the concepts of classes and objects to solve simple problems.
<b>C02</b>	Develop programs using inheritance, packages and interfaces.
<b>C03</b>	Build Java applications using exceptions and I/O streams.
<b>C04</b>	Develop Java applications with threads and generic classes.
<b>C05</b>	Develop interactive Java programs using basics of JAVAFX event handling, and controls.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>C01</b>	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
<b>C02</b>	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
<b>C03</b>	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
<b>C04</b>	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
<b>C05</b>	1	1	1	1	2	1	-	-	1	1	-	2	3	-	-
<b>AVG</b>	1	1	1	1	2	0.2	-	-	0.2	0.2	-	2	3	-	-





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YEAR	II	SEM	03	SUBJECT CODE	EC8395
SUBJECT	COMMUNICATION ENGINEERING				

The students will be able to:

C01	Explain Analog Communication Techniques.
C02	Describe Data and Pulse Communication Techniques.
C03	Demonstrate Digital Communication techniques.
C04	Analyze Source and Error Control coding.
C05	Relate Spread Spectrum and Multiple Access Techniques.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	-	-	-	-	-	-	-	-	-	-	1	-	-
C02	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-
C03	3	1	-	-	-	-	-	-	-	-	-	-	1	-	-
C04	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-
C05	3	1	-	-	-	-	-	-	-	-	-	-	1	-	-
AVG	3	1.4	-	-	-	-	-	-	-	-	-	-	1	-	-



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YEAR	II	SEM	03	SUBJECT CODE	CS8381
SUBJECT	DATA STRUCTURES LABORATORY				

The students will be able to:

C01	Illustrate the linked list and array implementation of linear data structures as list, stack and queues.
C02	Demonstrate the applications of stack.
C03	Implement the non-linear data structures as Trees and Heaps
C04	Apply graph algorithms as Prim's, Dijkstra's to find the shortest path.
C05	Analyze various sorting, searching and hashing techniques.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C02	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C03	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C04	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C05	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
AVG	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1



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YEAR	II	SEM	03	SUBJECT CODE	CS8383
SUBJECT	OBJECT ORIENTED PROGRAMMING LABORATORY				

The students will be able to:

C01	Build software development skills using java programming for real-world applications.
C02	Apply the concepts of classes, packages, interfaces, arraylist, exception handling and file processing.
C03	Apply Generic function using java.
C04	Analyze Exception handling method.
C05	Develop applications using generic programming and event handling.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	-	1	-	-	-	-	-	-	1	1	3	-
C02	3	3	2	-	1	-	-	-	-	-	-	1	1	3	-
C03	3	3	2	-	2	-	-	-	-	-	-	1	1	3	-
C04	3	3	2	-	1	-	-	-	-	-	-	1	1	3	-
C05	3	3	1	-	2	-	-	-	-	-	-	1	1	3	-
AVG	3	3	1.8	-	1.4	-	-	-	-	-	-	1	1	3	-



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YEAR	II	SEM	03	SUBJECT CODE	CS8382
SUBJECT	DIGITAL SYSTEMS LABORATORY				

The students will be able to:

C01	Build simplified combinational circuits using basic logic gates.
C02	Develop combinational circuits using MSI devices.
C03	Construct sequential circuits like registers and counters.
C04	Differentiate combinational and sequential circuits using HDL.
C05	Create simplified combinational circuits using basic logic gates.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	3	3	-	-	-	1	3	2	2	-	1
C02	2	2	2	-	2	-	-	-	-	-	3	2	3	1	1
C03	3	3	1	-	-	-	-	-	-	3	3	3	2	-	1
C04	3	3	2	-	-	2	-	-	-	3	3	3	3	1	1
C05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2.8	2.8	1.8	0.4	1	1	-	-	-	1.4	3	2	2	0.4	0.8



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YEAR	II	SEM	03	SUBJECT CODE	HS8381
SUBJECT	INTERPERSONAL SKILLS/LISTENING AND SPEAKING				

The students will be able to:

C01	Listen and respond appropriately.
C02	Participate in group discussions.
C03	Make effective presentations.
C04	Participate confidently and appropriately in conversations both formal and informal.
C05	Develop the tonal modulation.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C02	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C03	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C04	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C05	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
AVG	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-



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YEAR	II	SEM	04	SUBJECT CODE	MA8402
SUBJECT	PROBABILITY AND QUEUEING THEORY				

The students will be able to:

C01	Apply basic concept in probability and random process and to introduce some standard distributions.
C02	Examine the basic concepts of probability one and two dimensional random variables which can describe real life phenomenon.
C03	Apply the basic concepts of random process which are widely used in IT fields.
C04	Apply the concept of queueing models and apply in engineering.
C05	Explain the significant difference in advanced queueing models.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	-	-	-	-	-	1	2	2	2	-
C02	3	2	2	3	3	3	-	-	-	-	-	2	3	2	-
C03	3	2	3	3	3	-	-	-	-	1	-	2	2	-	-
C04	3	2	2	2	-	-	-	-	-	-	-	3	3	-	2
C05	3	2	2	3	3	-	-	-	-	2	-	-	2	-	2
AVG	3	2.2	2.2	2.6	2.2	0.6	-	-	-	0.6	0.2	1.8	2.4	0.8	0.8



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E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	04	SUBJECT CODE	CS8491
SUBJECT	COMPUTER ARCHITECTURE				

The students will be able to:

C01	Illustrate the basic structure and operations, instruction of a computer.
C02	Design the arithmetic and logic unit with fixed and floating point representation.
C03	Explain basics of pipelined execution and handling hazards.
C04	Analyze parallelism and multi-core processors.
C05	Evaluate the memory systems and I/O communication.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	2	1	-	-	-	-	-	1	-	1	2	1	-
C02	2	2	2	1	-	-	-	-	-	1	-	1	1	1	-
C03	1	1	2	1	-	-	-	-	-	1	-	1	1	1	-
C04	2	2	3	1	-	-	-	-	-	1	-	2	1	1	-
C05	2	2	2	1	-	-	-	-	-	1	-	2	1	1	-
AVG	1.8	1.8	2.2	1	-	-	-	-	-	1	-	1.4	1.2	1	-



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YEAR	II	SEM	04	SUBJECT CODE	CS8492
SUBJECT	DATABASE MANAGEMENT SYSTEM				

The students will be able to:

C01	Explain the basic concepts of SQL fundamentals and advanced database application.
C02	Design the database by using the Entity Relationship diagrams and write queries by using normalization concepts.
C03	Summarize the basic concepts of transaction processing, concurrency control techniques and recovery procedures.
C04	Create different database systems using various file and indexing techniques and optimize queries.
C05	Identify the newest technology in database with different versions.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	2	-	-	-	-	2	-	2	3	2	-
C02	3	3	3	3	1	-	-	-	-	-	-	1	2	1	3
C03	3	3	3	3	-	-	-	-	-	-	-	1	2	-	-
C04	3	3	3	3	-	-	-	-	-	-	-	2	2	-	3
C05	3	3	3	3	2	-	-	-	-	-	-	1	3	2	-
AVG	3	3	3	3	1	-	-	-	-	0.4	-	1.4	2.4	1	1.2





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YEAR	II	SEM	04	SUBJECT CODE	CS8451
SUBJECT	DESIGN AND ANALYSIS OF ALGORITHMS				

The students will be able to:

C01	Explain the fundamental concepts of problem solving algorithm, its types and the parameters to analyze those algorithm.
C02	Solve computing problems using Brute Force method and Divide and Conquer method.
C03	Solve computing problems using dynamic programming and greedy technique.
C04	Describe how scientific problems can be solved using iterative method.
C05	Explain how scientific problems can be solved using Back tracking or Branch and Bound method and how to cope with limitations of algorithm power.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	1	-	-	-	-	-	-	-	-	-	1	2	1
C02	3	3	2	-	-	-	-	-	-	-	-	-	2	3	1
C03	2	3	3	-	-	-	-	-	-	-	-	-	2	2	1
C04	2	3	3	-	-	-	-	-	-	-	-	-	3	1	1
C05	2	2	3	-	-	-	-	-	-	-	-	-	1	1	1
AVG	2.4	2.8	2.4	-	-	-	-	-	-	-	-	-	1.8	1.6	1



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YEAR	II	SEM	04	SUBJECT CODE	CS8493
SUBJECT	OPERATING SYSTEMS				

The students will be able to:

C01	Interpret the overview of Computer system hardware and functions of OS.
C02	Analyze various scheduling algorithms, processes, threads and deadlocks.
C03	Compare and contrast various memory management schemes.
C04	Analyze the functionalities of IO management and file systems.
C05	Demonstrate administrative tasks on Linux and compare iOS and Android OS.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	1	-	-	-	1	-	-	-	-	-	-	2	2	1	1
C02	2	3	3	3	-	-	-	-	-	-	-	2	2	1	1
C03	2	3	3	3	3	-	-	-	-	-	-	1	1	1	1
C04	2	3	3	2	1	-	-	-	-	-	-	1	1	1	1
C05	2	-	-	-	-	-	-	-	-	-	-	2	1	1	2
AVG	1.8	3	3	2.6	1.6	-	-	-	-	-	-	1.6	1.4	1	1.3



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YEAR	II	SEM	04	SUBJECT CODE	CS8494
SUBJECT	SOFTWARE ENGINEERING				

The students will be able to:

C01	Identify the key activities in managing a software project and Compare different process models.
C02	Analyze the concepts of requirements engineering and Analysis Modeling.
C03	Apply systematic procedure for software design and deployment.
C04	Compare and contrast the various testing and maintenance.
C05	Plan project schedule, estimate project cost and effort required.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	2	-	-	-	-	-	-	-	-	2	1	-	-
C02	2	3	2	-	2	-	-	-	2	-	-	2	2	-	-
C03	2	2	3	-	2	-	-	-	-	1	-	2	2	1	-
C04	2	2	2	-	2	-	-	-	-	1	2	3	1	-	-
C05	3	1	2	-	-	-	-	-	1	1	3	2	2	1	-
AVG	2.2	2	2.2	-	1.2	-	-	-	0.6	0.6	1	2.2	1.6	0.4	-



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YEAR	II	SEM	04	SUBJECT CODE	CS8481
SUBJECT	DATABASE MANAGEMENT SYSTEMS LABORATORY				

The students will be able to:

