



# **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 ELECTRONICS AND COMMUNICATION**

**AND ENGINEERING**

**COURSE OUTCOMES AND CO-PO MAPPING**



# BETHLAHEM INSTITUTE OF ENGINEERING

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## DEPARTMENT OF ELECTRONICS AND COMMUNICATION 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	GE8161	Problem Solving and Python Programming Laboratory	0	0	4	2
8	BS8161	Physics and Chemistry 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	PH8253	Physics for Electronics Engineering	3	0	0	3
4	BE8254	Basic Electrical and Instrumentation Engineering	3	0	0	3
5	EC8251	Circuit Analysis	4	0	0	4
6	EC8252	Electronic Devices	3	0	0	3
7	EC8261	Circuits and Devices Laboratory	0	0	4	2
8	GE8261	Engineering Practices Laboratory	0	0	4	2
<b>SEMESTER-III</b>						
1	MA8352	Linear Algebra and Partial Differential Equations	4	0	0	4
2	EC8393	Fundamentals of Data Structures In C	3	0	0	3
3	EC8351	Electronic Circuits- I	3	0	0	3



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4	EC8352	Signals and Systems	4	0	0	4
5	EC8392	Digital Electronics	3	0	0	3
6	EC8391	Control Systems Engineering	3	0	0	3
7	EC8381	Fundamentals of Data Structures in C Laboratory	0	0	4	2
8	EC8361	Analog and Digital Circuits Laboratory	0	0	4	2
9	HS8381	Interpersonal Skills/Listening & Speaking	0	0	2	1
<b>SEMESTER-IV</b>						
1	MA8451	Probability and Random Processes	4	0	0	4
2	EC8452	Electronic Circuits II	3	0	0	3
3	EC8491	Communication Theory	3	0	0	3
4	EC8451	Electromagnetic Fields	4	0	0	4
5	EC8453	Linear Integrated Circuits	3	0	0	3
6	GE8291	Environmental Science and Engineering	3	0	0	3
7	EC8461	Circuits Design and Simulation Laboratory	0	0	4	2
8	EC8462	Linear Integrated Circuits Laboratory	0	0	4	2
<b>SEMESTER-V</b>						
1	EC8501	Digital Communication	3	0	0	3
2	EC8553	Discrete-Time Signal Processing	4	0	0	4
3	EC8552	Computer Architecture and Organization	3	0	0	3
4	EC8551	Communication Networks	3	0	0	3
5	EC8073	Medical Electronics	3	0	0	3
6	OMD551	Basics of Bio-Medical Instrumentation	3	0	0	3
7	EC8562	Digital Signal Processing Laboratory	0	0	4	2
8	EC8561	Communication Systems Laboratory	0	0	4	2
9	EC8563	Communication Networks Laboratory	0	0	4	2



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SEMESTER-VI						
1	EC8691	Microprocessors and Microcontrollers	3	0	0	3
2	EC8095	VLSI Design	3	0	0	3
3	EC8652	Wireless Communication	3	0	0	3
4	MG8591	Principles of Management	3	0	0	3
5	EC8651	Transmission Lines and RF Systems	3	0	0	3
6	EC8004	Wireless Networks	3	0	0	3
7	EC8681	Microprocessors and Microcontrollers Laboratory	0	0	4	2
8	EC8661	VLSI Design Laboratory	0	0	4	2
9	EC8611	Technical Seminar	0	0	2	1
10	HS8581	Professional Communication	0	0	2	1
SEMESTER-VII						
1	EC8701	Antennas and Microwave Engineering	3	0	0	3
2	EC8751	Optical Communication	3	0	0	3
3	EC8791	Embedded and Real Time Systems	3	0	0	3
4	EC8702	Ad hoc and Wireless Sensor Networks	3	0	0	3
5	EC8071	Cognitive Radio	3	0	0	3
6	OIE751	Robotics	3	0	0	3
7	EC8711	Embedded Laboratory	0	0	4	2
8.	EC8761	Advanced Communication Laboratory	0	0	4	2
SEMESTER-VIII						
1	GE8076	Professional Ethics in Engineering	3	0	0	3
2	EC8094	Satellite Communication	3	0	0	3
3	EC8811	Project Work	0	0	20	10



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## DEPARTMENT OF ECE

Regulation 2017

### COURSE OUTCOMES AND CO PO MAPPING

YEAR	I	SEM	I	SUBJECT CODE	HS8151
SUBJECT	Communicative English				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
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	-	-	-	2	-
C02	-	2	-	2	-	-	-	-	-	3	-	-	-	2	-
C03	-	-	-	-	-	-	-	-	-	3	-	-	-	2	-
C04	-	2	-	1	-	-	-	-	-	3	-	-	-	3	-
C05	-	-	-	-	-	-	-	-	2	3	-	-	-	3	-
AVG	-	0.8	-	0.6	-	-	-	-	1	3	-	-	-	2.2	-



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YEAR	I	SEM	I	SUBJECT CODE	MA8151
SUBJECT	Engineering Mathematics - I				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Students are able to do different techniques of differentiation and easily identify the continuities
C02	Understood about the partial differentiation and Lagrange calculation
C03	Know the different techniques of integral calculus
C04	Know the different kinds of integrals. understand how to find area and volume by using double and triple integrals
C05	Understand 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	1	2	-
C02	3	3	2	2	-	1	1	-	2	1	-	3	2	-	1
C03	3	2	1	2	2	-	-	2	2	1	1	1	2	-	-
C04	3	3	2	3	-	2	1	-	1	1	-	2	1	2	-
C05	3	2	3	2	1	-	-	1	2	-	-	3	1	-	2
AVG	3	2.4	2	2	0.8	0.6	0.4	0.8	2	0.8	0.2	2	1.4	0.8	0.6



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## DEPARTMENT OF ECE

YEAR	I	SEM	I	SUBJECT CODE	PH8151
SUBJECT	Engineering Physics				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	The students will gain knowledge on the basics of properties of matter and its Applications
C02	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics
C03	The students will have adequate knowledge on the concepts of thermal properties of Materials and their applications in expansion joints and heat exchangers
C04	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes
C05	The students will understand 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
C01	3	3	2	2	2	2	-	-	1	-	-	2	2	-	2
C02	3	3	2	-	2	2	-	-	-	-	-	2	2	-	-
C03	3	2	3	2	-	2	3	-	-	-	-	3	1	-	3
C04	3	3	2	-	2	2	-	-	-	-	-	2	-	-	2
C05	2	3	3	2	-	2	1	-	-	-	-	3	2	-	2
AVG	2.8	2.8	2.4	1.2	2	2	0.8	0	1	0	0	2.4			



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YEAR	I	SEM	I	SUBJECT CODE	CY8151
SUBJECT	Engineering Chemistry				

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	C01	3	1	2	-	2	2	2	-	-	-	-	2		
C02	C02	3	-	2	-	3	2	2	-	-	2	-	-		
C03	C03	3	-	2	-	3	2	1	-	-	2	-	-		
C04	C04	2	-	3	-	-	2	3	-	-	-	-	2		
C05	C05	3	-	3	-	2	2	3	-	-	-	-	3		
AVG	Average aPO	2.8	0.2	2.4	0	2	2	2.2	0	0	0.8	0	1.4		





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YEAR	I	SEM	I	SUBJECT CODE	GE8151
SUBJECT	Problem Solving and Python Programming				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Explain the principles of problem solving techniques.
C02	Develop simple python programs.
C03	Develop programs based on control flow.
C04	Analyze compound data using lists, tuples, and dictionaries.
C05	Design files, modules & packages.

