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 MECHANICAL ENGINEERING

COURSE OUTCOMES

AND

CO-PO MAPPING

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

DEPARTMENT OF MECHANICAL ENGINEERING

Anna University Regulation 2021

List of Course Names

Sl. No	Course code	Course title	L	T	P	C
SEMESTER-I						
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	GE3171	Problem Solving and Python Programming Laboratory	0	0	4	2
7	BS3171	Physics and Chemistry Laboratory	0	0	4	2
8	GE3172	English Laboratory	0	0	2	1
SEMESTER-II						
1	HS3252	Professional English - II	2	0	0	2
2	MA3251	Statistics and Numerical Methods	3	1	0	4
3	PH3251	Materials Science	3	0	0	3
4	BE3251	Basic Electrical and Electronics Engineering	3	0	0	3
5	GE3251	Engineering Graphics	2	0	4	4
6	GE3271	Engineering Practices Laboratory	0	0	4	2
7	BE3271	Basic Electrical and Electronics	0	0	4	2
8	GE3272	Communication Laboratory / Foreign Language	0	0	4	2
SEMESTER-III						
1	MA3351	Transforms and Partial Differential Equations	3	1	0	4
2	ME3351	Engineering Mechanics	3	0	0	3
3	ME3391	Engineering Thermodynamics	3	0	0	3
4	CE3391	Fluid Mechanics and Machinery	3	1	0	4

5	ME3392	Engineering Materials and Metallurgy	3	0	0	3
6	ME3393	Manufacturing Processes	3	0	0	3
7	ME3381	Computer Aided Machine Drawing	0	0	4	2
8	ME3382	Manufacturing Technology Laboratory	0	0	4	2
SEMESTER-IV						
1	ME3491	Theory of Machines	3	0	0	3
2	ME3451	Thermal Engineering	4	0	0	4
3	ME3492	Hydraulics and Pneumatics	3	0	0	3
4	ME3493	Manufacturing Technology	3	0	0	3
5	CE3491	Strength of Materials	3	0	0	3
6	GE3451	Environmental Sciences and Sustainability	2	0	0	2
7	CE3481	Strength of Materials and Fluid Machinery Laboratory	0	0	4	2
8	ME3461	Thermal Engineering Laboratory	0	0	4	2
SEMESTER-V						
1	ME3591	Design of Machine Elements	4	0	0	4
2	ME3592	Metrology and Measurements	3	0	0	3
3	CME338	Value Engineering	3	0	0	3
4	CME388	Industrial Safety	3	0	0	3
5	CME332	Conventional and futuristic vehicle technology	3	0	0	3
6	MX3084	Disaster Risk reduction and Management	3	0	0	0
7	ME3581	Metrology and Dynamics Laboratory	0	0	4	2
SEMESTER-VI						
1	ME3691	Heat and Mass Transfer	3	1	0	4
2	MR3691	Robotics	3	0	0	3
3	CME350	Environment Sustainability and Impact Assessment	3	0	0	3
4	CME384	Power Plant Engineering	3	0	0	3
5	CME366	Equipment For Pollution Control	3	0	0	3
6	ME3681	CAD/CAM Laboratory	0	0	4	2
7	ME3682	Heat Transfer Laboratory	0	0	4	2

SEMESTER-VII						
1	ME3791	Mechatronics and IoT	3	0	0	3
2	ME3792	Computer Integrated Manufacturing	3	0	0	3
3	GE3791	Human Values and Ethics	2	0	0	2
4	GE3792	Industrial Management	3	0	0	3
5	OML351	Introduction to Non-Destructive Testing	3	0	0	3
6	OIM353	Production Planning and Control	3	0	0	3
7	ME3781	Mechatronics and IoT Laboratory	0	0	4	2
SEMESTER-VII						
1	ME3811	Project Work / Internship	0	0	20	10

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

DEPARTMENT OF MECHANICAL ENGINEERING

Anna university regulation 2021

Course outcome and CO-PO mapping

YEAR	I	SEM	01	SUBJECT CODE	HS3151
SUBJECT	PROFESSIONAL ENGLISH I				

The students will be able to:

CO1	To use appropriate words in a professional context
CO2	To gain understanding of basic grammatical structures and use them in right context.
CO3	To read and infer the denotative and connotative meanings of technical texts
CO4	To read and interpret information presented in tables, charts and other graphic forms
CO5	To write definitions, descriptions, narrations and essays on various topics

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
CO2	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
CO3	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
CO4	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
CO5	2	3	3	3	-	3	3	3	2	3	-	3	-	-	-
AVG	1.6	2.2	1.8	2.2	1.5	3	3	3	1.6	3	3	3	-	-	-

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

YEAR	I	SEM	01	SUBJECT CODE	MA3151
SUBJECT	MATRICES AND CALCULUS				

The students will be able to:

CO1	Use the matrix algebra methods for solving practical problems.
CO2	Apply differential calculus tools in solving various application problems.
CO3	Able to use differential calculus ideas on several variable functions.
CO4	Apply different methods of integration in solving practical problems.
CO5	Apply multiple integral ideas in solving areas, volumes and other practical problems

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO2	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO3	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO4	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO5	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
AVG	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-

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

YEAR	I	SEM	01	SUBJECT CODE	PH3151
SUBJECT	ENGINEERING PHYSICS				

The students will be able to:

CO1	Understand the importance of mechanics.
CO2	Express their knowledge in electromagnetic waves.
CO3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
CO4	Understand the importance of quantum physics.
CO5	Comprehend and apply quantum mechanical principles towards the formation of energy bands

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	1	-	-	-	-	-	-	-	-	-
CO2	3	3	2	1	2	1	-	-	-	-	-	-	-	-	-
CO3	3	3	2	2	2	1	-	-	-	-	-	1	-	-	-
CO4	3	3	1	1	2	1	-	-	-	-	-	-	-	-	
CO5	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-
AVG	3	3	1.6	1.2	1.8	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	I	SEM	01	SUBJECT CODE	CY3151
SUBJECT	ENGINEERING CHEMISTRY				