C01	Apply the data definitions and manipulation commands.
C02	Design database applications and to check Nested and Join Queries.
C03	Analyze the use of Tables, Views, Functions, and Procedures and use ER modeling and normalization to design and implement database.
C04	Develop applications with Front-end Tool.
C05	Design and create real life database applications.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	2	-	-	-	-	-	-	-	3	2	3	3
C02	3	2	2	2	-	-	-	-	-	-	-	3	2	3	3
C03	3	2	2	2	-	-	-	-	-	-	-	3	2	3	3
C04	3	2	2	2	2	-	-	-	-	-	-	3	2	3	3
C05	3	2	2	2	2	-	-	-	-	-	-	3	2	3	3
AVG	3	2	2	2	0.8	-	-	-	-	-	-	3	2	3	3



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YEAR	II	SEM	04	SUBJECT CODE	CS8461
SUBJECT	OPERATING SYSTEMS LABORATORY				

The students will be able to:

C01	Analyze the various CPU Scheduling Algorithms.
C02	Differentiate deadlock avoidance and deadlock detection algorithms.
C03	Analyze the performance of the various page replacement algorithms.
C04	Determine memory management scheme as memory allocation.
C05	Create file organization and file allocation strategies.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C02	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C03	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C04	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C05	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
AVG	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1



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<b>YEAR</b>	<b>II</b>	<b>SEM</b>	<b>04</b>	<b>SUBJECT CODE</b>	<b>HS8461</b>
<b>SUBJECT</b>	<b>ADVANCED READING AND WRITING</b>				

The students will be able to:

<b>C01</b>	Write different types of essays.
<b>C02</b>	Write winning job applications.
<b>C03</b>	Read and evaluate texts critically.
<b>C04</b>	Display critical thinking in various professional contexts.
<b>C05</b>	Learn to write projects.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>C01</b>	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-
<b>C02</b>	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-
<b>C03</b>	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-
<b>C04</b>	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-
<b>C05</b>	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-
<b>AVG</b>	-	-	-	2	-	-	-	-	2	3	1	-	-	-	-



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YEAR	III	SEM	05	SUBJECT CODE	MA8551
SUBJECT	ALGEBRA AND NUMBER THEORY				

The students will be able to:

C01	Examine the basic notations of group ,rings, fields which will then be used to solve related problems.
C02	Apply the concept of rings , finite fields and polynomials in engineering.
C03	Examine the basic concepts in number theory.
C04	Explain the key questions in the theory of numbers.
C05	Apply the number theory and abstract algebra and provides a firm basis for further reading and study in the subject.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	-	-	-	-	-	1	2	2	2	-
C02	3	3	2	3	3	3	-	-	-	-	-	2	3	2	-
C03	3	2	3	3	3	-	-	-	-	-	-	2	2	-	-
C04	3	2	2	2	-	-	-	-	-	-	-	3	3	-	2
C05	3	2	2	3	3	-	-	-	-	2	-	2	2	-	2
AVG	3	2.4	2.2	2.6	2.2	0.6	-	-	-	0.4	0.2	2.2	2.4	0.8	0.8



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YEAR	III	SEM	05	SUBJECT CODE	CS8591
SUBJECT	COMPUTER NETWORKS				

The students will be able to:

C01	Analyze the different aspects of networks, protocols and discuss the functions of physical layer.
C02	Examine various data link layer design issues and protocols.
C03	Summarize the various network layer protocols and routing technique.
C04	Analyze the concepts of transport layer and compare the transport layer protocols.
C05	Classify the important aspects and functions of application layer.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	1	2	-	1	-	-	-	-	-	-	-	-	1	1	-
C02	2	-	-	1	-	-	-	-	-	-	-	-	-	1	-
C03	2	2	1	1	-	-	-	-	-	-	-	-	-	2	-
C04	2	1	-	-	-	-	-	-	-	-	-	-	-	1	-
C05	2	1	-	1	-	-	-	-	-	-	-	-	-	1	-
AVG	1.8	1.2	0.2	0.8	-	-	-	-	-	-	-	-	0.2	1.2	-





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<b>YEAR</b>	<b>III</b>	<b>SEM</b>	<b>05</b>	<b>SUBJECT CODE</b>	<b>EC8691</b>
<b>SUBJECT</b>	<b>MICRO PROCESSORS AND MICRO CONTROLLER</b>				

The students will be able to:

<b>C01</b>	Analyze and execute programs based on 8086 Microprocessor.
<b>C02</b>	Design of system bus structure.
<b>C03</b>	Design aspects of Memory Interfacing circuits and interface I/O circuits.
<b>C04</b>	Analyze and execute programs based on 8051 Microcontroller.
<b>C05</b>	Design and implement 8051 Microcontroller based systems.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>C01</b>	2	2	2	2	1	-	-	1	-	1	-	2	2	-	2
<b>C02</b>	2	3	3	2	-	-	-	1	-	1	-	2	2	-	2
<b>C03</b>	1	3	3	1	2	1	-	1	-	1	-	2	3	3	1
<b>C04</b>	2	2	2	2	1	-	-	1	-	1	1	2	2	1	2
<b>C05</b>	2	2	2	1	2	2	1	1	-	1	1	2	2	1	2
<b>AVG</b>	1.8	2.4	2.4	1.6	1.2	0.6	0.2	1	-	1	0.4	2	2.2	1	1.8



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YEAR	III	SEM	05	SUBJECT CODE	CS8592
SUBJECT	OBJECT ORIENTED ANALYSIS AND DESIGN				

The students will be able to:

C01	Explain software design principles and design use case diagram.
C02	Design software applications using OO concepts.
C03	Identify various scenarios based on software requirements and construct projects using UML
C04	Interpret UML based software design into pattern based design using design patterns.
C05	Identify the various testing methodologies for OO software.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	-	-	2	3	-	-	-	-	-	-	3	1	2
C02	3	2	1	2	-	-	-	-	-	-	-	-	2	3	3
C03	3	3	3	3	-	-	-	-	3	-	2	-	2	2	3
C04	3	3	3	3	-	-	-	-	-	-	-	-	3	3	1
C05	3	3	2	-	3	-	-	-	-	-	-	3	3	1	1
AVG	3	2.4	1.8	1.6	1	0.6	-	-	0.6	-	0.4	0.6	2.6	2	2



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YEAR	III	SEM	05	SUBJECT CODE	CS8501
SUBJECT	THEORY OF COMPUTATION				

The students will be able to:

C01	Analyze the Finite Automata for any given language and its equivalence.
C02	Construct Automata for any given pattern and find its equivalent regular expression.
C03	Design a Context Free Grammar for any given language.
C04	Analyze the normalized production rules using Context free grammar.
C05	Evaluate undecidable problems and NP class problems.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	-	-	-	-	-	-	-	2	2	-
C02	3	3	3	2	2	-	-	-	-	-	-	-	1	1	-
C03	3	3	3	1	-	-	-	-	-	-	-	-	1	1	1
C04	3	3	3	1	-	-	-	-	-	-	-	-	2	2	2
C05	3	3	1	2	-	-	-	-	-	-	-	-	1	1	-
AVG	3	3	2.4	1.6	0.8	-	-	-	-	-	-	-	1.4	1.4	0.6



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YEAR	III	SEM	05	SUBJECT CODE	OMD551
SUBJECT	BASICS OF BIOMEDICAL INSTRUMENTATION				

The students will be able to:

C01	Apply the different bio potential and its propagation.
C02	Familiarize with the different electrode placement for various physiological recording.
C03	Design bio amplifier for various physiological recording.
C04	Develop various technique in non-electrical physiological measurements.
C05	Apply the different biochemical measurements.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	2		1	-	-	-	-	-	-	-	-	1
C02	-	-	-	2		2	-	-	-	-	-	-	-	2	2
C03	2	1	3	2	2	3	-	-	-	-	-	-	-	-	2
C04	-	-	2	2	1	3	-	-	-	-	-	-	1	-	1
C05	-	-	1	2	2	2	-	-	-	-	-	-	-	2	-
AVG	0.4	0.2	1.2	2	1	2.2	-	-	-	-	-	-	0.2	0.8	1.2



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YEAR	III	SEM	05	SUBJECT CODE	EC8681
SUBJECT	MICRO PROCESSORS AND MICRO CONTROLLER LABORATORY				

The students will be able to:

C01	Create ALP Programs for fixed and Floating Point and Arithmetic operations.
C02	Interpret I/Os with processor.
C03	Create waveforms using Microprocessors.
C04	Experiment with Programs in 8051.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	3	2	3	2	1	1	2	2	2	2	3	-	-
C02	3	2	3	2	3	2	3	1	2	2	3	2	3	-	3
C03	3	2	3	2	3	2	1	1	2	2	3	2	3	-	-
C04	3	2	3	2	3	2	3	1	2	2	3	2	3	-	2
C05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2.4	1.6	2.4	1.6	2.4	1.6	1.6	0.8	1.6	1.6	2.2	1.6	2.4	-	1



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E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	05	SUBJECT CODE	CS8581
SUBJECT	NETWORKS LABORATORY				

The students will be able to:

C01	Create various protocols using TCP and UDP.
C02	Compare the performance of different transport layer protocols.
C03	Choose simulation tools to analyze the performance of various network protocols.
C04	Analyze various routing algorithms.
C05	Identify error correction codes.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	-	1	-	-	-	-	-	-	1	1	3	2
C02	3	3	2	-	1	-	-	-	-	-	-	1	1	3	2
C03	3	3	2	-	2	-	-	-	-	-	-	1	1	3	2
C04	3	3	2	-	1	-	-	-	-	-	-	1	1	3	2
C05	3	3	1	-	2	-	-	-	-	-	-	1	1	3	2
AVG	3	3	1.8	-	1.4	-	-	-	-	-	-	1	1	3	2



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YEAR	III	SEM	05	SUBJECT CODE	CS8582
SUBJECT	OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY				

The students will be able to:

C01	Create the SRS (Software Requirement Specification).
C02	Design the Static and Dynamic UML diagrams for the given problem specification.
C03	Develop the code from the diagram.
C04	Test the software system thoroughly for all scenarios.
C05	Create the design by applying appropriate design patterns.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	-	2	-	-	-	-	-	-	-	-	-	1	3	2
C02	3	3	2	-	-	-	-	-	-	-	-	-	1	3	2
C03		-	-	-	2	-	-	-	-	-	-	-	1	3	2
C04	3	3	2	-		-	-	-	-	-	-	-	1	3	2
C05	3	3	1	-	2	-	-	-	-	-	-	-	1	3	2
AVG	2.4	1.8	1.4	-	0.8	-	-	-	-	-	-	-	1	3	2