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P01 0	P01	P01	PS0	PS0	PS0
C01	3	3	3	3	-	-	-	-	3	1	3	-	-	3	2
C02	3	3	3	3	-	-	-	-	3	1	3	-	-	1	2
C03	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
C04	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
C05	3	3	3	3	2	-	-	-	3	1	3	-	-	3	2
AVG	3	3	3	3	1.2	-	-	-	3	1	3	-	-	2.6	2



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YEAR	I	SEM	I	SUBJECT CODE	GE8152
SUBJECT	Engineering Graphics				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
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	I	SUBJECT CODE	GE8161
SUBJECT	Problem Solving and Python Programming Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Develop simple algorithms, Pseudo code, and 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	I	SUBJECT CODE	BS8161
SUBJECT	Physics and Chemistry Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
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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## SEMESTER II

YEAR	I	SEM	I	SUBJECT CODE	HS8251
SUBJECT	Technical English				

CO	COURSE OUTCOMES STATEMENT
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	I	SUBJECT CODE	MA8251
SUBJECT	Engineering Mathematics - II				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Understand the Eigen values and eigenvectors digonalisation 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	To develop the standard techniques of complex variable theory in particular analytic function and its property
C04	To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals
C05	Laplace transform and inverse transform of simple functions Properties Various related theorems and applications to differential equations 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	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	2.2	1.2	0.6	0.6	0.8 2	1.6	0.4	2.2	1.6	1.6	0.6	0.6



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YEAR	I	SEM	I	SUBJECT CODE	PH8253
SUBJECT	Physics for Electronics Engineering				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Gain knowledge on classical and quantum electron theories, and energy band structures
C02	Acquire knowledge on basics of semiconductor physics and its applications in various devices
C03	Get knowledge on magnetic and dielectric properties of materials
C04	Have the necessary understanding on the functioning of optical materials for Optoelectronics
C05	Understand the basics of quantum structures and their applications in spintronics and carbon electronics.

## 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		1			3	3	1	3
C02	3	3	3	2	2	2	2		1			3	3	1	3
C03	3	3	1	1	3	3	3		1			3	3	1	3
C04	3	3	3	2	2	2	2		1			3	3	2	3
C05	3	3	3	1	2	2	2		1			3	3	1	3
AVG	3	3	3	1.6	2.2	2.2	2.2		1			3	3	1.2	3



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YEAR	I	SEM	I	SUBJECT CODE	BE8254
SUBJECT	Basic Electrical and Instrumentation Engineering				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Explain the basic principles and equivalent circuit of the transformer
C02	Analyze the output characteristics of DC machines
C03	Analyze equivalent circuit and starting methods of AC rotating machines.
C04	Explain the types and operations of measurements and instrumentations.
C05	Explain the transmission and distribution of power systems.

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	2	-	2	2	-	-	-	-	1	3	2	3
C02	3	3	3	3	3	2	2	-	-	-	-	2	3	2	-
C03	3	3	3	3	2	2	2	-	1	-	-	2	3	-	1
C04	3	3	3	2	3	-	-	-	1	-	-	2	2	2	1
C05	3	1	3	1	-	3	2	1	-	1	3	-	3	2	-
AVG	3	2.6	3	2.2	1.6	1.8	1.6	0.2	0.4	0.2	0.6	1.4	2.8	1.6	1





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

YEAR	I	SEM	02	SUBJECT CODE	EC8251
SUBJECT	Circuit Analysis				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Apply Kirchoff's current and voltage laws to simple circuits and Solve complex circuits using Mesh & Nodal Methods
C02	Apply Network theorems to linear circuits and to solve simple and complex problems
C03	Compute the Frequency response of Series and Parallel resonance and analyze tuned circuits.
C04	Estimate the Transient response of RLC circuits under DC and AC excitation using Laplace Transform.
C05	Analyze the two port networks.

## CO PO MAPPING

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



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YEAR	I	SEM	I	SUBJECT CODE	EC8252
SUBJECT	Electronic Devices				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Explain the basic electronic devices such as PN junction diode and Bipolar transistors
C02	Analyze the equivalent circuit of transistors with input output characteristics
C03	Explain the basic FET devices
C04	Explain the special semiconductor devices such as LED, LCD and other Opto-electronic devices
C05	Analyze the basic power and display devices

## 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	2	-
C02	3	3	3	3	2	-	-	-	2	-	-	-	3	-	-
C03	3	3	3	3	2	-	-	-	2	-	-	-	3	1	-
C04	3	3	3	3	2	-	-	-	-	-	-	-	3	-	-
C05	3	3	3	3	-	-	-	-	-	-	-	-	3	1	-
AVG	3	3	3	3	0.4	-	-	-	0.2	-	-	0.1	3	0.8	-



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YEAR	I	SEM	02	SUBJECT CODE	EC8261
SUBJECT	Circuits and Devices Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Gain hands on experience in VI characteristics of basic electronic devices.
C02	Apply hands on experience in RL and RC circuits for transient analysis.
C03	Apply hands on experience in KVL, KCL, Thevenin, Norton'and superposition theorems.
C04	Analyze the working of Frequency response of Series and Parallel RLC Circuits
C05	Analyze the working of wave shaping circuits

## 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	1
C02	3	3	3	1	3	2	-	2	-	-	-	1	1	-	2
C03	3	3	3	-	2	-	-	-	-	-	-	-	-	-	-
C04	3	3	3	1	2	-	1	-	1	-	-	1	-	-	-
C05	3	3	3	1	2	-	-	-	-	-	1	-	-	-	-
AVG	3	3	3	1.2	2.4	0.4	0.2	0.4	0.2	0.4	0.2	0.6	0.8	0.2	0.6



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YEAR	I	SEM	I	SUBJECT CODE	GE8261
SUBJECT	Engineering Practices Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
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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## SEMESTER III

YEAR	I	SEM	I	SUBJECT CODE	MA8352
SUBJECT	Linear Algebra and Partial Differential Equations				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Determine the fundamental concept of advanced algebra and their role in modern mathematics and applied contexts
C02	Apply accurate and efficient use of advanced algebraic techniques
C03	Apply their mastery by solving non trivial problems related to the concept and by proving simple theorems about the statement proven by the text.
C04	Understand how to solve the given standard partial differential equations
C05	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.