The students will be able to:

CO1	To infer the quality of water from quality parameter data and propose suitable treatmentmethodologies to treat water.
CO2	To identify and apply basic concepts of nanoscience and nanotechnology in designing thesynthesis of nanomaterials for engineering and technology applications.
CO3	To apply the knowledge of phase rule and composites for material selection requirements.
CO4	To recommend suitable fuels for engineering processes and applications.
CO5	To recognize different forms of energy resources and apply them for suitable applications inenergy sectors

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	-	1	1	-	-	-	-	1	-	-	-
CO2	2	-	-	1	-	2	2	-	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	1	1	-	-	1	2	-	-	-	-	-	-	-	-
CO5	3	1	2	1	-	2	2	-	-	-	-	2	-	-	-
AVG	2.8	1.3	1.6	1	-	1.5	1.8	-		-	-	1.5	-	-	-

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

YEAR	I	SEM	01	SUBJECT CODE	GE3151
SUBJECT	PROBLEM SOLVING AND PYTHON PROGRAMMING				

The students will be able to:

CO1	Develop algorithmic solutions to simple computational problems.
CO2	Develop and execute simple Python programs.
CO3	Write simple Python programs using conditionals and looping for solving problems
CO4	Decompose a Python program into functions
CO5	Represent compound data using Python lists, tuples, dictionaries etc.
CO6	Read and write data from/to files in Python programs.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	-	-	-	-	-	2	2	3	3	-
CO2	3	3	3	3	2	-	-	-	-	-	2	2	3	-	-
CO3	3	3	3	3	2	-	-	-	-	-	2	-	3	-	-
CO4	2	2	-	2	2	-	-	-	-	-	1	-	3	-	-
CO5	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-
AVG	2	2	-	-	2	-	-	-	-	-	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
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:

CO1	Develop algorithmic solutions to simple computational problems
CO2	Develop and execute simple Python programs
CO3	Implement programs in Python using conditionals and loops for solving problems
CO4	Deploy functions to decompose a Python program
CO5	Process compound data using Python data structures
CO6	Utilize Python packages in developing software applications.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	-	-	-	-	-	3	2	3	3	3
CO2	3	3	3	3	3	-	-	-	-	-	3	2	3	-	3
CO3	3	3	3	3	2	-	-	-	-	-	2	-	3	-	3
CO4	3	2	-	2	2	-	-	-	-	-	1	-	3	-	3
CO5	1	2	-	-	1	-	-	-	-	-	1	-	2	-	1
CO6	2	-	-	-	2	-	-	-	-	-	1	-	2	-	2
AVG	2	3	3	3	2	-	-	-	-	-	2	2	3	3	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	I	SEM	01	SUBJECT CODE	BS3171
SUBJECT	PHYSICS AND CHEMISTRY LABORATORY				

PHYSICS LABORATORY: (Any Seven Experiments)

The students will be able to:

CO1	Understand the functioning of various physics laboratory equipment.
CO2	Use graphical models to analyze laboratory data.
CO3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.
CO4	Access, process and analyze scientific information.
CO5	Solve problems individually and collaboratively

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO3	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
AVG	3	2.4	2.6	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	I	SEM	01	SUBJECT CODE	BS3171
SUBJECT	PHYSICS AND CHEMISTRY LABORATORY				

CHEMISTRY LABORATORY: (Any seven experiments to be conducted)

The students will be able to:

CO1	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness andDO.
CO2	To determine the amount of metal ions through volumetric and spectroscopic techniques
CO3	To analyse and determine the composition of alloys.
CO4	To learn simple method of synthesis of nanoparticles
CO5	To quantitatively analyse the impurities in solution by electroanalytical techniques

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
CO2	3	1	2	-	-	1	2	-	-	-	-	1	-	-	-
CO3	3	2	1	1	-	-	1	-	-	-	-	-	-	-	-
CO4	2	1	2	-	-	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	-	1	2	2	-	-	-	-	1	-	-	-
AVG	2.6	1.3	1.6	1	1	1.4	1.8	-	-	-	-	1.3	-	-	-

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

YEAR	I	SEM	01	SUBJECT CODE	GE3172
SUBJECT	ENGLISH LABORATORY				

The students will be able to:

CO1	To listen to and comprehend general as well as complex academic information
CO2	To listen to and understand different points of view in a discussion
CO3	To speak fluently and accurately in formal and informal communicative contexts
CO4	To describe products and processes and explain their uses and purposes clearly and accurately
CO5	To express their opinions effectively in both formal and informal discussions

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
CO2	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
CO3	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
CO4	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
CO5	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
AVG	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-

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

YEAR	I	SEM	02	SUBJECT CODE	HS3252
SUBJECT	PROFESSIONAL ENGLISH II				

The students will be able to:

CO1	To compare and contrast products and ideas in technical texts.
CO2	To identify and report cause and effects in events, industrial processes through technical texts
CO3	To analyse problems in order to arrive at feasible solutions and communicate them in the writtenformat.
CO4	To present their ideas and opinions in a planned and logical manner
CO5	To draft effective resumes in the context of job search

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
CO2	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
CO3	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
CO4	3	3	3	3	2	3	3	3	2	3	3	3	-	-	-
CO5	-	-	-	-	-	-	-	-	3	3	3	3	-	-	-
AVG	3	3	3	3	2.75	3	3	3	2.2	3	3	3	-	-	-

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

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

The students will be able to:

CO1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO4	Understand the knowledge of various techniques and methods for solving first and second orderordinary differential equations.
CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO2	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO3	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO4	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
CO5	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-
AVG	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-

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

YEAR	I	SEM	02	SUBJECT CODE	PH3251
SUBJECT	MATERIALS SCIENCE				

The students will be able to:

CO1	Know basics of crystallography and its importance for varied materials properties
CO2	Gain knowledge on the electrical and magnetic properties of materials and their applications
CO3	Understand clearly of semiconductor physics and functioning of semiconductor devices
CO4	Understand the optical properties of materials and working principles of various opticaldevices
CO5	Appreciate the importance of functional nanoelectronic devices

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	1	1	-	-	-	-	-	-	-	-	-
CO2	3	2	1	1	2	1	1	-	-	-	-	-	-	-	-
CO3	3	2	2	2	2	1	-	-	-	-	-	-	-	-	-
CO4	3	2	2	1	2	2	-	-	-	-	-	1	-	-	-
CO5	3	2	2	1	2	1	-	-	-	-	-	-	-	-	-
AVG	3	2	1.6	1.4	1.8	1.2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	I	SEM	02	SUBJECT CODE	BE3251
SUBJECT	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING				

The students will be able to:

CO1	Compute the electric circuit parameters for simple problems
CO2	Explain the working principle and applications of electrical machines
CO3	Analyze the characteristics of analog electronic devices
CO4	Explain the basic concepts of digital electronics
CO5	Explain the operating principles of measuring instruments

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO2	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO3	2	1	1	-	-	-	-	1	-	-	-	2	-	-	1
CO4	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
CO5	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
AVG	2	1.8	1	-	-	-	-	1	-	-	-	2	-	-	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	I	SEM	02	SUBJECT CODE	GE3251
SUBJECT	ENGINEERING GRAPHICS				

The students will be able to:

CO1	Use BIS conventions and specifications for engineering drawing.
CO2	Construct the conic curves, involutes and cycloid.
CO3	Solve practical problems involving projection of lines.
CO4	Draw the orthographic, isometric and perspective projections of simple solids.
CO5	Draw the development of simple solids

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
CO2	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
CO3	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
CO4	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
CO5	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
AVG	3	1	2	-	2	-	-	-	-	3	-	2	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	I	SEM	02	SUBJECT CODE	GE3271
SUBJECT	ENGINEERING PRACTICES LABORATORY				

The students will be able to:

CO1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work
CO2	Wire various electrical joints in common household electrical wire work
CO3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work
CO4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
AVG	3	2	-	-	1	1	1	-	-	-	-	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	I	SEM	02	SUBJECT CODE	BE3271
SUBJECT	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY				

The students will be able to:

CO1	Use experimental methods to verify the Ohm's and Kirchhoff's Laws.
CO2	Analyze experimentally the load characteristics of electrical machines
CO3	Analyze the characteristics of basic electronic devices
CO4	Use DSO to measure the various parameters

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	1.5	2	-	-	-	-	-	1
CO2	3	3	2	1	1	-	-	1.5	2	-	-	-	-	-	1
CO3	3	3	2	1	1	-	-	1.5	2	-	-	-	-	-	1
CO4	3	3	2	1	1	-	-	1.5	2	-	-	-	-	-	1
CO5	3	3	2	1	1	-	-	1.5	2	-	-	-	-	-	1
AVG	3	3	2	1	1	-	-	1.5	2	-	-	-	-	-	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	I	SEM	02	SUBJECT CODE	GE3272
SUBJECT	COMMUNICATION LABORATORY				

The students will be able to:

CO1	Speak effectively in group discussions held in ~~a~~ formal/semi formal contexts.
CO2	Discuss, analyse and present concepts and problems from various perspectives to arrive atsuitable solutions
CO3	Write emails, letters and effective job applications.
CO4	Write critical reports to convey data and information with clarity and precision
CO5	Give appropriate instructions and recommendations for safe execution of tasks

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
CO2	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
CO3	2	2	3	3	1	3	3	3	3	3	3	3	-	-	-
CO4	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
CO5	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
AVG	2.4	2.8	3	3	1.8	3	3	3	3	3	3	3	-	-	-

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

YEAR	II	SEM	03	SUBJECT CODE	MA3351
SUBJECT	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS				

The students will be able to:

CO1	Understand how to solve the given standard partial differential equations.
CO2	Solve differential equations using Fourier series analysis which plays a vital role inengineering applications.
CO3	Appreciate the physical significance of Fourier series techniques in solving one- and two- dimensional heat flow problems and one-dimensional wave equations.
CO4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
CO5	Use the effective mathematical tools for the solutions of partial differential equations by usingZ transform techniques for discrete time systems

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-
CO2	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-
CO3	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-
CO4	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-
CO5	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-
AVG	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-

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

YEAR	II	SEM	03	SUBJECT CODE	ME3351
SUBJECT	ENGINEERING MECHANICS				

The students will be able to:

CO1	Illustrate the vector and scalar representation of forces and moments
CO2	Analyse the rigid body in equilibrium
CO3	Evaluate the properties of distributed forces
CO4	Determine the friction and the effects by the laws of friction
CO5	Calculate dynamic forces exerted in rigid body

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	-	-	-	-	-	-	2	3	1	1
CO2	3	2	2	1	2	-	-	-	-	-	-	2	3	1	1
CO3	3	2	3	1	2	-	-	-	-	-	-	2	3	1	2
CO4	3	2	3	1	2	-	-	-	-	-	-	2	3	1	2
CO5	3	2	3	1	2	-	-	-	-	-	-	2	3	1	2
AVG	3	2	2	1	2	-	-	-	-	-	-	2	3	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	03	SUBJECT CODE	ME3391
SUBJECT	ENGINEERING THERMODYNAMICS				

The students will be able to:

CO1	Apply the zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems.
CO2	Apply the second law of thermodynamics in analysing the performance of thermal devices through energy and entropy calculations.
CO3	Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart
CO4	Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relations.
CO5	Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	-	-	-	-	-	-	-	2	-	-	-
CO2	3	3	2	1	-	-	-	-	-	-	-	2	-	-	-
CO3	3	3	2	1	-	-	-	-	1	-	1	2	3	-	3
CO4	3	3	2	1	-	1	-	-	2	-	1	2	3	2	-
CO5	3	3	2	1	-	1	-	-	2	-	1	2	3	2	3
AVG	3	3	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	03	SUBJECT CODE	CE3391
SUBJECT	FLUID MECHANICS AND MACHINERY				

The students will be able to:

CO1	Understand the properties and behaviour in static conditions. Also, to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics
CO2	Estimate losses in pipelines for both laminar and turbulent conditions and analysis of pipes connectedin series and parallel. Also, to understand the concept of boundary layer and its thickness on the flatsolid surface.
CO3	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performances of prototype by model studies
CO4	Explain the working principles of various turbines and design the various types of turbines.
CO5	Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	2	2	1	2	1	1	2	3	2	3
CO2	3	3	3	2	1	2	2	1	2	1	1	2	3	2	3
CO3	3	3	3	3	1	2	2	1	2	1	1	2	3	3	3
CO4	3	3	3	3	1	2	2	1	2	1	1	3	3	2	2
CO5	3	3	3	3	1	2	2	1	2	1	1	3	3	2	2
AVG	3	3	2	2	1	2	2	1	2	1	1	2	3	2	3

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

YEAR	II	SEM	03	SUBJECT CODE	ME3392
SUBJECT	ENGINEERING MATERIALS AND METALLURGY				

The students will be able to:

CO1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.
CO2	Explain isothermal transformation, continuous cooling diagrams and different heattreatment processes.
CO3	Clarify the effect of alloying elements on ferrous and non-ferrous metals.
CO4	Summarize the properties and applications of non-metallic materials.
CO5	Explain the testing of mechanical properties

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	1	3	2								2	2	1	2
CO2	3	1	3	1		2		1				2	2	1	2
CO3	3	1	3									2	2	1	2
CO4	3	1	3				2					2	2	1	2
CO5	3	1	3	2	2							2	2	1	2
AVG	3	1	3	2								2	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	03	SUBJECT CODE	ME3393
SUBJECT	MANUFACTURING PROCESSES				

The students will be able to:

CO1	Explain the principle of different metal casting processes.
CO2	Describe the various metal joining processes.
CO3	Illustrate the different bulk deformation processes.
CO4	Apply the various sheet metal forming process.
CO5	Apply suitable molding technique for manufacturing of plastics components.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		2			2	3	1	1	-	-	1	3	1	2
CO2	3		2			2	3	1	1	-	-	1	3	1	2
CO3	3		2			2	2	1	1	-	-	1	3	1	2
CO4	3		2			2	2	1	1	-	-	1	3	1	2
CO5	3		2		2	2	2	1	1	-	-	1	3	1	2
AVG	3		2			2	3	1	1	-	-	1	3	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	03	SUBJECT CODE	ME3381
SUBJECT	COMPUTER AIDED MACHINE DRAWING				

The students will be able to:

CO1	Prepare standard drawing layout for modelled assemblies with BoM.
CO2	Model orthogonal views of machine components.
CO3	Prepare standard drawing layout for modelled parts

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2			3				3	2		3	2	2	2
CO2	1	2			3				3	2		3	2	2	2
CO3	1	2			3				3	2		3	2	2	2
AVG	1	2	-	-	3	-	-	-	3	2	-	3	2	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	03	SUBJECT CODE	ME3382
SUBJECT	MANUFACTURING TECHNOLOGY LABORATORY				

The students will be able to:

CO1	Demonstrate the safety precautions exercised in the mechanical workshop and join two metals using GMAW
CO2	The students able to make the work piece as per given shape and size using machining process such as rolling, drawing, turning, shaping, drilling and milling
CO3	The students become make the gears using gear making machines and analyze the defects in the cast and machined components

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	1	-	2	-	-	1	1	2	2
CO2	3	-	-	-	-	-	1	-	2	-	-	1	1	2	2
CO3	3	-	-	-	-	-	1	-	2	-	-	1	1	2	2
AVG	3	-	-	-	-	-	1	-	2	-	-	1	1	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	04	SUBJECT CODE	ME3491
SUBJECT	THEORY OF MACHINES				

The students will be able to:

CO1	Discuss the basics of mechanism.
CO2	Solve problems on gears and gear trains.
CO3	Examine friction in machine elements.
CO4	Calculate static and dynamic forces of mechanisms.
CO5	Calculate the balancing masses and their locations of reciprocating and rotating masses. Computing the frequency of free vibration, forced vibration and damping coefficient

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	3	2	2	-	2	-	-	1	-	-	-	1	3	-	1
CO2	3	2	2	-	2	-	-	1	-	-	-	1	3	-	1
CO3	3	2	2	-	2	-	-	1	-	-	-	1	3	-	1
CO4	3	2	2	-	2	-	-	1	-	-	-	1	3	-	1
CO5	3	2	2	-	2	-	-	1	-	-	-	1	3	-	1
AVG	3	2	2	-	2	-	-	1	-	-	-	1	3	-	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	04	SUBJECT CODE	ME3451
SUBJECT	THERMAL ENGINEERING				

The students will be able to:

CO1	Apply thermodynamic concepts to different air standard cycles and solve problems.
CO2	To solve problems in steam nozzle and calculate critical pressure ratio.
CO3	Explain the flow in steam turbines, draw velocity diagrams, flow in Gas turbines and solve problems.
CO4	Explain the functioning and features of IC engine, components and auxiliaries.
CO5	Calculate the various performance parameters of IC engines