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YEAR	III	SEM	06	SUBJECT CODE	CS8651
SUBJECT	INTERNET PROGRAMMING				

The students will be able to:

C01	Develop the basic website using HTML and Cascading Style Sheets.
C02	Create the dynamic web page using Java Script and applying event handling mechanisms.
C03	Develop the server side web pages using Servlets and JSP.
C04	Create the server side web pages using Servlets and JSP simple web pages using PHP and to representing data in XML format.
C05	Create the basic website using HTML and Cascading Style Sheets.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	1	1	1		-	-	-	-	-	-	2	1	3	1
C02	2	2	2	-	-	-	-	-	-	-	-	-	1	3	1
C03	2	3	3	-	1	-	-	-	-	-	-	-	1	3	1
C04	2	1	1	-	1	-	-	-	-	-	-	2	1	3	1
C05	2	-	-	-	-	-	-	-	-	-	-	2	1	3	1
AVG	2	1.4	1.4	0.2	0.4	-	-	-	-	-	-	1.2	1	3	1





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YEAR	III	SEM	06	SUBJECT CODE	IT8076
SUBJECT	SOFTWARE TESTING				

The students will be able to:

C01	Analyze the software testing criteria for developing test cases.
C02	Build the software test cases for software testing.
C03	Explain the various levels of testing.
C04	Discuss about the test metrics, measurements and management process.
C05	Apply latest automated test tool for functional and performance testing.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	2	-	-	-	-	-	-	-	-	2	1	2	-
C02	2	3	2	-	2	-	-	-	2	-	-	2	2	2	-
C03	2	2	3	-	2	-	-	-	-	1	-	2	2	2	-
C04	2	2	2	-	2	-	-	-	-	1	2	3	1	2	-
C05	2	2	2	-	-	-	-	-	-	-	-	2	1	2	-
AVG	2	2.2	2.2	-	1.2	-	-	-	0.4	0.4	0.4	1.2	1.4	2	-



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YEAR	III	SEM	06	SUBJECT CODE	CS8691
SUBJECT	ARTIFICIAL INTELLIGENCE				

The students will be able to:

C01	Apply apt agent strategy to solve a given problem.
C02	Apply search algorithm for any AI problem.
C03	Apply first order and predicate logic.
C04	Design software agent to solve a problem.
C05	Design applications for NLP that use Artificial Intelligence.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	3	-	-	1	-	-	3	3	-	2	3	3	2
C02	3	2	1	-	-	-	3	1	-	2	-	3	3	3	2
C03	3	3	-	-	-	-	-	-	-	3	1	-	2	3	3
C04	3	2	3	-	-	-	-	-	3	1	-	2	3	3	2
C05	3	-	1	3	2	3	-	-	-	3	-	3	3	3	3
AVG	3	1.8	1.6	0.6	0.4	0.8	0.6	0.2	1.2	2.4	0.2	2	2.8	3	2.4



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YEAR	III	SEM	06	SUBJECT CODE	CS8601
SUBJECT	MOBILE COMPUTING				

The students will be able to:

C01	Explain the generations of mobile communication system.
C02	Describe the infrastructure of 2G and 3G.
C03	Analyze the various routing protocols for Ad-Hoc networks.
C04	Interpret the functionality of transport layer and application layer protocol.
C05	Summarize various mobile application OSs and SDK.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	-	-	-	2	1	-	-	-	-	-	2	1	1
C02	2	2	1	-	-	2	2	3	-	-	-	-	3	1	1
C03	2	1	1	-	-	-	2	-	-	-	-	-	3	3	1
C04	2	1	-	-	-	-	-	-	-	-	-	-	1	1	1
C05	2	3	3	3	1	-	-	-	-	-	-	-	3	3	2
AVG	2	1.8	1	0.6	0.2	0.8	1	0.6	-	-	-	-	2.4	1.8	1.4



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YEAR	III	SEM	06	SUBJECT CODE	CS8602
SUBJECT	COMPILER DESIGN				

The students will be able to:

C01	Analyze the phases of compiler and design of Lexical analyzer for a sample code.
C02	Apply different parsers for a given Grammar and design a parser using LEX and YACC tools.
C03	Develop intermediate code for statements in high level language.
C04	Analyze syntax directed translation schemes for a given context free grammar.
C05	Evaluate optimization techniques to intermediate code and generate machine code for high level language.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	-	-	-	-	-	-	2	2	2	2
C02	3	3	3	2	2	-	-	-	2	-	-	2	1	1	-
C03	3	3	3	-	1	-	-	-	2	-	-	1	1	1	1
C04	3	3	3	1	-	-	-	-	-	-	-	-	2	2	2
C05	3	3	-	-	-	-	-	-	3	-	-	2	1	1	-
AVG	3	3	2.2	1	1	-	-	-	1.4	-	-	1.4	1.4	1.4	1



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YEAR	III	SEM	06	SUBJECT CODE	CS8603
SUBJECT	DISTRIBUTED SYSTEMS				

The students will be able to:

C01	Determine the foundations and issues of distributed systems.
C02	Relate the various synchronization issues and global state for distributed systems.
C03	Analyze the Mutual Exclusion and Deadlock detection algorithms in distributed systems.
C04	Explain the agreement protocols and fault tolerance mechanisms in distributed systems.
C05	Explain the features of peer-to-peer and distributed shared memory systems.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	1	-	-	-	-	-	-	-	-	-	-	3	-	-
C02	2	-	1	-	2	-	-	-	-	-	-	-	-	3	-
C03	3	2	1	1	-	-	-	-	-	-	-	-	-	2	-
C04	3	2	1	1	-	-	-	-	-	-	-	-	-	-	2
C05	-	-	3	-	2	-	-	-	-	-	-	-	3	-	-
AVG	2.0	1.0	1.2	0.4	0.8	-	-	-	-	-	-	-	1.2	1.0	0.4



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YEAR	III	SEM	06	SUBJECT CODE	CS8661
SUBJECT	INTERNET PROGRAMMING LABORATORY				

The students will be able to:

C01	Create web pages using HTML/XML and style sheets.
C02	Develop dynamic web pages using server side scripting.
C03	Develop PHP programming to develop web applications.
C04	Develop a Client Server application using JSP.
C05	Build the applications using Web services.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	1	1	-	-	-	-	-	-	-	-	-	2	2	-
C02	2	2	1	-	-	-	-	-	-	-	-	-	2	2	-
C03	2	2	2	-	-	-	-	-	-	-	-	-	2	2	-
C04	2	2	2	-	-	-	-	-	-	2	2	2	-	2	-
C05	2	2	1	-	-	-	-	-	-	2	1	2	-	2	-
AVG	2	1.8	1.4	-	-	-	-	-	-	0.8	0.6	0.8	1.2	2	-



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YEAR	III	SEM	06	SUBJECT CODE	CS8662
SUBJECT	MOBILE APPLICATION DEVELOPMENT LABORATORY				

The students will be able to:

C01	Develop an application that uses GUI components.
C02	Develop an application that uses Layout Managers.
C03	Develop an application that draws basic graphical primitives on the screen.
C04	Create an application using multithreading.
C05	Develop a mobile application for simple needs.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	-	1	-	-	-	3	2	2	2	3	3	-
C02	3	3	1	-	2	-	-	-	3	2	2	2	2	3	-
C03	3	2	1	-	2	-	-	-	3	2	2	2	2	3	-
C04	3	2	1	-	2	-	-	-	3	2	2	2	2	3	-
C05	3	2	1	-	2	-	-	-	3	2	2	2	2	3	-
AVG	3	2.4	1.4	-	1.8	-	-	-	3	2	2	2	2.2	3	-



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YEAR	III	SEM	06	SUBJECT CODE	CS8611
SUBJECT	MINI PROJECT				

The students will be able to:

C01	Identify the problem by applying acquired knowledge.
C02	Analyze and categorize executable project modules after considering risks.
C03	Choose efficient algorithms or techniques for designing project modules.
C04	Combine all the modules through effective team work after efficient testing.
C05	Elaborate the completed task and compose the project report.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	1	2	1	2	3	3	3	3	3	3	3
C02	3	3	3	3	1	2	1	2	3	3	3	3	3	3	3
C03	3	3	3	3	1	2	1	2	3	3	3	3	3	3	3
C04	3	3	3	3	1	2	1	2	3	3	3	3	3	3	3
C05	3	3	3	3	1	2	1	3	3	3	3	3	3	3	3
AVG	3	3	3	3	1	2	1	2.2	3	3	3	3	3	3	3





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YEAR	III	SEM	06	SUBJECT CODE	HS8581
SUBJECT	PROFESSIONAL COMMUNICATION				

The students will be able to:

C01	Create effective presentations.
C02	Participate confidently in Group Discussions.
C03	Attend job interviews and be successful in them.
C04	Develop adequate Soft Skills required for the workplace.
C05	Manage stress in the workplace.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C02	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C03	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C04	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
C05	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-
AVG	-	2	-	-	-	-	-	-	2	3	-	-	-	-	-



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YEAR	IV	SEM	07	SUBJECT CODE	CS8792
SUBJECT	CRYPTOGRAPHY AND NETWORK SECURITY				

The students will be able to:

C01	Explain the fundamentals of networks security, security architecture, threats and vulnerabilities.
C02	Apply the different cryptographic operations of symmetric cryptographic algorithms.
C03	Apply the different cryptographic operations of public key cryptography.
C04	Analyze the various Authentication schemes to simulate different applications.
C05	Evaluate various Security practices and System security standards.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	-	-	2	-	-	-	-	-	-	-	2	-	-
C02	3	2	2	1	2	-	2	-	-	2	-	-	1	1	-
C03	3	2	2	-	2	-	2	-	-	2	-	3	1	1	-
C04	2	-	-	-	-	-	-	-	-	2	-	2	1	-	-
C05	-	2	-	-	-	2	-	-	-	-	-	1	1	-	-
AVG	2	1.6	0.8	0.2	1.2	0.4	0.8	-	-	1.2	-	1.2	1.2	0.4	-