## 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	-	-
C02	3	3	2	-	-	-	-	-	1	-	-	1	1	-	-
C03	3	3	2	-	-	-	-	-	1	-	-	1	1	-	-
C04	3	3	2	-	-	-	-	-	-	-	-	1	1	-	-
C05	3	3	2	-	-	-	-	-	-	-	-	1	1	-	-
AVG	3	3	2	-	-	-	-	-	0.6	-	--	1	1	-	-



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YEAR	I	SEM	I	SUBJECT CODE	EC8393
SUBJECT	Fundamentals of Data Structures In C				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Introduce the basics of C programming language.
C02	learn the concepts of advanced features of C.
C03	Study the concepts of ADTs and linear data structures.
C04	Know the concepts of non-linear data structure and hashing.
C05	familiarize the concepts of sorting and searching techniques

## 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	2
C02	3	3	3	-	-	-	-	-	1	2	1	2	2	3	3
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	2.6	3	1	3	-	-	-	1	2	1	2	2.2	2.6	2.75



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YEAR	II	SEM	03	SUBJECT CODE	EC8351
SUBJECT	Electronic Circuits- I				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Design and analyze the stability factor of BJT and FET
C02	Analyze the performance of small signal single stage and multistage BJT amplifier
C03	Analyze the performance of small signal single stage and multistage BJT amplifier
C04	Apply the frequency characteristics of BJT and FET amplifiers.
C05	Analyze and design power supplies and electronic device testing

## 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	2	-
C02	3	3	3	3	2	-	-	-	2	-	-	-	3	-	-
C03	3	3	3	3	2	-	-	-	2	-	-	-	3	1	-
C04	3	3	3	3	2	-	-	-	-	-	-	-	3	-	-
C05	3	3	3	3	-	-	-	-	-	-	-	-	3	1	-
AVG	3	3	3	3	0.4	-	-	-	0.2	-	-	0.1	3	0.3	-



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YEAR	II	SEM	03	SUBJECT CODE	EC8352
SUBJECT	Signals and Systems				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Determine if a given system is linear/causal/stable
C02	Analyze fourier and laplace transform
C03	Characterize LTI systems in the time domain and frequency domain of fourier and laplace transform
C04	Analyze DTFT and Z transform
C05	Characterize LTI systems in the time domain and frequency domain of DTFT and Z transform domains

## 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	2	3	3	3	-	-	1	-	-	2	3	1	-
C03	3	2	3	3	3	-	-	-	-	-	-	2	2	2	-
C04	3	2	2	2	-	-	2	1	-	-	-	3	3	-	-
C05	3	2	2	3	3	-	-	2	2	2	-	-	2	-	-
AVG	3	2.4	2.6	2.6	2.2	0.6	0.4	0.6	0.6	0.4	0.4	1.8	2.4	0.6	0.4





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YEAR	II	SEM	03	SUBJECT CODE	EC8392
SUBJECT	Digital Electronics				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Understand digital fundamentals, minimize Boolean expressions and obtain knowledge of logic gates
C02	Design various combinational digital circuits using logic gates
C03	Do the analysis and design procedures for synchronous sequential circuits
C04	Do the analysis and design procedures for asynchronous sequential circuits
C05	Summarize the semiconductor memories and analyze logic families

## CO PO MAPPING

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



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<b>YEAR</b>	<b>II</b>	<b>SEM</b>	<b>03</b>	<b>SUBJECT CODE</b>	<b>EC8391</b>
<b>SUBJECT</b>	<b>Control Systems Engineering</b>				

Students will be able to

<b>CO</b>	<b>COURSE OUTCOMES STATEMENT</b>
<b>C01</b>	Apply various mathematical principles to find the transfer function of mechanical, electrical and electromechanical control systems.
<b>C02</b>	Analyze the various time domain parameters
<b>C03</b>	Analyze the system in frequency domain through various frequency response plots and to design compensators for improving the performance of the system
<b>C04</b>	Apply the concepts of various system stability criteria on the systems.
<b>C05</b>	Design and analyze the digital control system using state variable models

## 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	3	2	-
<b>C02</b>	3	3	3	3	2	-	-	-	3	-	-	3	3	-	-
<b>C03</b>	3	3	3	3	2	-	-	-	-	-	-	3	3	1	-
<b>C04</b>	3	3	3	3	2	-	-	-	-	-	-	3	3	-	-
<b>C05</b>	3	3	3	3	-	-	-	-	-	-	-	3	3	1	-
<b>AVG</b>	3	3	3	3	2	-	-	-	3	-	-	3	3	1.3	-



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

YEAR	I	SEM	I	SUBJECT CODE	EC8381
SUBJECT	Fundamentals of Data Structures in C Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Use different constructs of C and develop applications
C02	Write functions to implement linear and non-linear data structure operations
C03	Suggest and use the appropriate linear / non-linear data structure operations for a given problem
C04	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval
C05	Implement Sorting and searching algorithms for a given application

## 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	2.6	3	1						1	2	1	2	2.2	2.6



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YEAR	II	SEM	03	SUBJECT CODE	EC8361
SUBJECT	Analog and Digital Circuits Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Understand about the frequency response BJT/JFET amplifiers
C02	Differentiate cascode and cascade amplifiers
C03	Measure CMRR in differential amplifier
C04	Simulate and analyze amplifier circuits using PSpice
C05	Design and Test the digital logic circuits

## CO PO MAPPING

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



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YEAR	II	SEM	II	SUBJECT CODE	HS8381
SUBJECT	Interpersonal Skills/Listening & Speaking				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
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	Get accustomed with 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	-	-	-	-	2
C02	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
C03	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
C04	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
C05	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
AVG	-	2.0	-	-	-	-	-	-	2.0	3.0	-	-	-	-	2.0



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## SEMESTER IV

YEAR	II	SEM	04	SUBJECT CODE	MA8451
SUBJECT	Probability and Random Processes				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Basic concepts in probability and random processes for applications such as random signals, linear systems in communication engineering
C02	To understand the basic concepts of probability, one and two dimensional random variables and to introduce some standard distributions applicable to engineering which can describe real life phenomenon
C03	To understand the basic concepts of random processes which are widely used in IT fields.
C04	Understand and apply the concept of correlation and spectral densities
C05	Able to analyze the response of random inputs to linear time invariant systems

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	2	2	1	1	-	-	-	-	1	-	1	-		1	-
C02	2	2	1	1	-	1	2	1	1	2	-	2	2	1	-
C03	3	2	-	2	2	-	2	-	2		-	2	3	-	-
C04	3	2	3	1	-	3	2	3	2	3	1	2	3	1	-
C05	3	2	3	2	3	1	2	-	-	2	2	2	-	3	-
AVG	2.6	2	1.6	1.5	1	1	1.6	0.8	1.2	1.3	0.6	1.6	1.8	1.2	-



# 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	04	SUBJECT CODE	EC8452
SUBJECT	Electronic Circuits II				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Understand the design negative feedback amplifiers and also analyze the stability of feedback amplifiers
C02	Analyze sinusoidal oscillators (positive feedback) and also investigate frequency stability of different oscillators
C03	Understand and know the performance of tuned amplifier
C04	Understand the design and working of multi - vibrators
C05	Analyze the performance of power amplifiers and also investigate the performance of DC convertors.