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	-	-	1	2	1	-
CO2	3	2	2	1	-	-	-	-	-	-	-	1	2	1	-
CO3	3	2	2	1	-	-	-	-	-	-	-	1	2	1	-
CO4	3	2	1	1	-	-	-	-	-	-	-	1	2	1	-
CO5	3	2	1	1	-	-	-	-	-	-	-	1	2	1	-
AVG	3	2	1	1	-	-	-	-	-	-	-	1	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	04	SUBJECT CODE	ME3492
SUBJECT	HYDRAULICS AND PNEUMATICS				

The students will be able to:

CO1	Apply the working principles of fluid power systems and hydraulic pumps
CO2	Apply the working principles of hydraulic actuators and control components
CO3	Design and develop hydraulic circuits and systems
CO4	Apply the working principles of pneumatic circuits and power system and its components
CO5	Identify various troubles shooting methods in fluid power systems

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	-	-	-	-	-	-	-	1	2	1	1
CO2	2	1	1	1	-	-	-	-	-	-	-	1	2	1	1
CO3	2	1	1	1	-	-	-	-	-	-	-	1	2	1	1
CO4	2	1	1	1	-	-	-	-	-	-	-	1	2	1	1
CO5	2	1	1	1	-	-	-	-	-	-	-	1	2	1	1
AVG	2	1	1	1	-	-	-	-	-	-	-	1	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	II	SEM	04	SUBJECT CODE	ME3493
SUBJECT	MANUFACTURING TECHNOLOGY				

The students will be able to:

CO1	Apply the mechanism of metal removal process and to identify the factors involved in improvingmachinability.
CO2	Describe the constructional and operational features of centre lathe and other special purposelathes.
CO3	Describe the constructional and operational features of reciprocating machine tools.
CO4	Apply the constructional features and working principles of CNC machine tools.
CO5	Demonstrate the Program CNC machine tools through planning, writing codes and setting up CNC machine tools to manufacture a given component

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	1	1	3	-	-	3	-	2	3	3	2
CO2	3	3	3	1	1	1	3	-	-	3	-	2	3	2	2
CO3	3	3	3	1	1	1	3	-	-	3	-	2	3	2	2
CO4	3	3	2	1	1	1	3	-	-	3	-	2	3	2	2
CO5	3	3	3	1	1	1	3	-	-	3	-	2	3	2	3
AVG	3	3	3	1	1	1	**3**	-	-	3	-	2	3	2	3

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

YEAR	II	SEM	04	SUBJECT CODE	CE3491
SUBJECT	STRENGTH OF MATERIALS				

The students

will be able to:

CO1	Understand the concepts of stress and strain in simple and compound bars, the important of principal stresses and principal planes.
CO2	Understand the load transferring mechanism in beams and stress distribution due shearing force and bending moment
CO3	Apply basic equation of torsion in designing of shafts and helical springs
CO4	Calculate slope and deflection in beams using different methods
CO5	Analyze thin and thick shells for applied pressures.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3
CO2	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3
CO3	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3
CO4	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3
CO5	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3
AVG	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3

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

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

The students will be able to:

CO1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation
CO2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society
CO3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations
CO4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development
CO5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
CO2	3	2	-	-	-	3	3	-	-	-	-	2	-	-	-
CO3	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
CO4	3	2	1	1	-	2	2	-	-	-	-	2	-	-	-
CO5	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-
AVG	2.8	1.8	1	1	-	2.2	2.4	-	-	-	-	1.8	-	-	-

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

YEAR	II	SEM	04	SUBJECT CODE	CE3481
SUBJECT	STRENGTH OF MATERIALS AND FLUID MACHINERY LABORATORY				

The students will be able to:

CO1	Determine the tensile, torsion and hardness properties of metals by testing
CO2	Determine the stiffness properties of helical and carriage spring
CO3	Apply the conservation laws to determine the coefficient of discharge of a venturimeter and finding the friction factor of given pipe
CO4	Apply the fluid static and momentum principles to determine the metacentric height and forces due to impact of jet
CO5	Determine the performance characteristics of turbine, rotodynamic pump and positive displacement pump.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	3	3	1	1	1	3	1	1	2	2	2	1
CO2	3	2	1	3	3	1	1	1	3	1	1	2	3	2	1
CO3	3	3	2	3	2	1	1	1	3	1	1	2	3	2	1
AVG	3	2.3	1.3	3	2.6	1	1	1	3	1	1	2	2.6	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	04	SUBJECT CODE	ME3461
SUBJECT	THERMAL ENGINEERING LABORATORY				

The students will be able to:

CO1	Conduct tests to evaluate performance characteristics of IC engines
CO2	Conduct tests to evaluate the performance of refrigeration cycle
CO3	Conduct tests to evaluate Performance and Energy Balance on a Steam Generator

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	1	-	-	-	-	1	-	-	1	1	1	1
CO2	2	2	1	1	-	-	-	-	1	-	-	1	1	1	1
CO3	2	2	1	1	-	-	-	-	1	-	-	1	1	1	1
AVG	2	2	1	1	-	-	-	-	1	-	-	1	1	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	05	SUBJECT CODE	ME3591
SUBJECT	DESIGN OF MACHINE ELEMENTS				

The students will be able to:

CO1	Explain the design machine members subjected to static and variable loads
CO2	Apply the concepts design to shafts, key and couplings
CO3	Apply the concepts of design to bolted, Knuckle, Cotter, riveted and welded joints
CO4	Apply the concept of design helical, leaf springs, flywheels, connecting rods and crank shafts
CO5	Apply the concepts of design and select sliding and rolling contact bearings, seals and gaskets

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	-	-	-	-	1	1	-	-	2	3	2	2
CO2	2	2	3	-	-	-	-	1	1	-	-	2	3	2	2
CO3	2	2	3	-	-	-	-	1	1	-	-	2	3	2	2
CO4	2	2	3	-	-	-	-	1	1	-	-	2	3	2	2
CO5	2	2	3	-	-	-	-	1	1	-	-	2	3	2	2
AVG	2	2	3	-	-	-	-	1	1	-	-	2	3	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	05	SUBJECT CODE	ME3592
SUBJECT	METROLOGY AND MEASUREMENTS				