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YEAR	IV	SEM	07	SUBJECT CODE	CS8791
SUBJECT	CLOUD COMPUTING				

The students will be able to:

C01	Explain the principles of Parallel and Distributed Computing and evolution of cloud computing from existing technologies.
C02	Relate different types of Virtualization technologies and Service Oriented Architecture systems.
C03	Explain the concepts of NIST Cloud Computing architecture and its design challenges.
C04	Illustrate the issues in Resource provisioning and Security governance in clouds.
C05	Select among various cloud technologies for implementing applications.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	3	2	-	2	-	-	-	-	-	-	-	2	-	-
C02	2	2	3	-	2	-	-	-	-	-	-	-	-	3	-
C03	3	1	2	-	-	-	-	-	-	-	-	-	2	-	-
C04	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-
C05	-	-	3	-	3	-	-	-	-	-	-	-	2	-	-
AVG	1.6	1.6	2	-	1.4								1.6	0.6	-



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YEAR	IV	SEM	07	SUBJECT CODE	MG8591
SUBJECT	PRINCIPLES OF MANAGEMENT				

The students will be able to:

C01	Discuss the evolution of management thoughts and the challenges of managerial activities in a global business environment.
C02	Explain the types of planning and decision making methodologies in organizations.
C03	Summarize various types of organization structure and associated human resources activities for man-power utilization.
C04	Explain about motivation theories, behavior, leadership theories and communication for effective directing.
C05	Explain various controlling techniques to maintain standards in organizations.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-
C02	-	-	-	-	-	-	-	-	2	-	2	-	-	-	-
C03	-	-	-	-	-	-	-	2	2	-	2	-	-	-	-
C04	-	-	-	-	-	-	-	2	2	2	-	3	-	-	-
C05	-	-	-	-	-	-	-	-	2	2	2	-	-	-	-
AVG	-	-	-	-	-	-	-	0.8	2	1.2	1.2	0.6	-	-	-



# BETHLAHEM INSTITUTE OF ENGINEERING

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Phone : 04651 - 268466, 268655, Fax : 04651 - 268466

E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	IV	SEM	07	SUBJECT CODE	CS8088
SUBJECT	WIRELESS AD-HOC AND SENSOR NETWORKS				

The students will be able to:

C01	Relate different issues and to analyze protocols developed for ad hoc networks.
C02	Analyze transport & Qos in ad hoc networks.
C03	Analyze protocols developed for sensor networks.
C04	Analyze transport layer and QoS in wireless sensor networks.
C05	Analyze security issues in ad hoc and sensor networks.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	1	1	-	-	-	-	2	-	1	1	1	-
C02	3	3	3	1	1	-	-	-	-	2	-	1	1	1	-
C03	3	3	3	-	-	-	-	-	-	2	-	1	-	-	-
C04	3	3	3	-	-	-	-	-	-	2	-	1	-	-	-
C05	3	3	3	-	-	-	-	-	-	2	-	1	-	-	-
AVG	3	3	3	0.4	0.4					2		1	0.4	0.4	



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YEAR	IV	SEM	07	SUBJECT CODE	OGI751
SUBJECT	CLIMATE CHANGE AND ITS IMPACT				

The students will be able to:

C01	Explain the concepts of climate and atmosphere.
C02	Explain the principles of atmospheric dynamics and transfer of heat and air in the atmosphere.
C03	Develop simple global climate and to investigate about climate features.
C04	Solve equations for the climate system.
C05	Construct and evaluate a simple climate model.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C02	3	3	-	-	-	-	2	-	-	-	-	-	-	-	2
C03	2	-	3	-	-	-	1	-	-	-	-	-	-	-	2
C04	3	3	-	-	-	-	-	-	-	-	-	2	-	-	-
C05	3	3	-	2	2	-	-	-	-	-	-	2	-	-	-
AVG	2.8	1.8	0.6	0.4	0.4	-	0.6	-	-	-	-	0.8	-	-	0.8



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YEAR	IV	SEM	07	SUBJECT CODE	IT8761
SUBJECT	SECURITY LABORATORY				

The students will be able to:

C01	Develop code for classical Encryption Techniques to solve the problems.
C02	Build cryptosystems by applying symmetric and public key encryption algorithms.
C03	Construct code for authentication algorithms.
C04	Develop a signature scheme using Digital signature standard.
C05	Demonstrate the network security system using open source tools.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	-	1	-	-	-	3	2	2	2	3	3	-
C02	3	3	1	-	2	-	-	-	3	2	2	2	2	3	-
C03	3	2	1	-	2	-	-	-	3	2	2	2	2	3	-
C04	3	2	1	-	2	-	-	-	3	2	2	2	2	3	-
C05	3	2	1	-	2	-	-	-	3	2	2	2	2	3	-
AVG	3	2.4	1.4	-	1.8	-	-	-	3	2	2	2	2.2	3	-



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YEAR	IV	SEM	07	SUBJECT CODE	CS8711
SUBJECT	CLOUD COMPUTING LABORATORY				

The students will be able to:

C01	Analyze various virtualization tools such as VirtualBox, VMware workstation.
C02	Design and deploy a web application in a PaaS environment.
C03	Illustrate how to simulate a cloud environment to implement new schedulers.
C04	Make use of generic cloud environment that can be used as a private cloud.
C05	Define large data sets in a parallel environment.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	-	-	-	3	-	-	-	-	-	-	-	1	3	2
C02	2	-	3	-	3	-	-	-	-	-	-	-	1	3	2
C03	1	-	-	2	-	2	-	-	-	-	-	-	1	3	2
C04	-	-	3	-	3	-	-	-	-	-	-	-	1	3	2
C05	1	-	-	-	2	2	-	-	-	-	-	-	1	3	2
AVG	1.4	-	1.2	0.4	2.2	0.8	-	-	-	-	-	-	1	3	2





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YEAR	IV	SEM	08	SUBJECT CODE	GE8076
SUBJECT	PROFESSIONAL ETHICS IN ENGINEERING				

The students will be able to:

C01	Analyze the core values that enrich the ethical behavior of an engineer.
C02	Apply the importance of moral issues and theories of the profession.
C03	Apply the code of ethics in real time application as responsible experimenters with various social issues.
C04	Relate the suitable safety measures towards risk benefit analysis and explain the concepts of professional rights, Employee rights, confidentiality, conflicts of interest and IPR.
C05	Evaluate the global ethical issues related to various work place situation.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	-	-	1	1	3	-	2	-	1	3	-	1
C02	-	-	-	-	-	1	1	3	1	2	-	-	2	1	-
C03	-	-	1	-	-	3	2	3	-	-	3	-	-	2	3
C04	-	-	3	2	-	3	2	2	-	1	-	2	1	1	2
C05	-	1	3	-	-	3	2	3	2	-	3	-	-	3	1
AVG	-	0.2	1.4	0.4	-	2.2	1.6	2.8	0.6	1	1.2	0.6	1.2	1.4	1.4



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YEAR	IV	SEM	08	SUBJECT CODE	CS8078
SUBJECT	GREEN COMPUTING				

The students will be able to:

C01	Apply green computing practices to minimize negative impacts on the environment.
C02	Analyze the skill in energy saving practices in their use of hardware.
C03	Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.
C04	Analyze the ways to minimize equipment disposal requirements.
C05	Compare and analyse different case studies.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	-	-	-	-	1	3	-	-	-	-	-	1	1	1
C02	2	-	-	-	-	-	2	-	-	-	-	1	1	1	1
C03	3	2	3	-	-	2	-	-	-	-	-	-	3	3	-
C04	-	-	-	2	3	-	-	2	-	-	-	-	1	1	-
C05	-	1	1	1	-	-	-	-	-	3	-	-	1	1	-
AVG	1.4	0.6	0.8	0.6	0.6	0.6	1	0.4	-	0.6	-	0.2	1.4	1.4	0.4





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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### Anna University Regulation 2021

#### List of Course Names

Sl. No	Course code	Course title	L	T	P	C
<b>SEMESTER-I</b>						
1	HS3152	Professional English - I	3	0	0	3
2	MA3151	Matrices and Calculus	3	1	0	4
3	PH3151	Engineering Physics	3	0	0	3
4	CY3151	Engineering Chemistry	3	0	0	3
5	GE3151	Problem Solving and Python Programming	3	0	0	3
6	BS3171	Physics and Chemistry Laboratory	0	0	4	2
7	GE3171	Problem Solving and Python Programming Laboratory	0	0	4	2
<b>SEMESTER-II</b>						
1	HS3252	Professional English - II	2	0	0	2
2	MA3251	Statistics and Numerical Methods	3	1	0	4
3	PH3256	Physics for Information Science	3	0	0	3
4	CS3251	Programming in C	3	0	0	3
5	BE3251	Basic Electrical and Electronics Engineering	3	0	0	3
6	GE3251	Engineering Graphics	2	0	4	4
7	GE3271	Engineering Practices Laboratory	0	0	4	2
8	CS3271	Programming in C Laboratory	0	0	4	2
<b>SEMESTER-III</b>						
1	MA3354	Discrete Mathematics	3	1	0	4
2	CS3351	Digital Principles and Computer Organization	3	0	2	4
3	CS3352	Foundations of Data Science	3	0	0	3
4	CS3301	Data Structures	3	0	0	3
5	CS3391	Object Oriented Programming	3	0	0	3
6	CS3311	Data Structures Laboratory	0	0	3	1.5



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7	CS3381	Object Oriented Programming Laboratory	0	0	3	1.5
8	CS3361	Data Science Laboratory	0	0	4	2
<b>SEMESTER-IV</b>						
1	CS3452	Theory of Computation	3	0	0	3
2	CS3491	Artificial Intelligence and Machine Learning	3	0	2	4
3	CS3492	Database Management Systems	3	0	0	3
4	CS3401	Algorithms	3	0	2	4
5	CS3451	Introduction to Operating Systems	3	0	0	3
6	GE3451	Environmental Sciences and Sustainability	2	0	0	2
7	CS3481	Database Management Systems Laboratory	0	0	3	1.5
8	CS3461	Operating Systems Laboratory	0	0	3	1.5
<b>SEMESTER-V</b>						
1	CS3591	Computer Networks	3	0	2	4
2	CS3501	Compiler Design	3	0	2	4
3	CB3491	Cryptography and Cyber Security	3	0	0	3
4	CS3551	Distributed Computing	3	0	0	3
5	CCW331	Business analytics	2	0	2	3
6	CCS375	Web Technologies	2	0	2	3
7	MX3084	Disaster Risk reduction and Management	3	0	0	0
<b>SEMESTER-VI</b>						
1	CCS356	Object Oriented Software Engineering	3	0	2	4
2	CS3691	Embedded Systems and IoT	3	0	2	4
3	CCS358	Principles of Programming Languages	3	0	0	32
4	CCS354	Network Security	2	0	2	3
5	CCS352	Multimedia and Animation	2	0	2	3



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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Anna university regulation 2017

### Course outcome and CO-PO mapping

YEAR	I	SEM	01	SUBJECT CODE	HS3151
SUBJECT	PROFESSIONAL ENGLISH I				

The students will be able to:

C01	Create ideas and express them effectively.
C02	Improve interpersonal communication through personal and societal experiences.
C03	Describe the process effectively in diverse environments.
C04	Improve mass communication skills.
C05	Participate effectively in public forums.

### CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	-	-	-	-	-	3	3	-	-	-	-	1
C02	-	-	-	-	-	-	-	-	3	3	-	-	-	-	1
C03	-	-	-	-	-	-	3	-	-	3	-	-	-	-	1
C04	-	-	-	-	-	-	-	-	-	3	-	-	-	-	1
C05	-	-	-	-	-	2	-	-	3	3	-	-	-	-	1
AVG	-	-	-	-	-	0.4	0.6	-	1.8	3	-	-	-	-	1



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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>01</b>	<b>SUBJECT CODE</b>	<b>MA3151</b>
<b>SUBJECT</b>	<b>MATRICES AND CALCULUS</b>				

The students will be able to:

<b>C01</b>	Explain the different types of Matrices, properties of matrices and Cayley-Hamilton
<b>C02</b>	Apply different techniques of differential calculus.
<b>C03</b>	Explain the functions of several partial differentiation using various methods.
<b>C04</b>	Apply the different techniques of integral calculus.
<b>C05</b>	Explain the different kinds of integrals. understand how to find area and volume by using double and triple integrals.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>C01</b>	3	2	2	1	1	-	-	1	3	1	-	1	2	1	-
<b>C02</b>	3	3	2	2	-	1	1	-	2	1	-	3	1	-	2
<b>C03</b>	3	2	1	2	2	-	-	2	2	1	1	1	3	-	-
<b>C04</b>	3	3	2	3	-	2	1	-	1	1	-	2	2	2	-
<b>C05</b>	3	2	3	2	1	-	-	1	2	-	-	3	2	-	2
<b>AVG</b>	3	2.4	2	2	0.8	0.6	0.4	0.8	2	0.8	0.2	2	2	0.6	0.8



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YEAR	I	SEM	01	SUBJECT CODE	PH3151
SUBJECT	ENGINEERING PHYSICS				

The students will be able to:

C01	Explain the importance of mechanics.
C02	Examine the concepts of electromagnetic waves.
C03	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C04	Explain the importance of quantum physics.
C05	Apply quantum mechanical principles.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	2	-	-	1	-	-	2	3	-	-
C02	3	3	2	-	2	2	-	-	-	-	-	2	2	-	2
C03	3	2	3	2	-	2	3	-	-	-	-	3	3	1	-
C04	3	3	2	-	2	2	-	-	-	-	-	2	-	1	2
C05	2	3	3	2	-	2	1	-	-	-	-	3	2	-	1
AVG	2.8	2.8	2.4	1.2	1.2	2	0.8	-	0.2	-	-	2.4	2	0.4	1





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YEAR	I	SEM	01	SUBJECT CODE	CY3151
SUBJECT	ENGINEERING CHEMISTRY				

The students will be able to:

C01	Analyze the various water quality parameters and propose suitable methods for water treatment.
C02	Identify and apply the basic concepts of nanoscience and nanotechnology for the production of nanomaterials to be applied for engineering and technological needs.
C03	Infer sound knowledge about phase rule and composites for the selection of materials.
C04	Analyse and classify the available fuels for their appropriate use in industry.
C05	Elaborate the available forms of energy resources and their judicious use in energy sectors by providing due emphasis for attaining sustainable energy.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	2	-	2	2	2	-	-	-	-	2	2	-	2
C02	3	-	2	-	3	2	2	-	-	2	-	-	2	-	-
C03	3	-	2	-	3	2	1	-	-	2	-	-	1	-	3
C04	2	-	3	-	-	2	3	-	-	-	-	2	-	-	2
C05	3	-	3	-	2	2	3	-	-	-	-	3	2	-	2
AVG	2.8	0.2	2.4	-	2	2	2.2	-	-	0.8	-	1.4	1.4	-	1.8



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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>01</b>	<b>SUBJECT CODE</b>	<b>GE3151</b>
<b>SUBJECT</b>	<b>PROBLEM SOLVING AND PYTHON PROGRAMMING</b>				

The students will be able to:

<b>C01</b>	Explain the principles of problem solving techniques.
<b>C02</b>	Create simple python programs.
<b>C03</b>	Develop programs based on control flow.
<b>C04</b>	Analyze compound data using lists, tuples, dictionaries.
<b>C05</b>	Design files, modules & packages.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>C01</b>	3	3	3	3	-	-	-	-	3	1	3	-	-	3	2
<b>C02</b>	3	3	3	3	-	-	-	-	3	1	3	-	-	1	2
<b>C03</b>	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
<b>C04</b>	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
<b>C05</b>	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
<b>AVG</b>	3	3	3	3	1.2	-	-	-	3	1	3	-	-	2.6	2



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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>01</b>	<b>SUBJECT CODE</b>	<b>BS3171</b>
<b>SUBJECT</b>	<b>PHYSICS AND CHEMISTRY LABORATORY</b>				

The students will be able to:

<b>C01</b>	Apply the hands on experience in Air wedge.
<b>C02</b>	Apply the hands on experience in young modulus.
<b>C03</b>	Demonstrate the working of torsion pendulum.
<b>C04</b>	Analyze compound data using Acquire practical skills in the determination of water quality parameters.
<b>C05</b>	Analyze the determination of molecular weight.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>C01</b>	3	3	3	3	3	-	-	-	-	2	-	1	3	1	2
<b>C02</b>	3	3	3	1	3	2	-	2	-	-	-	1	1	-	3
<b>C03</b>	3	3	3	1	3	-	-	-	1	-	-	1	-	1	-
<b>C04</b>	3	3	3	-	-	2	-	-	-	-	-	-	-	-	3
<b>C05</b>	3	3	3	-	-	-	-	-	1	-	-	1	-	1	-
<b>AVG</b>	3	3	3	1	1.8	0.8	-	0.4	0.4	0.4	-	0.8	0.8	0.6	1.6



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E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	I	SEM	01	SUBJECT CODE	GE3171
SUBJECT	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY				

The students will be able to:

C01	Develop simple algorithms, Pseudo code, flowchart for simple problems.
C02	Develop and execute simple Python programs.
C03	Build programs in Python using conditionals statement and loop statement.
C04	Develop simple programs using functions and use Python data structures to implement programs.
C05	Create files, packages and modules in python.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	-	-	-	-	3	1	3	-	3	3	2
C02	3	3	3	3	-	-	-	-	3	1	3	-	1	1	2
C03	3	3	3	3	2	-	-	-	3	1	3	-	3	3	2
C04	3	3	3	3	2	-	-	-	3	1	3	-	3	3	2
C05	3	3	3	3	2	-	-	-	3	1	3	-	3	2	2
AVG	3	3	3	3	1.2	-	-	-	3	1	3	-	2.6	2.4	2



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YEAR	I	SEM	02	SUBJECT CODE	HS3251
SUBJECT	PROFESSIONAL ENGLISH II				

The students will be able to:

C01	Compare and contrast the ideas and products in a technical context.
C02	Analyze the causes of events and represent them appropriately.
C03	Explore the problems to arrive at suitable solutions for the same and present them in oral and written form.
C04	Compile events and processes on the technical contexts.
C05	Present ideas logically and prepare job application letter with resume.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2
C02	-	-	-	-	-	3	3	-	-	-	-	-	-	-	2
C03	-	3	3	3	-	-	2	-	-	3	-	-	-	-	2
C04	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-
C05	-	-	-	-	-	-	-	-	-	2	2	2	-	-	-
AVG	-	0.6	0.6	0.6	-	-	1	-	0.8	1.4	0.4	0.4	-	-	1.2



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YEAR	I	SEM	02	SUBJECT CODE	MA3251
SUBJECT	STATISTICS AND NUMERICAL METHODS				

The students will be able to:

C01	Analyze the concept of testing of hypothesis for small and large samples in real life problems.
C02	Analyze the basic concepts of classifications of design experiments in the field of agriculture.
C03	Solve the numerical techniques of interpolation in various intervals and the numerical techniques of differentiation and integration for engineering problems.
C04	Apply various techniques and methods for solving first and second order ordinary differential equations.
C05	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	3	2	2	-	-	1	3	3	-	2	2	1	-
C02	3	3	2	2	-	2	1	-	2	2	-	3	1	-	2
C03	3	2	1	2	2	-	-	2	2	1	2	1	2	-	-
C04	3	3	2	3	-	1	2	-	1	2	-	2	1	2	-
C05	3	2	3	2	2	-	-	1	2	-	-	3	2	-	1
AVG	3	2.4	2.2	2.2	1.2	0.6	0.6	0.8	2	1.6	0.4	2.2	1.6	0.6	0.6



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YEAR	I	SEM	02	SUBJECT CODE	PH3256
SUBJECT	PHYSICS FOR INFORMATION SCIENCE				

The students will be able to:

C01	Illustrate classical and quantum electron theories, and energy band structures.
C02	Examine the basics of semiconductor physics and its applications.
C03	Analyse the magnetic properties of materials and their applications.
C04	Demonstrate functioning of optical materials for optoelectronics.
C05	Apply the basics of quantum structures and basics of quantum computing.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	-	1	-	-	-	-	-	-	3	3	-	-
C02	3	3	1	-	1	-	-	-	-	1	-	-	-	-	-
C03	3	2	2	-	-	-	3	-	-	-	-	-	3	1	2
C04	3	2	1	-	2	-	-	-	-	1	-	-	-	1	2
C05	3	2	2	-	2	-	1	-	-	-	-	3	2	-	1
AVG	3	2.4	1.6	-	1.2	-	0.8	-	-	0.4	-	1.2	1.6	0.4	1