## 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	-	-	-	-	3	-	1	3	-	2
C02	1	3	3	3	2	-	-	-	-	1	-	-	3	-	2
C03	3	1	2	2	1	-	-	-	-	3	-	-	2	-	1
C04	3	3	3	3	2	-	-	-	-	3	-	1	3	1	1
C05	1	1	2	2	2	-	-	-	-	3	-	-	1	-	1
AVG	2.2	2.2	2.6	2.2	1.6					2.6		0.4	2.4	0.2	1.4



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YEAR	II	SEM	04	SUBJECT CODE	EC8491
SUBJECT	Communication Theory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Explain the principles of amplitude modulation techniques
C02	Analyze the spectral characteristics of angle modulation techniques
C03	Apply the concepts of Random Process to the design of Communication systems
C04	Evaluate the noise performance of receivers
C05	Analyze pulse modulation methods and multiplexing techniques

## CO PO MAPPING

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





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YEAR	II	SEM	04	SUBJECT CODE	EC8451
SUBJECT	Electromagnetic Fields				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Explain Gradient, Divergence, and Curl operations on electromagnetic vector fields
C02	Explain electrostatic fields, electric potential, energy density and their applications
C03	Explain the magneto static fields, magnetic flux density, vector potential.
C04	Analyse different methods of emf generation and Maxwell's equations
C05	Describe the concept of electromagnetic waves and characterizing parameters

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	2	2	1	-	-	-	-	-	-	2	2	-	3
C02	2	2	2	2	2	-	-	-	-	-	-	2	3	-	2
C03	3	2	1	2	3	-	-	-	-	-	-	2	2	-	2
C04	3	3	2	2	2	-	-	-	-	-	-	2	3	3	2
C05	3	3	2	3	2	-	-	-	-	-	-	2	2	3	2
AVG	2.8	2.6	1.8	2.2	2	-	-	-	-	-	-	2	2.4	1.2	2.2



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YEAR	II	SEM	04	SUBJECT CODE	EC8453
SUBJECT	Linear Integrated Circuits				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Design linear and nonlinear applications of OP – AMPS
C02	Design applications using analog multiplier and PLL
C03	Design ADC and DAC using OP – AMPS
C04	Generate waveforms using OP – AMP Circuits
C05	Analyze special function ICs

## 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	3	-	2
C02	3	3	2	2	-	-	-	-	-	-	-	3	2	-	2
C03	3	3	2	2	-	-	-	-	-	3	-	2	2	-	2
C04	3	3	3	2	-	-	2	-	-	-	-	2	3	-	2
C05	3	3	2	2	-	-	-	-	-	2	-	3	3	-	2
AVG	3	3	2.4	1.8	-	-	0.1	-	-	1	-	2.4	2.6	-	2



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YEAR	II	SEM	04	SUBJECT CODE	GE8291
SUBJECT	Environmental Science and Engineering				

Students will able to

CO	COURSE OUTCOMES STATEMENT
C01	Understand the concept of Eco system and Bio diversity.
C02	Analyse the reasons for different types of pollution.
C03	Evaluate scarcity of all kind of natural resources and also find the reasons to avoid it.
C04	Remember the social issues like green chemistry, medical wastes, and natural diaster.
C05	Apply the various concepts to reduce the population growth improve the women welfare.

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	2	-	-	2	3	1	-	-	1	1	-	2	1
C02	1	-	2	-	1	-	2	-	1	1	-	-	-	2	-
C03	3	-	2	-	1	-	3	1	1	-	-	-	-	2	1
C04	2	-	-	-	-	-	3	2	1	1	-	-	-	1	1
C05	-	-	2	-	-	2	2	-	1	1	-	-	-	2	1
AVG	1	-	1.6	-	0.4	0.8	2.6	0.6	0.8	0.6	0.2	0.2	-	1.8	0.8



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YEAR	I	SEM	I	SUBJECT CODE	EC8461
SUBJECT	Circuits Design and Simulation Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Analyze the characteristics of PN Junction Diode and Zener Diode.
C02	Design and Testing of BJT and MOSFET amplifiers
C03	Analyze the operation of power amplifiers
C04	Analyze the concepts of SCR and observe its characteristics
C05	Design and analyze RC, RL, series & parallel resonance circuits

## 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	3	-	2	-	2	3	-	-
C02	3	2	3	2	3	2	3	3	-	2	-	2	3	-	-
C03	3	2	3	2	3	2	1	3	-	2	-	2	3	-	-
C04	3	2	3	2	3	2	-	2	-	2	-	2	3	-	-
C05	3	2	3	2	3	2	-	2	-	2	-	2	3	-	-
AVG	3	2	3	2	3	2	0.33	2.6	-	2	-	2	3	-	-



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YEAR	I	SEM	I	SUBJECT CODE	EC8462
SUBJECT	Linear Integrated Circuits Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Design amplifiers, oscillators, D-A converters using operational amplifiers
C02	Design filters using op-am
C03	Design DC power supply using ICs
C04	Understand the operation of Switch Mode Power Supply
C05	Analyze the performance of filters and multivibrators using SPICE.