The students will be able to:

CO1	Discuss the concepts of measurements to apply in various metrological instruments.
CO2	Apply the principle and applications of linear and angular measuring instruments, assembly andtransmission elements.
CO3	Apply the tolerance symbols and tolerance analysis for industrial applications.
CO4	Apply the principles and methods of form and surface metrology.
CO5	Apply the advances in measurements for quality control in manufacturing Industries.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	-	-	-	-	1	-	-	1	3	2	1
CO2	3	2	2	2	-	-	-	-	1	-	-	1	3	2	1
CO3	3	2	2	2	-	-	-	-	1	-	-	1	3	2	1
CO4	3	2	2	2	-	-	-	-	1	-	-	1	3	2	1
CO5	3	2	2	2	-	-	-	-	1	-	-	1	3	2	1
AVG	3	2	2	2	-	-	-	-	1	-	-	1	3	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	05	SUBJECT CODE	CME388
SUBJECT	INDUSTRIAL SAFETY				

The students will be able to:

CO1	Explain the fundamental concept and principles of industrial safety
CO2	Apply the principles of maintenance engineering
CO3	Analyze the wear and its reduction
CO4	Evaluate faults in various tools, equipments and machines
CO5	Apply periodic maintenance procedures in preventive maintenance

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	2	-	-	2	1	-	-	-	-	1	1	2	1
CO2	2	1	2	-	-	2	1	-	-	-	-	1	1	2	1
CO3	2	1	2	-	-	2	1	-	-	-	-	1	1	2	1
CO4	2	1	2	-	-	2	1	-	-	-	-	1	1	2	1
CO5	2	1	2	-	-	2	1	-	-	-	-	1	1	2	1
AVG	2	1	2	-	-	2	1	-	-	-	-	1	1	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	05	SUBJECT CODE	CME332
SUBJECT	CONVENTIONAL AND FUTURISTIC VEHICLE TECHNOLOGY				

The students will be able to:

CO1	Discuss the latest trends in engine technology
CO2	Discuss the need of advanced combustion technologies and its impact on reducing carbon foot-print on the environment
CO3	Analyzing the basic characteristics of low carbon fuels, its impact over conventional fuels and in achieving sustainable development goals
CO4	Discuss the working and energy flow in various hybrid and electric configurations
CO5	Analyzing the need for fuel cell technology in automotive applications

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	-	-	-	1	-	-	1	3	2	2
CO2	3	2	2	2	2	-	-	-	1	-	-	1	3	2	2
CO3	3	2	2	2	2	-	-	-	1	-	-	1	3	2	2
CO4	3	2	2	2	2	-	-	-	1	-	-	1	3	2	2
CO5	3	2	2	2	2	-	-	-	1	-	-	1	3	2	2
AVG	3	2	2	2	2	-	-	-	1	-	-	1	3	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
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:

CO1	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)
CO2	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction
CO3	To develop disaster response skills by adopting relevant tools and technology
CO4	Enhance awareness of institutional processes for Disaster response in the country
CO5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	-	-	2	2	-	-	2	-	2	-	1
CO2	3	3	3	3	-	-	2	1	-	-	2	-	2	-	1
CO3	3	3	3	3	-	-	2	2	-	-	-	-	2	-	1
CO4	3	3	2	3	-	-	2	1	-	-	2	-	2	-	1
CO5	3	3	2	3	-	-	2	2	-	-	2	-	3	-	1
AVG	3	3	3	3	-	-	2	2	-	-	2	-	2	-	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	05	SUBJECT CODE	ME3581
SUBJECT	METROLOGY AND DYNAMICS LABORATORY				

The students will be able to:

CO1	The students able to measure the gear tooth dimensions, angle using sine bar, straightness
CO2	Determine mass moment of inertia of mechanical element, governor effort and range of sensitivity
CO3	Determine the natural frequency and damping coefficient, critical speeds of shafts

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	-	2	2	-	1	2	2	-	3	2	2	2
CO2	2	2	3	-	2	2	-	1	2	2	-	2	2	2	2
CO3	2	2	3	-	2	2	-	1	2	2	-	3	2	2	2
AVG	2	2	3	-	2	2	-	1	2	2	-	2.6	2	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	06	SUBJECT CODE	ME3691
SUBJECT	HEAT AND MASS TRANSFER				

The students will be able to:

CO1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems
CO2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems
CO3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems.
CO4	Explain basic laws for radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems
CO5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	-	-	-	-	1	-	-	1	3	2	1
CO2	3	3	3	3	-	-	-	-	1	-	-	1	3	2	1
CO3	3	3	3	2	-	-	-	-	1	-	-	1	3	2	1
CO4	3	3	3	2	-	-	-	-	1	-	-	1	3	2	1
CO5	3	3	3	2	-	-	-	-	1	-	-	1	3	2	1
AVG	3	3	3	2.2	-	-	-	-	1	-	-	1	3	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	06	SUBJECT CODE	MR3691
SUBJECT	ROBOTICS				

The students will be able to:

CO1	State the basic concepts and terminologies of robots
CO2	Know the Procedures for Forward and Inverse Kinematics, Dynamics for Various Robots
CO3	Derive the Forward and Inverse Kinematics, Dynamics for Various Robots
CO4	Apply the various programming techniques in industrial applications
CO5	Analyze the use of various types of robots in different applications

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	2	-	-	-	-	-	-	1	2	1	3
CO2	3	2	3	1	2	-	-	-	-	-	-	1	2	1	3
CO3	3	2	3	1	2	-	-	-	-	-	-	1	2	1	3
CO4	3	2	3	1	2	-	-	-	-	-	-	1	2	2	3
CO5	3	2	3	1	3	-	-	-	-	-	-	1	2	2	3
AVG	3	2	3	1	2.2	-	-	-	-	-	-	1	2	1.4	3