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YEAR	I	SEM	02	SUBJECT CODE	CS3251
SUBJECT	PROGRAMMING IN C				

The students will be able to:

C01	Explain the structure of C program.
C02	Create simple C programs using arrays and strings.
C03	Develop programs based on functions and pointers.
C04	Analyze compound data using structures.
C05	Evaluate the file access methods.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	-	-	-	-	-	1	2	1	2	2	2	3
C02	3	3	3	-	-	-	-	-	1	2	1	2	2	3	3
C03	3	3	3	-	-	-	-	-	1	2	1	2	2	3	3
C04	3	-	3	-	-	-	-	-	-	-	1	2	2	3	3
C05	3	-	3	-	-	-	-	-	1	-	1	-	2	3	3
AVG	3	1.8	3	-	-	-	-	-	0.8	1.2	1	1.6	2	2.8	3





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YEAR	I	SEM	02	SUBJECT CODE	BE3252
SUBJECT	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING				

The students will be able to:

C01	Analyze the electric circuit parameters for simple problems.
C02	Explain the working principle and applications of electrical machines.
C03	Analyze the characteristics of analog electronic devices.
C04	Explain the basic concepts of digital electronics.
C05	Explain the operating principles of measuring instruments.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	2	3	2	-	-	2	-	3	2	2	-	2
C02	3	3	3	2	-	2	-	-	2	-	-	2	2	-	2
C03	3	3	2	2	2	-	-	-	1	-	-	2	2	-	2
C04	3	3	3	3	3	2	-	-	3	-	3	3	2	-	2
C05	3	3	2	1	1	-	-	-	1	-	-	2	2	1	-
AVG	3	3	2.6	2	1.8	1.2	-	-	1.8	-	1.2	2.2	2	0.2	1.6



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YEAR	I	SEM	02	SUBJECT CODE	GE3251
SUBJECT	ENGINEERING GRAPHICS				

The students will be able to:

C01	Create BIS conventions and specifications for engineering drawing.
C02	Construct the conic curves, involutes and cycloid.
C03	Solve practical problems involving projection of lines.
C04	Design the orthographic, isometric and perspective projections of simple solids.
C05	Design the development of simple solids.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	-	-	-	-	-	1	2	2	2	-
C02	3	3	2	3	3	3	-	-	-	-	-	2	3	2	-
C03	3	2	3	3	3	-	-	-	-	-	-	2	2	-	-
C04	3	2	2	2	-	-	-	-	-	-	-	3	3	-	2
C05	3	2	2	3	3	-	-	-	-	2	-	-	2	-	2
AVG	3	2.4	2.2	2.6	2.2	0.6	-	-	-	0.4	0.2	1.8	2.4	0.8	0.8



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YEAR	I	SEM	02	SUBJECT CODE	GE3271
SUBJECT	ENGINEERING PRACTICES LABORATORY				

The students will be able to:

C01	Design pipe line plan, lay and connect pipe fittings used in common household Plumbing work.
C02	Plan and make joints in wood materials used in common house hold wood work.
C03	Construct various joints in steel plates using arc welding work.
C04	Make up various simple process like turning, drilling, and tapping in parts.
C05	Combine simple mechanical assembly of common household equipment.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	-	-	-	-	-	-	-	-	1	2	-	-	-	2
C02	3	-	3	-	-	-	-	-	-	1	2	-	-	-	2
C03	3	-	3	-	-	-	-	-	-	1	2	-	-	-	2
C04	3	-	3	-	-	-	-	-	-	1	2	-	-	-	2
C05	3	-	-	-	-	-	-	-	-	1	2	-	-	-	2
AVG	3	-	1.8	-	-	-	-	-	-	1	2	-	-	-	2



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YEAR	I	SEM	02	SUBJECT CODE	CS3271
SUBJECT	PROGRAMMING IN C LABORATORY				

The students will be able to:

C01	Demonstrate the basics of C program.
C02	Design and implement applications using arrays and strings
C03	Develop and implement modular applications in C using functions
C04	Develop applications in C using structures and pointers.
C05	Design applications using sequential and random access file processing.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	-	-	-	-	-	3	2	2	2	3	3	3
C02	3	3	1	-	-	-	-	-	3	2	2	2	2	3	3
C03	3	2	1	-	-	-	-	-	3	2	2	2	2	3	3
C04	3	2	1	-	-	-	-	-	3	2	2	2	2	3	3
C05	3	2	1	-	-	-	-	-	3	2	2	2	2	3	3
AVG	3	2	1	-	-	-	-	-	3	2	2	2	2.2	3	3



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YEAR	II	SEM	03	SUBJECT CODE	MA3354
SUBJECT	DISCRETE MATHEMATICS				

The students will be able to:

C01	Recognize the concept of logic, propositions and proofs.
C02	Create the mathematical induction and knowing the generating function.
C03	Analyze the various kinds of graphs and their properties.
C04	Analyze the groups and the kinds of groups and their properties.
C05	Evaluate the concept of Lattices and the Boolean Algebra.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	-	-	-	-	2	1	-	1	2	2	-
C02	3	2	2	2	-	-	-	-	1	2	-	1	1	1	-
C03	2	3	1	2	-	-	-	-	1	1	-	1	2	1	-
C04	3	2	2	1	-	-	-	-	1	1	-	1	1	1	-
C05	2	2	3	1	-	-	-	-	1	1	-	1	2	2	-
AVG	2.6	2.4	2	1.6	-	-	-	-	1.2	1.2	-	1	1.6	1.4	-



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YEAR	II	SEM	03	SUBJECT CODE	CS3351
SUBJECT	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION				

The students will be able to:

C01	Design various combinational digital circuits using logic gates.
C02	Design sequential circuits and analyze the design procedures.
C03	State the fundamentals of computer systems and analyze the execution of an instruction.
C04	Analyze different types of control design and identify hazards.
C05	Identify the characteristics of various memory systems and I/O communication.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	3	3	-	-	-	1	3	2	2	-	1
C02	2	2	2	-	2	-	-	-	-	-	3	2	3	1	1
C03	3	3	1	-	-	-	-	-	-	3	3	3	2	-	1
C04	3	3	2	-	-	2	-	-	-	3	3	3	3	1	1
C05	2	2	2	-	3	3	3	-	-	2	-	2	2	1	1
AVG	2.6	2.6	1.8	0.4	1.6	1.6	0.6	-	-	1.8	2.4	2.4	2.4	0.6	1



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YEAR	II	SEM	03	SUBJECT CODE	CS3352
SUBJECT	FOUNDATIONS OF DATA SCIENCE				

The students will be able to:

C01	Explain the data science fundamentals and process.
C02	Describe the different types of data description for data science process.
C03	Identify the relationships between the variables.
C04	Understand the various python libraries for data wrangling.
C05	Interpret and explore the data using visualization libraries.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	2	-	-	-	-	-	-	-	-	-	2	1	1
C02	2	2	2	-	-	-	-	-	-	-	-	-	1	1	1
C03	2	2	2	-	-	-	-	-	-	-	-	-	1	1	1
C04	2	2	2	1	2	-	-	-	-	-	-	-	-	-	-
C05	2	3	3	3	1	-	-	-	-	-	-	-	-	-	-
AVG	2	2.2	2.2	0.8	0.6	-	-	-	-	-	-	-	0.8	0.6	0.6



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YEAR	II	SEM	03	SUBJECT CODE	CS3301
SUBJECT	DATA STRUCTURES				

The students will be able to:

C01	Analyze the concept of list and its various implementations.
C02	Apply the algorithms using Stack and Queue ADT in stack and queue applications.
C03	Analyze the non-linear data structures as Tree and Heap.
C04	Apply appropriate Graph algorithms in Graph applications.
C05	Evaluate various Sorting, Searching and Hashing Techniques.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	3	1	-	-	-	-	-	-	-	-	2	2	-
C02	3	3	3	1	-	-	-	-	-	-	-	-	2	2	-
C03	3	2	3	1	-	-	-	-	-	-	-	-	3	2	-
C04	3	2	3	1	-	-	-	-	-	-	-	-	3	3	3
C05	3	3	3	1	3	-	-	-	-	-	-	-	1	3	3
AVG	3	2.4	3	1	0.6	-	-	-	-	-	-	-	2.2	2.4	1.2





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YEAR	II	SEM	03	SUBJECT CODE	CS3391
SUBJECT	OBJECT ORIENTED PROGRAMMING				

The students will be able to:

C01	Apply the concepts of classes and objects to solve simple problems.
C02	Develop programs using inheritance, packages and interfaces.
C03	Build Java applications using exceptions and I/O streams.
C04	Develop Java applications with threads and generic classes.
C05	Develop interactive Java programs using basics of JAVAFX event handling, and controls.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
C02	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
C03	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
C04	1	1	1	1	2	-	-	-	-	-	-	2	3	-	-
C05	1	1	1	1	2	1	-	-	1	1	-	2	3	-	-
AVG	1	1	1	1	2	0.2	-	-	0.2	0.2	-	2	3	-	-



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YEAR	II	SEM	03	SUBJECT CODE	CS3311
SUBJECT	DATA STRUCTURES LABORATORY				

The students will be able to:

C01	Create the linked list and array implementation of linear data structures as list, stack and queues.
C02	Demonstrate the applications of stack.
C03	Design the non-linear data structures as Trees and Heaps.
C04	Apply graph algorithms as Prim's, Dijkstra's to find the shortest path.
C05	Analyze various sorting, searching and hashing techniques.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C02	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C03	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C04	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
C05	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1
AVG	3	2	2	1	-	-	-	-	-	2	2	-	2	1	1



# BETHLAHEM INSTITUTE OF ENGINEERING

KARUNGAL - 629 157, KANYAKUMARI DIST., TAMIL NADU.