## 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	3	2	1	2	3	-	1
C02	3	2	3	-	-	2	-	2	3	2	1	2	3	-	1
C03	3	2	3	-	-	2	-	2	3	2	1	2	3	-	1
C04	3	1	-	-	-	2	-	2	3	2	1	2	3	-	1
C05	3	2	3	-	3	2	-	2	3	2	1	2	3	-	2
AVG	3	0.6	0.8	-	0.2	2	-	2	3	2	1	2	3	-	0.4



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## SEMESTER V

YEAR	I	SEM	I	SUBJECT CODE	EC8501
SUBJECT	Digital Communication				

CO	COURSE OUTCOMES STATEMENT
C01	Understand the limits set by information theory
C02	Understand the various waveform coding schemes.
C03	Design and implement base band transmission & reception schemes
C04	Analyze the spectral characteristics of band pass signaling schemes and their noise performance.
C05	Design error control coding schemes

## 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
C02	3	3	3	2	-	-	-	-	-	-	-	1	3	-	2
C03	3	3	3	2	-	-	-	-	-	-	-	1	3	-	2
C04	3	3	3	2	-	-	-	-	-	-	-	1	3	-	2
C05	3	3	3	2	-	-	-	-	-	-	-	1	3	-	2
AVG	3	3	3	2								0.8	3		2



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YEAR	I	SEM	I	SUBJECT CODE	EC8553
SUBJECT	Discrete-Time Signal Processing				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Apply DFT for the analysis of digital signal and systems
C02	Design IIR and FIR filters
C03	Characterize the effects of finite precision representation on digital filters
C04	Design multi rate filters
C05	Apply adaptive filters appropriately in communication systems

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	-	-	2	-	-	-	3	-	-	2	-	-	3
C02	3	3	3	-	-	-	-	-	3	-	-	-	3	-	-
C03	3	3	3	-	-	-	-	-	3	-	-	-	3	-	-
C04	3	3	3	-	-	-	-	-	3	-	-	-	3	-	-
C05	3	1	-	-	-	-	-	-	-	2	-	-	-	-	-
AVG	3	2.2	1.8	-	0.1	-	-	-	2.4	0.1	-	0.1	1.8	-	0.2



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YEAR	III	SEM	05	SUBJECT CODE	EC8552
SUBJECT	Computer Architecture and Organization				

Students will able to

CO	COURSE OUTCOMES STATEMENT
C01	Analyze the concept of stored program, role of operating system, Instruction sets and Addressing modes and Demonstrate problems on Addressing modes.
C02	Design of adders, ALU and Explain the Use of fixed point multiplication (Booth's) and division (Restoring and non-restoring) algorithms.
C03	Discuss about implementation schemes of control unit and pipeline performance.
C04	Analyze the concept of various memories, interfacing and organization of multiple Processors.
C05	Discuss parallel processing technique and Implementation & Understand about unconventional architectures and network topologies.

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	1	1	-	-	-	1	-	1	-	1	3	-	2
C02	3	2	1	1	-	-	-	1	-	1	-	1	2	-	-
C03	3	3	2	2	-	-	-	1	-	1	-	1	3	-	2
C04	3	3	2	-	-	-	-	1	-	1	-	1	3	-	2
C05	3	3	2	1	-	-	-	1	-	2	-	1	3	-	2
AVG	3	2.6	1.6	1	-	-	-	1		1.2		1	2.8	-	1.6





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YEAR	I	SEM	I	SUBJECT CODE	EC8551
SUBJECT	Communication Networks				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Analyze the functions of each layer and gain knowledge in different applications that use computer networks.
C02	Inspect the networking programs of protocols and IP addressing.
C03	Implement and understand the behaviors of various networking protocols like TCP, UDP and client server programming.
C04	Understand the terminology and concepts of OSI security architecture and security services.
C05	Trace the concept of hardware security like channel attacks and physical attack

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	3	3	-	-	2	-	-	3	-	-	1	3	1
C02	3	3	2	2	-	-	3	-	-	3	-	-	2	-	3
C03	2	3	3	2	3	3	-	-	-	2	-	-	1	-	1
C04	3	2	-	3	3	1	-	-	-	-	-	2-	3	3	2
C05	3	3	-	2	-	-	-	-	-	1	-	-	3	2	-
AVG	2.8	2.4	1.6	2.4	1.2	0.8	1	-	-	1.8	-	0.2	2	1.6	1.4



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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>I</b>	<b>SUBJECT CODE</b>	<b>EC8073</b>
<b>SUBJECT</b>	<b>Medical Electronics</b>				

<b>CO</b>	<b>COURSE OUTCOMES STATEMENT</b>
<b>C01</b>	Discuss the human body electro- physiological parameters and recordings of bio- potentials
<b>C02</b>	Discuss the non- electrical physiological parameters and their measurement – body temperature, blood pressure, pulse, blood cell count, blood flow meter etc.
<b>C03</b>	Discover about the various assist devices used in the hospitals viz. pacemakers, defibrillators, dialyzers and ventillators.
<b>C04</b>	Discuss the physical medicine methods eg.ultrasonic, shortwave, microwave surgical diathermics annd bio- telemetry principles and methods
<b>C05</b>	Discover the recent trends in medical instrumentation.

## 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	2	3	3	-	-	3	2	3	3	3	3
<b>C02</b>	3	3	3	3	1	3	3	-	-	3	2	3	3	3	3
<b>C03</b>	2	3	3	3	1	2	2	-	-	3	2	3	3	3	3
<b>C04</b>	3	3	3	3	1	3	3	-	-	3	2	3	3	3	3
<b>C05</b>	3	3	2	3	1	3	3	-	-	3	2	3	3	3	3
<b>AVG</b>	2.8	3	<b>2.8</b>	3	1.2	2.8	3			3	2	3	3	3	3



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YEAR	III	SEM	5	SUBJECT CODE	OMD551
SUBJECT	Basics of Bio-Medical Instrumentation				

CO	COURSE OUTCOMES STATEMENT
C01	To Learn the different bio potential and its propagation.
C02	To get Familiarize the different electrode placement for various physiological recording
C03	Students will be able design bio amplifier for various physiological recording.
C04	Students will understand various technique non electrical physiological measurements
C05	Understand the different biochemical measurements

### CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-
C02	2	2	3	-	2	-	-	-	-	-	-	2	-	2	-
C03	2	3	2	-	2	-	-	-	-	-	-	3	-	2	-
C04	-	3	-	-	2	-	-	-	-	-	-	2	-	-	-
C05	-	2	-	-	2	-	-	-	-	-	-	2	-	2	-
AVG	2.8	2	1	0	1.6	.2	0	0	0	0	0	2.2	0	1.2	0



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YEAR	III	SEM	5	SUBJECT CODE	EC8562
SUBJECT	Digital Signal Processing Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Experiment with sequence generation, correlation, convolution & spectrum analysis using DFT
C02	Design FIR and IIR filters with known specifications
C03	Apply adaptive filtering in equalization for various applications of DSP
C04	Demonstrate DSP processors and explain its operation and addressing modes
C05	Build FIR and IIR filters and analyze finite word length effects on DSP processors.

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2	3	2	-	-	2	2	3	-	2	1	2	1
C02	2	3	3	2	3	-	1	2	2	2	-	2	2	1	2
C03	3	2	2	3	3	-	-	3	3	3	-	3	2	2	1
C04	3	2	3	2	2	-	-	2	2	3	-	2	2	1	3
C05	2	3	2	3	3	-	-	3	2	2	-	2	1	2	1
AVG	2.6	2.4	2.4	2.6	2.6	0	.2	2.4	2.2	2.6	0	2.2	1.6	1.6	1.6



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YEAR	I	SEM	I	SUBJECT CODE	EC8561
SUBJECT	Communication Systems Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Demonstrate analog modulation and demodulation scheme.
C02	Demonstrate the digital modulation & Demodulation scheme.
C03	Demonstrate the concept of line coding techniques.
C04	Simulation of BPSK, QPSK & QAM signal constellation, ASK, FSK BPSK & DPSK digital modulation schemes using MATLAB.