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

YEAR	III	SEM	06	SUBJECT CODE	CME350
SUBJECT	ENVIRONMENT SUSTAINABILITY AND IMPACT ASSESSMENT				

The students will be able to:

CO1	Explain the concepts of Environment Sustainability and trained to make decision related to Environment
CO2	Make decision that has an effect on our environment
CO3	Evaluate the basics of environmental policy, planning and various legislation Get valuable information for exploring decisions in each life stage of materials, buildings, services and infrastructure
CO4	Explain the Life cycle assessment of Environmental sustainability
CO5	Explain sustainable urban economic development

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	2	-	-	-	3	-	1	-	-	1	1	2	1
CO2	1	-	2	-	-	-	3	-	1	-	-	1	1	2	1
CO3	1	-	2	-	-	-	3	-	1	-	-	1	1	2	1
CO4	1	-	2	-	-	-	3	-	1	-	-	1	1	2	1
CO5	1	-	2	-	-	-	3	-	1	-	-	1	1	2	1
AVG	1	-	2	-	-	-	3	-	1	-	-	1	1	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	06	SUBJECT CODE	CME384
SUBJECT	POWER PLANT ENGINEERING				

The students will be able to:

CO1	Explain the layout, construction and working of the components inside a thermal power plant
CO2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants
CO3	Explain the layout, construction and working of the components inside nuclear power plants
CO4	Explain the layout, construction and working of the components inside Renewable energy power plants
CO5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	-	1	3	-	-	1	-	1	2	2	1
CO2	3	1	1	1	-	1	3	-	-	1	-	1	2	2	1
CO3	3	1	1	1	-	1	3	-	-	1	-	1	2	2	1
CO4	3	1	1	1	-	1	3	-	-	1	-	1	2	2	1
CO5	3	1	1	1	-	1	3	-	-	1	-	1	2	2	1
AVG	3	1	1	1	-	1	3	-	-	1	-	1	2	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	06	SUBJECT CODE	CME366
SUBJECT	EQUIPMENT FOR POLLUTION CONTROL				

The students will be able to:

CO1	Explain the different types of pollution, their sources and effects
CO2	Discuss the pollution control regulations and standards
CO3	Design equipment for pollution control
CO4	Discuss different methods of pollution control from various sources in air, water and soil
CO5	Discuss the Conduct performance assessment of pollution control equipment.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	-	-	-	3	-	1	-	-	1	1	2	2
CO2	2	1	1	-	-	-	3	-	1	-	-	1	1	2	2
CO3	2	1	1	-	-	-	3	-	1	-	-	1	1	2	2
CO4	2	1	1	-	-	-	3	-	1	-	-	1	1	2	2
CO5	2	1	1	-	-	-	3	-	1	-	-	1	1	2	2
AVG	2	1	1	-	-	-	3	-	1	-	-	1	1	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	06	SUBJECT CODE	CCW331
SUBJECT	CAD/CAM LABORATORY				

The students will be able to:

CO1	Design experience in handling 2D drafting and 3D modelling software systems
CO2	Design 3-Dimensional geometric model of parts, sub-assemblies, assemblies and export it to drawing
CO3	Demonstrate manual part programming and simulate the CNC program and Generate part programming using G and M code through CAM software

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	3	-	-	-	2	-	-	1	3	3	1
CO2	2	2	2	2	3	-	-	-	2	-	-	1	3	3	1
CO3	2	2	2	2	3	-	-	-	2	-	-	1	3	3	1
AVG	2	2	2	2	3	-	-	-	2	-	-	1	3	3	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	III	SEM	06	SUBJECT CODE	ME3682
SUBJECT	HEAT TRANSFER LABORATORY				

The students will be able to:

CO1	Conduct experiment on Predict the thermal conductivity of solids and liquids
CO2	Conduct experiment on Estimate the heat transfer coefficient values of various fluids
CO3	Conduct experiment on Test the performance of tubes in tube heat exchangers

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3	2	-	-	-	-	1	-	-	1	2	2	3
CO2	1	1	3	2	-	-	-	-	1	-	-	1	2	2	3
CO3	1	1	3	2	-	-	-	-	1	-	-	1	2	2	3
AVG	1	1	3	2	-	-	-	-	1	-	-	1	2	2	3

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

YEAR	IV	SEM	07	SUBJECT CODE	ME3791
SUBJECT	MECHATRONICS AND IoT				

The students will be able to:

CO1	Explain Select suitable sensors and actuators to develop mechatronics systems
CO2	Discuss Devise proper signal conditioning circuit for mechatronics systems, and also able to implement PLC as a controller for an automated system
CO3	Elucidate the fundamentals of Iot and Embedded Systems
CO4	Discuss Control I/O devices through Arduino and Raspberry Pi
CO5	Design and develop an apt mechatronics/IoT based system for the given real-time application.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	-	-	-	-	1	2	3
CO2	3	3	3	1	2	-	-	-	1	-	-	2	1	2	3
CO3	3	1	2	1	2	-	2	-	-	-	-	-	1	2	3
CO4	3	3	3	3	3	-	-	-	3	-	-	3	1	2	3
CO5	3	3	3	3	3	-	2	-	3	-	-	3	1	2	3
AVG	3	2.4	2.4	1.8	2.2	-	0.8	-	1.4	-	-	1.6	1	2	3

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

YEAR	IV	SEM	07	SUBJECT CODE	ME3792
SUBJECT	COMPUTER INTEGRATED MANUFACTURING				

The students will be able to:

CO1	Discuss the basics of computer aided engineering
CO2	Choose appropriate automotive tools and material handling systems
CO3	Discuss the overview of group technology, FMS and automation identification methods
CO4	Design using computer aided process planning for manufacturing of various components
CO5	Acquire knowledge in computer process control techniques