(Approved by AICTE Vide : FNo. 06/05/TN/E&T/2007/25 dt. 02-06-2008 &

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Phone : 04651 - 268466, 268655, Fax : 04651 - 268466

E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	03	SUBJECT CODE	CS3381
SUBJECT	OBJECT ORIENTED PROGRAMMING LABORATORY				

The students will be able to:

C01	Elaborate the knowledge on java programming constructs.
C02	Develop programs in java using inheritance, packages & interfaces.
C03	Develop programs in java using nested try statements.
C04	Develop programs and applications in java using strings.
C05	Develop applications in event handling.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	-	-	-	-	-	3	2	-	2	3	-	-
C02	3	3	1	-	-	-	-	-	3	2	-	2	2	-	-
C03	3	2	1	-	-	-	-	-	3	2	-	2	2	-	-
C04	3	2	1	-	-	-	-	-	3	2	-	2	2	-	-
C05	3	2	1	-	-	-	-	-	3	2	-	2	2	-	-
AVG	3	2.4	1.4	-	-	-	-	-	3	2	-	2	2.2	-	-



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YEAR	II	SEM	03	SUBJECT CODE	CS3361
SUBJECT	DATA SCIENCE LABORATORY				

The students will be able to:

C01	Utilize the Python libraries for data science.
C02	Create the data frames in Python with Pandas.
C03	Create descriptive analysis on datasets.
C04	Develop regression model analysis and do comparison.
C05	Interpret data using visualization packages in Python.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	2	-	-	-	-	-	-	-	-	2	3	3
C02	3	2	2	2	-	-	-	-	-	-	-	-	2	3	3
C03	3	2	2	2	-	-	-	-	-	-	-	-	2	3	3
C04	3	2	2	2	-	-	-	-	-	-	-	-	2	3	3
C05	3	2	2	2	-	-	-	-	-	-	-	-	2	3	3
AVG	3	2	2	2	-	-	-	-	-	-	-	-	2	2	2



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YEAR	II	SEM	04	SUBJECT CODE	CS3452
SUBJECT	THEORY OF COMPUTATION				

The students will be able to:

C01	Design the Finite Automata for any given language and its equivalence.
C02	Construct Automata for any given pattern and find its equivalent regular expression.
C03	Design a Context Free Grammar for any given language.
C04	Analyze the normalized production rules using Context free grammar.
C05	Evaluate undecidable problems and NP class problems.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	-	-	-	-	-	-	-	2	2	-
C02	3	3	3	2	2	-	-	-	-	-	-	-	1	1	-
C03	3	3	3	1	-	-	-	-	-	-	-	-	1	1	1
C04	3	3	3	1	-	-	-	-	-	-	-	-	2	2	2
C05	3	3	1	2	-	-	-	-	-	-	-	-	1	1	-
AVG	3	3	2.4	1.6	0.8	-	-	-	-	-	-	-	1.4	1.4	0.6



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YEAR	II	SEM	04	SUBJECT CODE	CS3491
SUBJECT	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING				

The students will be able to:

C01	Apply appropriate search algorithms for problem solving.
C02	Apply reasoning under uncertainty.
C03	Build supervised learning models.
C04	Build ensembling and unsupervised models.
C05	Build deep learning neural network models

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	2	3	-	3	-	-	-	-	3	3	3
C02	3	3	3	3	2	3	-	3	-	-	-	-	3	3	3
C03	3	3	3	3	2	3	-	3	-	-	-	-	3	3	3
C04	3	3	3	3	2	3	-	3	-	-	-	-	3	3	3
C05	3	3	3	3	2	3	-	3	-	-	-	-	3	3	3
AVG	3	3	3	3	2	3	-	3	-	-	-	-	3	3	3



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YEAR	II	SEM	04	SUBJECT CODE	CS3492
SUBJECT	DATABASE MANAGEMENT SYSTEMS				

The students will be able to:

C01	Analyze the basic concepts and the applications of database systems.
C02	Interpret the basics of SQL and construct queries using SQ.
C03	Analyze the relational database design principles.
C04	Explain the basic issues of transaction processing and concurrency control.
C05	Examine database storage structures and access techniques.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	1	-	-	-	-	-	-	-	-	2	2	-	-
C02	2	1	2	1	3	-	-	-	-	-	-	1	3	-	-
C03	2	1	2	1	2	-	-	-	-	-	-	1	2	-	-
C04	2	3	-	-	1	-	-	-	-	-	-	2	3	-	-
C05	1	1	2	1	-	-	-	-	-	-	-	1	2	-	-
AVG	2.0	1.6	1.4	0.6	1.2	-	-	-	-	-	-	1.4	2.4	-	-



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YEAR	II	SEM	04	SUBJECT CODE	CS3401
SUBJECT	ALGORITHMS				

The students will be able to:

C01	Analyze the efficiency of algorithms using various frameworks.
C02	Apply graph algorithms to solve problems and analyze their efficiency.
C03	Solve problems by using algorithmic design techniques like divide and conquer, dynamic programming and greedy techniques.
C04	Describe the state space tree method for solving problems.
C05	Solve problems using approximation algorithms and randomized algorithms.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	1	-	-	-	-	-	-	-	-	-	1	2	1
C02	3	3	2	-	-	-	-	-	-	-	-	-	2	3	1
C03	2	3	3	-	-	-	-	-	-	-	-	-	2	2	1
C04	2	3	3	-	-	-	-	-	-	-	-	-	3	1	1
C05	2	2	3	-	-	-	-	-	-	-	-	-	1	1	1
AVG	2.4	2.8	2.4	-	-	-	-	-	-	-	-	-	1.8	1.6	1





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YEAR	II	SEM	04	SUBJECT CODE	CS3451
SUBJECT	INTRODUCTIONS TO OPERATING SYSTEMS				

The students will be able to:

C01	Define the overview of Computer system hardware and functions of OS.
C02	Analyze various scheduling algorithms, processes, threads and deadlocks.
C03	Compare and contrast various memory management schemes.
C04	Analyze the functionalities of IO management and file systems.
C05	Design different applications with the basics of virtual machines and Mobile OS like iOS and Android.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	1	-	-	-	1	-	-	-	-	-	-	2	2	1	1
C02	2	3	3	3	-	-	-	-	-	-	-	2	2	1	1
C03	2	3	3	3	3	-	-	-	-	-	-	1	1	1	1
C04	2	3	3	2	1	-	-	-	-	-	-	1	1	1	1
C05	2	-	-	-	-	-	-	-	-	-	-	2	1	1	2
AVG	1.8	1.8	1.8	1.6	1	-	-	-	-	-	-	1.6	1.4	1	1.2



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YEAR	II	SEM	04	SUBJECT CODE	GE3451
SUBJECT	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY				

The students will be able to:

C01	Find knowledge to protect environment and minimize environmental pollution.
C02	Create an awareness about value of environment at infant stage.
C03	Analyze ignorance, incomplete knowledge and misconceptions about environment.
C04	Take part in the life style that would reduce environmental disasters.
C05	Discover the importance of clean environment and a healthy society.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	2	-	-	2	3	-	2	3	-	-	1	-	-
C02	2	-	2	-	2	-	-	-	-	-	-	1	-	1	-
C03	-	-	-	2	2	-	2	-	-	-	-	-	-	1	-
C04	-	-	-	-	-	-	2	-	-	2	2	-	-	-	1
C05	-	-	-	-	-	2	2	-	-	-	1	2	-	-	1
AVG	0.4	-	0.8	0.4	0.8	0.8	1.8	-	0.4	1	0.6	0.6	0.2	0.4	0.4



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YEAR	II	SEM	04	SUBJECT CODE	CS3481
SUBJECT	DATABASE MANAGEMENT SYSTEMS LABORATORY				

The students will be able to:

C01	Create databases with different types of key constraints.
C02	Create simple and complex SQL queries using DML and DCL commands.
C03	Apply advanced features such as stored procedures and triggers and incorporate in GUI based application development.
C04	Create an XML database and validate with meta-data (XML schema).
C05	Create and manipulate data using NOSQL database.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	3	-	-	-	-	3	1	3	2	2	3	2
C02	2	2	3	2	2	-	-	-	1	2	3	3	2	1	2
C03	3	3	2	1	1	-	-	-	1	1	1	3	2	3	3
C04	1	3	3	3	1	-	-	-	1	1	3	2	3	1	3
C05	3	2	1	1	1	-	-	-	2	2	3	1	3	1	2
AVG	2.4	2.6	2.4	2	1.2	-	-	-	1.6	1.4	2.6	2.2	2.4	1.8	2.4



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YEAR	II	SEM	04	SUBJECT CODE	CS3461
SUBJECT	OPERATING SYSTEMS LABORATORY				

The students will be able to:

C01	Define and implement UNIX Commands.
C02	Compare the performance of various CPU Scheduling Algorithms.
C03	Compare and contrast various Memory Allocation Methods.
C04	Define File Organization and File Allocation Strategies.
C05	Implement various Disk Scheduling Algorithms.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	3	1	1	-	-	-	1	2	2	-	2	1	3
C02	3	1	1	2	2	-	-	-	3	2	2	-	2	1	2
C03	3	3	2	1	2	-	-	-	3	2	2	-	2	1	2
C04	1	2	2	3	2	-	-	-	3	2	2	-	2	1	1
C05	2	2	1	1	3	-	-	-	1	2	2	-	2	1	3
AVG	2.4	1.8	1.8	1.6	2	-	-	-	2.2	2	2	-	2	1	2.2



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YEAR	III	SEM	05	SUBJECT CODE	CS3591
SUBJECT	COMPUTER NETWORKS				

The students will be able to:

C01	Explain the different aspects of networks, protocols and discuss functions of application layer.
C02	Demonstrate the transport layer protocols.
C03	Visualize the network layer protocols.
C04	Learn the various network layer routing protocols and its functions.
C05	Describe the various data link layer design issues and understand the aspects of physical layer.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	1	2	-	1		-	-	-	-	-	-		1	1	1
C02	2	-	-	1	-	-	-	-	-	-	-	-	-	1	-
C03	2	2	1	1	-	-	-	-	-	-	-	-	-	1	-
C04	2	1	-	-	-	-	-	-	-	-	-	-	-	1	2
C05	2	1	-	1	-	-	-	-	-	-	-	-	-	1	1
AVG	1.8	1.2	0.2	0.8	-	-	-	-	-	-	-	-	0.2	1	0.8



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YEAR	III	SEM	05	SUBJECT CODE	CS3501
SUBJECT	COMPILER DESIGN				

The students will be able to:

C01	Analyze the phases of compiler and design of Lexical analyzer for a sample code.
C02	Apply different parsers for a given Grammar and design a parser using LEX and YACC tools.
C03	Develop intermediate code for statements in high level language.
C04	Analyze syntax directed translation schemes for a given context free grammar.
C05	Evaluate optimization techniques to intermediate code and generate machine code for high level language.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	-	-	-	-	-	-	2	2	2	2
C02	3	3	3	2	2	-	-	-	2	-	-	2	1	1	-
C03	3	3	3	-	1	-	-	-	2	-	-	1	1	1	1
C04	3	3	3	1	-	-	-	-	-	-	-	-	2	2	2
C05	3	3	-	-	-	-	-	-	3	-	-	2	1	1	-
AVG	3	3	2.2	1	1	-	-	-	1.4	-	-	1.4	1.4	1.4	1



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YEAR	III	SEM	05	SUBJECT CODE	CB3491
SUBJECT	CRYPTOGRAPHY AND CYBER SECURITY				

The students will be able to:

C01	Analyze the fundamentals of networks security, security architecture, threats and vulnerabilities.
C02	Apply the different cryptographic operations of symmetric cryptographic algorithms.
C03	Apply the different cryptographic operations of public key cryptography.
C04	Apply the various Authentication schemes to simulate different applications.
C05	Analyze various cybercrimes and cyber security.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	-	-	2	-	-	-	-	-	-	1	2	1	-
C02	3	2	2	1	2	-	2	-	-	2	-	-	1	1	-
C03	3	2	2	-	2	-	2	-	-	2	-	3	1	1	-
C04	2	-	-	-	-	-	-	-	-	2	-	2	1	1	-
C05	-	1	2	-	2	2	-	-	2	-	-	1	1	1	-
AVG	2.2	1.4	1.2	-	1.6	0.4	0.8	-	0.2	1.2	-	1.4	1.2	1	-



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YEAR	III	SEM	05	SUBJECT CODE	CS3551
SUBJECT	DISTRIBUTED COMPUTING				

The students will be able to:

C01	Illustrate the foundations and issues of distributed systems.
C02	Relate the various synchronization issues and global state for distributed systems.
C03	Compare the Mutual Exclusion and Deadlock detection algorithms in distributed systems.
C04	Interpret the agreement protocols and fault tolerance mechanisms in distributed systems.
C05	Explain the cloud computing models and the underlying concepts.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	1	-	-	-	-	-	-	-	-	-	-	2	-	2
C02	2	-	1	-	2	-	-	-	-	-	-	-	-	3	2
C03	3	2	1	1	-	-	-	-	-	-	-	-	-	2	3
C04	3	2	1	1	-	-	-	-	-	-	-	-	-	1	3
C05	-	3	2	-	2	-	-	-	-	-	-	-	2	-	-
AVG	2.0	1.6	1.0	0.4	0.8	-	-	-	-	-	-	-	0.8	1.2	2.0





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YEAR	III	SEM	05	SUBJECT CODE	CCW331
SUBJECT	BUSINESS ANALYTICS				

The students will be able to:

C01	Explain the real world business problems and model with analytical solutions.
C02	Identify the business processes for extracting Business Intelligence.
C03	Apply predictive analytics for business fore-casting.
C04	Apply analytics for supply chain and logistics management.
C05	Apply analytics for marketing and sales.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	3	-	-	-	-	-	-	-	-	-	3	-	2
C02	-	3	-	-	3	-	-	-	-	-	-	-	2	-	-
C03	-	-	2	3	-	-	-	-	-	-	-	-	3	-	-
C04	-	-	3	-	3	-	-	-	-	-	-	-	-	2	-
C05	-	-	-	-	1	1	-	-	-	2	-	-	-	3	-
AVG	0.4	1	1.6	0.6	1.4	0.2	-	-	-	0.4	-	-	1.6	1	0.4



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<b>YEAR</b>	<b>III</b>	<b>SEM</b>	<b>05</b>	<b>SUBJECT CODE</b>	<b>CCS375</b>
<b>SUBJECT</b>	<b>WEB TECHNOLOGIES</b>				

The students will be able to:

<b>C01</b>	Construct a basic website using HTML and Cascading Style Sheets
<b>C02</b>	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
<b>C03</b>	Develop server side programs using Servlets and JSP.
<b>C04</b>	Construct simple web pages in PHP and to represent data in XML format.
<b>C05</b>	Develop interactive web applications.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>C01</b>	3	2	3	3	3	-	-	-	1	3	3	1	3	2	3
<b>C02</b>	2	2	2	1	2	-	-	-	2	2	1	3	2	2	2
<b>C03</b>	1	1	3	2	3	-	-	-	1	2	1	1	1	2	1
<b>C04</b>	2	3	3	1	2	-	-	-	3	1	2	2	2	2	2
<b>C05</b>	1	2	3	2	2	-	-	-	2	1	3	1	1	1	2
<b>AVG</b>	1.8	2	2.8	1.8	2.4	-	-	-	1.8	1.8	2	1.6	1.8	1.8	2



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E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	05	SUBJECT CODE	MX3084
SUBJECT	DISASTER RISK REDUCTION AND MANAGEMENT				

The students will be able to:

C01	Demonstrate the types of disasters, causes and their impact on environment and society.
C02	Illustrate vulnerability and various methods of risk reduction measures as well as mitigation.
C03	Interpret the components and policies of disaster management.
C04	Summarize tools and recovery phases of disaster.
C05	Identify the potential impacts and actions of disaster through case studies.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	3	-	-	2	2	1	1	2	-	-	1	3
C02	3	3	3	3	-	-	2	1	1	1	2	-	-	1	3
C03	3	3	3	3	-	-	-	1	1	1	2	-	-	1	3
C04	3	3	2	3	-	-	2	1	1	1	2	-	-	1	3
C05	3	3	2	3	-	-	2	1	1	1	2	-	-	1	3
AVG	3	3	2.4	3	-	-	1.6	1.2	1	1	2	-	-	1	3



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YEAR	III	SEM	06	SUBJECT CODE	CCS356
SUBJECT	OBJECT ORIENTED SOFTWARE ENGINEERING				

The students will be able to:

C01	Compare various Software Development Lifecycle Models.
C02	Evaluate software requirement analysis.
C03	Define formal analysis on specifications.
C04	Evaluate project management approaches as well as cost and schedule estimation strategies.
C05	Design using architectural styles and design patterns, and test the system.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	1	2	2	-	-	-	-	1	1	2	2	-	1
C02	2	3	2	3	2	-	-	-	2	2	3	2	3	2	-
C03	2	3	2	1	1	-	-	-	2	2	3	2	2	3	-
C04	2	3	2	2	3	-	-	-	2	2	3	2	2	-	1
C05	2	3	1	2	2	-	-	-	-	-	-	1	3	2	2
AVG	2	2.8	1.6	2	2	-	-	-	1.2	1.4	2	1.8	2.4	1.4	0.8



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YEAR	III	SEM	06	SUBJECT CODE	CS3691
SUBJECT	EMBEDDED SYSTEMS AND IOT				

The students will be able to:

C01	Explain the architecture of embedded processors.
C02	Design embedded C programs.
C03	Design simple embedded applications.
C04	Compare the communication models in IOT.
C05	Design IoT applications using Arduino/Raspberry Pi /open platform.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	-		-	-	-	-	-	-	-	-	2	-	2	2
C02	2	-		-	-	-	-	-	-	-	-	2	-	2	2
C03	2	-		-	-	-	-	-	-	-	-	2	-	2	2
C04	2	-		-	-	-	-	-	-	-	-	2	-	2	2
C05	2	-	1	-	1	-	-	-	-	-	-	2	-	2	2
AVG	2.0	-	0.2	-	0.2	-	-	-	-	-	-	2.0	-	2.0	2.0



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YEAR	III	SEM	06	SUBJECT CODE	CCS358
SUBJECT	PRINCIPLES OF PROGRAMMING LANGUAGES				

The students will be able to:

C01	Apply syntax and semantics of programming languages.
C02	Explain data, data types, and basic statements of programming languages.
C03	Design and implement subprogram constructs.
C04	Apply object-oriented, concurrency, and event handling programming constructs and Develop programs in Scheme, ML, and Prolog.
C05	Evaluate functional and logic programming languages.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	3	2	1	-	-	-	-	-	-	3	2	3	-
C02	2	2	3	2	2	-	-	-	-	-	-	3	2	3	-
C03	3	3	3	2	2	-	-	-	-	-	-	3	2	3	-
C04	3	3	3	3	2	2	-	-	-	-	-	-	3	2	-
C05	3	3	3	3	3	3	-	-	-	-	-	-	3	3	-
AVG	2.6	2.6	3	2.4	2	1	-	-	-	-	-	1.8	2.4	2.8	-



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YEAR	III	SEM	06	SUBJECT CODE	CCS354
SUBJECT	NETWORK SECURITY				

The students will be able to:

C01	Relate the fundamentals of cryptography.
C02	Outline the key management techniques and authentication approaches.
C03	Explain the network and transport layer security techniques.
C04	Distinguish the application layer security standards.
C05	Illustrate the real time security practices.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	2	-	-	-	2	1	2	1	2	3	1
C02	1	1	3	2	2	-	-	-	2	2	1	1	3	1	2
C03	1	2	1	1	2	-	-	-	3	3	1	3	2	1	3
C04	2	2	3	2	3	-	-	-	3	3	2	1	2	1	3
C05	2	1	3	2	2	-	-	-	2	1	1	3	2	1	1
AVG	1.8	1.8	2.4	1.8	2.2	-	-	-	2.4	2	1.4	1.8	2.2	1.4	2



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YEAR	III	SEM	06	SUBJECT CODE	CCS352
SUBJECT	MULTIMEDIA AND ANIMATION				

The students will be able to:

C01	Relate the fundamental knowledge of Multimedia elements and systems.
C02	Develop knowledge about Multimedia file formats and standards.
C03	Outline the process of Authoring multimedia presentations.
C04	Analyze techniques of animation in 2D and 3D and for the mobile UI.
C05	Analyze different popular applications of multimedia.

## CO-PO MAPPING

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	3	2	3	-	-	-	3	2	1	2	3	2	3
C02	3	3	3	3	3	-	-	-	3	3	2	2	3	2	3
C03	3	3	3	3	3	-	-	-	3	3	2	3	3	2	3
C04	3	3	3	3	3	2	-	-	3	3	3	3	3	3	3
C05	3	3	3	3	3	2	-	-	3	3	3	3	3	3	3
AVG	3	2.8	3	2.8	3	0.8	-	-	3	2.8	2.2	2.6	3	2.4	3