## 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	-	1	3	2	-
C02	3	3	3	1	-	-	-	-	-	-	-	1	3	-	2
C03	3	3	3	-	3	-	-	-	-	-	-	1	1	-	1
C04	3	3	3	-	3	-	-	-	-	-	-	-	3	-	-
AVG	3	3	3	0.5	2.25					0.5		0.75	2.5	0.5	0.75



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

YEAR	I	SEM	I	SUBJECT CODE	EC8563
SUBJECT	Communication Networks Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Communication between PCs.
C02	Implement Carrier Sense multiple access.
C03	Simulation of different topologies and protocols
C04	Implementation of congestion control mechanism.
C05	Simulation of different routing algorithms.

## CO PO MAPPING

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



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## SEMESTER VI

YEAR	III	SEM	06	SUBJECT CODE	EC8691
SUBJECT	Microprocessors and Microcontrollers				

Students will able to

CO	COURSE OUTCOMES STATEMENT
C01	Analyze and execute programs based on 8086 Microprocessor
C02	Design of system bus structure
C03	Design aspects of Memory Interfacing circuits and interface I/O circuits
C04	Analyze and execute programs based on 8051 Microcontroller
C05	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
C01	2	2	2	2	1	-	-	1	-	1	-	2	2	-	2
C02	2	3	3	2	-	-	-	1	-	1	-	2	2	-	-
C03	1	3	3	1	2	1	-	1	-	1	-	2	3	3	2
C04	2	2	2	2	1	-	-	1	-	1	1	2	2	1	2
C05	2	2	2	1	2	2	1	1	-	1	1	2	2	1	-
AVG	1.8	2.4	2.4	1.6	1.2	0.6	0.2	1	-	1	0.4	2	2.2	0.8	1.2



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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>I</b>	<b>SUBJECT CODE</b>	<b>EC8095</b>
<b>SUBJECT</b>	<b>VLSI Design</b>				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
<b>CO1</b>	Realize the concepts of digital building blocks using MOS transistor.
<b>CO2</b>	Design combinational MOS circuit and power strategies.
<b>CO3</b>	Design and construct Sequential Circuits and Timing systems.
<b>CO4</b>	Design arithmetic building blocks and memory subsystems.
<b>CO5</b>	Apply and implement FPGA design flow and testing.

### CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
<b>CO1</b>	3	3	3	1	-	-	-	-	-	-	-	2	3	-	2
<b>CO2</b>	3	3	2	2	-	-	-	-	-	-	-	3	2	-	2
<b>CO3</b>	3	3	2	2	-	-	-	-	-	3	-	2	2	-	2
<b>CO4</b>	3	3	3	2	-	-	2	-	-	-	-	2	3	-	2
<b>CO5</b>	3	3	2	2	-	-	-	-	-	2	-	3	3	-	2
<b>AVG</b>	3	3	2.4	1.8	-	-	2	-	-	2.5	-	2.4	2.6	-	2





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<b>YEAR</b>	<b>III</b>	<b>SEM</b>	<b>06</b>	<b>SUBJECT CODE</b>	<b>EC8652</b>
<b>SUBJECT</b>	<b>Wireless Communication</b>				

<b>CO</b>	<b>COURSE OUTCOMES STATEMENT</b>
<b>C01</b>	Characterize a wireless channel and evolve the system design specifications
<b>C02</b>	Design a cellular system based on resource availability and traffic demands
<b>C03</b>	Implement various signaling schemes for fading channels.
<b>C04</b>	Identify suitable signaling & multipath mitigation techniques for the wireless channel
<b>C05</b>	Design and implement systems with transmit / receive diversity and Analyze the performance of MIMO systems.

## 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	2	1	1	1	-	-	-	-	-	3	3
<b>C02</b>	3	3	3	3	2	1	1	1	-	1	-	2	1	3	3
<b>C03</b>	3	3	3	3	2	-	-	-	-	-	-	2	1	3	3
<b>C04</b>	3	3	3	3	-	-	-	1	-	-	-	-	-	3	3
<b>C05</b>	3	3	3	3	2	1	1	1	-	1	-	2	1	3	3
<b>AVG</b>	3	3	3	3	1.6	.6	.6	.8	0	.4	0	1.2	.6	3	3



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YEAR	I	SEM	I	SUBJECT CODE	MG8591
SUBJECT	Principles of Management				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Understand the managerial functions like planning, organizing, staffing, leading & controlling.
C02	Have same basic knowledge on international aspect of management.
C03	Ability to understand management concept of organizing.
C04	Ability to understand management concept of directing.
C05	Ability to understand management concept of controlling.

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	-	-	-	-	1	-	-	-	-	-	-	2	1	1
C02	-	1	1	-	-	-	-	-	-	-	-	-	2	1	-
C03	1	-	-	2	-	-	1	-	-	2	1	1	-	-	2
C04	-	1	1	1	2	-	-	1	1	2	-	-	1	1	1
C05	1	-	-	-	1	1	-	-	-	-	-	-	1	-	1
AVG	1.6	1	1	1.5	1.5	1	1	1	1	2	1	1	1.5	1	1.25



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YEAR	III	SEM	06	SUBJECT CODE	EC8651
SUBJECT	Transmission Lines and RF Systems				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Explain the characteristics of transmission lines and its losses
C02	Write about the standing wave ratio and input impedance in high frequency transmission lines
C03	Analyze impedance matching by stubs using smith charts
C04	Analyze the characteristics of TE and TM waves
C05	Design a RF transceiver system for wireless communication

### CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	3	3	2	2	2	-	-	-	2	-	3	3	3	3
C02	3	3	3	3	2	-	-	1	-	1	-	2	-	2	2
C03	3	3	3	2	2	-	-	-	-	-	-	2	-	2	2
C04	3	3	3	1	3	2	1	-	-	-	-	2	1	-	2
C05	3	2	3	-	2	-	2	-	2	-	3	2	1	2	2
AVG	3	2.8	3	1.6	2.2	0.8	0.6	0.2	0.4	0.6	0.6	2.2	0.8	1.8	2.2



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YEAR	I	SEM	I	SUBJECT CODE	EC8004
SUBJECT	Wireless Networks				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	C01: Explain the various protocols and standards of wireless LAN and HIPERLAN.
C02	C02: Describe the protocols for mobile network layer and routing in mobile ad-hoc network.
C03	C03: Describe 3G networks.
C04	C04: Analyze the internetworking of WLAN and WWAN and explain about the different wireless WAN architectures.
C05	C05: Interpret the latest 4G networks and its architecture.