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	-	-	-	1	-	-	1	2	1	3
CO2	3	2	2	1	2	-	-	-	1	-	-	1	2	1	3
CO3	3	2	2	1	2	-	-	-	1	-	-	1	2	1	3
CO4	3	2	2	1	2	-	-	-	1	-	-	1	2	1	3
CO5	3	2	2	1	2	-	-	-	1	-	-	1	2	1	3
AVG	3	2	2	1	2	-	-	-	1	-	-	1	2	1	3

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

YEAR	IV	SEM	07	SUBJECT CODE	GE3791
SUBJECT	HUMAN VALUES AND ETHICS				

The students will be able to:

CO1	Identify the importance of democratic, secular and scientific values in harmonious functioning of social life
CO2	Practice democratic and scientific values in both their personal and professional life
CO3	Find rational solutions to social problems
CO4	Behave in an ethical manner in society
CO5	Practice critical thinking and the pursuit of truth

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	2	-	-	-	3	-	1	-	-	1	1	2	1
CO2	1	-	2	-	-	-	3	-	1	-	-	1	1	2	1
CO3	1	-	2	-	-	-	3	-	1	-	-	1	1	2	1
CO4	1	-	2	-	-	-	3	-	1	-	-	1	1	2	1
CO5	1	-	2	-	-	-	3	-	1	-	-	1	1	2	1
AVG	1	-	2	-	-	-	3	-	1	-	-	1	1	2	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	IV	SEM	07	SUBJECT CODE	GE3792
SUBJECT	INDUSTRIAL MANAGEMENT				

The students will be able to:

CO1	Discuss basic concepts of management; approaches to management; contributors to management studies; various forms of business organization and trade unions function in professional organizations
CO2	Discuss the planning; organizing and staffing functions of management in professional organization
CO3	Apply the leading; controlling and decision making functions of management in professional organization
CO4	Discuss the organizational theory in professional organization
CO5	Apply principles of productivity and modern concepts in management in professional organization

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	1	1	-	3	2	3	2	3	2	3	1	1	1
CO2	-	-	1	1	-	3	2	3	2	3	2	3	1	1	1
CO3	-	-	1	1	-	3	2	3	2	3	2	3	1	1	1
CO4	-	-	1	1	-	3	2	3	2	3	2	3	1	1	1
CO5	-	-	1	1	-	3	2	3	2	3	2	3	1	1	1
AVG	-	-	1	1	-	3	2	3	2	3	2	3	1	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	IV	SEM	07	SUBJECT CODE	OML351
SUBJECT	INTRODUCTION TO NON-DESTRUCTIVE TESTING				

The students will be able to:

CO1	Realize the importance of NDT in various engineering fields
CO2	Have a basic knowledge of surface NDE techniques which enables to carry out various inspection in accordance with the established procedures
CO3	Calibrate the instrument and inspect for in-service damage in the components by means of Eddy current testing as well as Thermography testing
CO4	Differentiate various techniques of UT and AET and select appropriate NDT methods for better evaluation
CO5	Interpret the results of Radiography testing and also have the ability to analyse the influence of various parameters on the testing

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	3	-	-	2	2	-	-	-	2	1	2	-
CO2	3	1	2	2	-	-	2	2	-	-	-	2	2	2	1
CO3	3	2	1	2	-	-	2	2	-	-	-	2	2	2	-
CO4	3	1	2	2	-	-	2	2	-	-	-	2	2	2	2
CO5	3	2	2	2	-	-	2	2	-	-	-	2	2	2	1
AVG	2.8	1.6	1.8	2.2	-	-	2	2	-	-	-	2	1.8	2	1.3

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

YEAR	IV	SEM	07	SUBJECT CODE	OIM353
SUBJECT	PRODUCTION PLANNING AND CONTROL				

The students will be able to:

CO1	The students can able to prepare production planning and control act work study
CO2	The students can able to prepare product planning
CO3	The students can able to prepare production scheduling
CO4	The students can able to prepare Inventory Control
CO5	They can plan manufacturing requirements manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP)

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	3	-	1	-	-	-	1	-	3	-	-
CO2	3	2	-	-	3	-	-	-	-	-	-	-	-	2	-
CO3	-	2	-	-	3	-	-	-	-	-	-	-	-	2	-
CO4	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	-	-	1	-
AVG	1.8	2.4	0.8	-	1.8	-	0.2	-	-	-	0.2		0.6	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 &
Affiliated to Anna University, Chennai)
Phone : 04651 - 268466, 268655, Fax : 04651 - 268466
E-mail : mail@bethlahem.org, Website : www.bethlahem.org

YEAR	IV	SEM	07	SUBJECT CODE	ME3781
SUBJECT	MECHATRONICS AND IoT LABORATORY				

The students will be able to:

CO1	Demonstrate the functioning of mechatronics systems with various pneumatic, hydraulic and electrical systems
CO2	Demonstrate the microcontroller and PLC as controllers in automation systems by executing proper interfacing of I/O devices and programming
CO3	Demonstrate the sensing and actuation of mechatronics elements using IoT

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	1	1	3	-	-	-	3	-	-	3	1	1	3
CO2	-	-	1	1	3	-	-	-	3	-	-	3	1	1	3
CO3	-	-	3	3	3	-	-	-	3	-	-	3	3	3	3
AVG	-	-	1.6	1.6	3	-	-	-	3	-	-	3	1.6	1.6	3

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

YEAR	IV	SEM	08	SUBJECT CODE	ME3811
SUBJECT	PROJECT WORK				

The students will be able to:

CO1	Take up any challenging practical problems and find solution by formulating proper methodology.
CO2	Develop knowledge about Multimedia file formats and standards.
CO3	Outline the process of Authoring multimedia presentations.
CO4	Analyze techniques of animation in 2D and 3D and for the mobile UI.
CO5	Analyze different popular applications of multimedia.

CO-PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
AVG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1