## 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	2	2	-	1	-	-	2	2	2
C02	2	2	2	2	-	-	-	-	-	-	-	2	2	-	3
C03	2	2	2	2	-	-	-	-	-	-	-	2	-	2	2
C04	3	2	3	2	-	-	2	2	-	-	-	2	1	2	2
C05	2	1	-	-	2	2	2	2	-	-	-	2	2	2	3
AVG	2.2	1.8	1.6	1.8	0.4	0.8	1.2	1.2	-	0.2	-	1.8	1.4	1.8	2.4



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YEAR	III	SEM	06	SUBJECT CODE	EC8681
SUBJECT	Microprocessors and Microcontrollers Laboratory				

Students will able to

CO	COURSE OUTCOMES STATEMENT
C01	Write ALP Programmes for fixed and Floating Point and Arithmetic operations
C02	Interface different I/Os with processor
C03	Generate waveforms using Microprocessors
C04	Execute 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	1	-	-	2	2	-	-	3	-	-
C02	3	2	3	2	3	2	3	1	2	2	3	2	3	-	3
C03	3	2	3	2	3	1	-	-	2	2	-	-	3	-	-
C04	3	2	3	2	3	2	1	1	2	2	3	2	3	-	2
AVG	3	2	3	2	3	1.5	1	1	2	2	1.5	1	3	-	1.25



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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>I</b>	<b>SUBJECT CODE</b>	<b>EC8661</b>
<b>SUBJECT</b>	<b>VLSI Design Laboratory</b>				

<b>CO</b>	<b>COURSE OUTCOMES STATEMENT</b>
<b>CO1</b>	Write HDL code for basic as well as advanced digital integrated circuit
<b>CO2</b>	Import the logic modules into FPGA Boards
<b>CO3</b>	Synthesize Place and Route the digital IPs
<b>CO4</b>	Design, Simulate and Extract the layouts of Digital IC Blocks using EDA tools.
<b>CO5</b>	Design, Simulate and Extract the layouts of Analog IC Blocks using EDA tools

## 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>CO1</b>	3	3	3	1	3	-	-	-	-	2	-	1	3	2	-
<b>CO2</b>	3	3	3	1	3	-	-	-	-	2	-	1	3	-	2
<b>CO3</b>	3	3	3	-	3	-	-	-	-	-	-	1	1	-	1
<b>CO4</b>	3	3	3	-	-	-	-	-	-	2	-	-	3	-	-
<b>CO5</b>	3	3	3	1	-	-	-	-	-	2	-	-	3	-	-
<b>AVG</b>	3	3	3	0.6	1.8	0	0	0	0	1.6	0	0.6	2.6	0.4	0.6



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YEAR	I	SEM	I	SUBJECT CODE	EC8611
SUBJECT	Technical Seminar				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	To study research papers for understanding of a new field, in the absence of a textbook, to summarize and review them.
C02	To identify promising new directions of various cutting edge technologies.
C03	Analyze the various methodologies and technologies and discuss with the team for solving the problem.
C04	To impart skills in preparing detailed report describing the project and results
C05	To effectively communicate by making an oral presentation before an evaluation committee

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
C02	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
C03	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
C04	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
C05	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
AVG	-	2.0	-	-	-	-	-	-	2.0	3.0	-	-	-	-	2.0



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<b>YEAR</b>	<b>III</b>	<b>SEM</b>	<b>VI</b>	<b>SUBJECT CODE</b>	<b>HS8581</b>
<b>SUBJECT</b>	<b>Professional Communication</b>				

CO	COURSE OUTCOMES STATEMENT
C01	Make 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	-	-	-	-	2
C02	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
C03	-	2	-	-	-	-	-	-	2	3	--	-	-	-	2
C04	-	2	-	-	-	-	-	-	2	3	-	-	-	-	2
C05	-	2	-	2	-	-	-	-	2	3	-	-	-	-	2
AVG	-	2.0	-	0.4	-	-	-	-	2.0	3.0	-	-	-	-	2.0





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## SEMESTER VII

YEAR	I	SEM	I	SUBJECT CODE	EC8701
SUBJECT	Antennas and Microwave Engineering				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	CO1: Apply the basic principles and evaluate antenna parameters and link power budgets.
C02	Compare the radiation mechanisms of wire and loop antennas. Design and assess the performance of aperture and frequency independent antennas.
C03	Distinguish the radiation pattern of end fire and broad side arrays.
C04	Describe the working principle of active and passive microwave components.
C05	Design a microwave system given the application specifications

## CO PO MAPPING

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



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YEAR	IV	SEM	07	SUBJECT CODE	EC8751
SUBJECT	Optical Communication				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Realize basic elements in optical fibers, different modes and configurations.
C02	Analyze the transmission characteristics associated with dispersion and polarization techniques.
C03	Design optical sources and detectors with their use in optical communication system.
C04	Construct fiber optic receiver systems, measurements and coupling techniques.
C05	Design optical communication systems and its networks

## 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	3	3	2
C02	3	3	2	3	3	3	-	-	-	-	-	2	3	3	2
C03	3	2	3	3	3	-	-	1	1	-	-	2	3	2	3
C04	3	2	2	2	-	-	-	1	2	-	-	3	3	2	2
C05	3	2	2	3	3	-	3	1	-	2	-	-	3	2	2
AVG	3	2.4	2.2	2.6	2.2	0.6	0.6	0.6	0.6	0.4	0.2	1.8	3	2.4	2.2



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<b>YEAR</b>	<b>IV</b>	<b>SEM</b>	<b>07</b>	<b>SUBJECT CODE</b>	<b>EC8791</b>
<b>SUBJECT</b>	<b>Embedded and Real Time Systems</b>				

<b>CO</b>	<b>COURSE OUTCOMES STATEMENT</b>
<b>CO1</b>	Outline the concepts of embedded system
<b>CO2</b>	Describe the architecture and programming of ARM processor
<b>CO3</b>	Understand Embedded Programming
<b>CO4</b>	Explain the basic concepts of real time operating system design
<b>CO5</b>	Model real-time applications using embedded-system concept

### 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>	2	2	2	2	-	2	-	-	2	-	2	2	2	2	3
<b>C02</b>	2	2	-	-	-	-	-	-	-	-	2	2	2	1	3
<b>C03</b>	3	2	-	2	2	-	-	-	-	-	-	3	2	1	3
<b>C04</b>	2	2	2	2	-	2	2	-	-	-	2	2	2	1	3
<b>C05</b>	2	2	2	2	3	-	2	-	-	2	1	2	2	1	3
<b>AVG</b>	2.2	2	1.2	1.6	1	0.8	0.8	-	0.4	0.4	1.4	2.2	2	1.2	3



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

YEAR	I	SEM	I	SUBJECT CODE	EC8702
SUBJECT	Ad hoc and Wireless Sensor Networks				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Analyze the basics and applications of Adhoc and wireless sensor networks
C02	Apply the knowledge to identify the suitable algorithm based on the network and user requirement.
C03	Interpret the appropriate physical and MAC layer protocols.
C04	Analyze the transport layer and security issues possible in Adhoc and sensor networks.
C05	Analyze the OS used in wireless sensor networks and build basic modules

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	1	-	-	2	-	-	-	-	-	1	2	-	1
C02	3	2	3	1	1	-	-	-	-	-	1	2	1	-	-
C03	3	2	1	-	-	-	-	-	-	-	-	3	-	-	1
C04	2	2	3	-	1	2	-	-	-	-	-	2	3	-	2
C05	3	2	1	1	12	-	-	-	-	-	-	3	-	-	3
AVG	2.8	2	1.8	0.4	0.8	0.8	-	-	-	-	0.1	2.2	1.2	-	1.4



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YEAR	I	SEM	I	SUBJECT CODE	EC8071
SUBJECT	Cognitive Radio				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	To understand the evolving software defined radio and cognitive radio techniques and their essential functionalities
C02	To study the basic architecture and standard for cognitive radio
C03	To learn the concepts of cooperative spectrum sensing and handoff process
C04	To understand the physical, MAC and Network layer design of cognitive radio.
C05	To expose the student to evolving applications and advanced features of cognitive radio.

## 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
C02	3	3	3	3	2	-	-	-	-	3	-	3	3	-	3
C03	3	3	3	3	2	2	-	-	-	3	-	3	3	-	3
C04	3	3	3	3	2	-	-	-	-	3	-	3	3	-	3
C05	3	3	3	3	2	-	-	-	-	3	-	3	3	-	3
AVG	3	3	3	3	2	0.4	-	-	-	3	-	3	3	-	3



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<b>YEAR</b>	<b>I</b>	<b>SEM</b>	<b>I</b>	<b>SUBJECT CODE</b>	<b>OIE751</b>
<b>SUBJECT</b>	<b>Robotics</b>				

Students will be able to

<b>CO</b>	<b>COURSE OUTCOMES STATEMENT</b>
<b>C01</b>	Apply various functions of robot and the concept of robot specifications
<b>C02</b>	Analyze various drive systems and end effectors of robot.
<b>C03</b>	Analyze the functions of sensors and image processing techniques in robot
<b>C04</b>	Apply the concepts of forward and reverse kinematics.
<b>C05</b>	Design and analyze the implementation of robots in industries.

## 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	-	-	-	2	3	-	-	-	-	-	3	-	2	3
<b>C02</b>	3	2	-	3	-	-	2	-	-	-	-	2	3	-	-
<b>C03</b>	3	3	-	3	2	-	-	-	-	2	-	3	2	3	-
<b>C04</b>	3	-	2	-	2	-	-	-	-	-	-	-	3	-	-
<b>C05</b>	1	3	2	3	-	-	-	-	-	-	-	-	3	1	-
<b>AVG</b>	2.6	1.6	0.8	1.8	1.2	0.6	0.4	-	-	0.4	-	1.6	2.2	1.2	0.6



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YEAR	I	SEM	I	SUBJECT CODE	EC8711
SUBJECT	Embedded Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Write programs in ARM for a specific Application
C02	Interface memory, A/D and D/A convertors with ARM system
C03	Analyze the performance of interrupt
C04	Write program for interfacing keyboard, display, motor and sensor
C05	Formulate a mini project using embedded systems

## 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	-	1	3	2	-
C02	3	3	3	1	3	-	-	-	-	2	-	1	3	-	2
C03	3	3	3	-	3	-	-	-	-	-	-	1	1	-	1
C04	3	3	3	-	-	-	-	-	-	2	-	-	3	-	-
C05	3	3	3	-	3	-	-	-	-	-	-	1	3	2	-
AVG	3	3	3	0.4	2.4	0	0	0	0	1.2	0	0.8	2.6	0.8	0.6



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YEAR	IV	SEM	07	SUBJECT CODE	EC8761
SUBJECT	Advanced Communication Laboratory				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Apply the working principle of optical sources, detector, fibers.
C02	Develop understanding of simple optical communication link.
C03	Analyze the measurement of BER, Pulse broadening.
C04	Demonstrate and capture an experimental approach to digital wireless communication.
C05	Examine the actual communication waveforms that will be sent and received across wireless

## 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	3	3	2
C02	3	2	3	3	3	3	-	2	-	-	-	2	3	3	2
C03	3	2	3	3	3	-	2	-	-	-	-	2	3	2	3
C04	3	2	2	2	-	-	1	-	1	-	-	3	3	2	2
C05	3	2	2	2	3	-	-	-	1	2	-	-	3	2	2
AVG	3	2.2	2.4	2.4	2.2	0.6	0.6	0.4	0.4	0.4	0.2	1.8	3	2.4	2.2





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## SEMESTER VIII

YEAR	I	SEM	I	SUBJECT CODE	GE8076
SUBJECT	Professional Ethics in Engineering				

Students will be able to

CO	COURSE OUTCOMES STATEMENT
C01	Illustrate the core values that enrich the ethical behavior of an engineer
C02	Discuss the importance of moral issues and theories of the profession
C03	Associate 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	Explain 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	0.2	0.4	-	2.2	1.6	2.8	0.6	1	1.2	0.6	1.2	2.4	1.4



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YEAR	I	SEM	I	SUBJECT CODE	EC8094
SUBJECT	Satellite Communication				

CO	COURSE OUTCOMES STATEMENT
C01	Describe the orbital parameters and launching procedures in satellite communications.
C02	Analyze the spacecraft technology and different subsystems in satellite
C03	Explain the satellite link design and interference analysis
C04	Analyze the multiple access methods like FDMA, TDMA, CDMA and coding schemes
C05	Explain the satellite series like INTELSAT, INSAT, VSAT and analyze the mobile satellite services.

## CO PO MAPPING

COS	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	1	3	-	-	-	-	-	-	-	-	3	1	3	1
C02	3	1	2	2	-	-	-	-	-	-	-	2	2	-	-
C03	2	3	3	2	-	-	-	-	-	2	-	-	1	-	1
C04	3	2	2	-	-	-	-	-	-	2	-	2	3	3	2
C05	3	-	-	2	-	2	-	2	-	-	3	2	3	2	-
AVG	2.8	1.4	2	1.2	-	0.4	-	0.4	-	0.2	0.6	1.8	2	1.6	0.8

