



**I Year B.Tech Full Time**  
**2017 Regulation Curriculum & Syllabus**  
**SEMESTER – I**

Course Code	Course Title	C	L	T/SLr	P/R	Ty/Lb/ETL
BEN17001	TECHNICAL ENGLISH – I	2	1	0/0	2/0	Ty
BMA17001	MATHEMATICS – I/	4	3	1/0	0/0	Ty
BMA17002	BIO MATHEMATICS (FOR BIOTECH)					
BPH17001	ENGINEERING PHYSICS	3	2	0/1	0/0	Ty
BCH17001	ENGINEERING CHEMISTRY – I	3	2	0/1	0/0	Ty
BES17001	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	3	2	0/1	0/0	Ty
BES17002	BASIC MECHANICAL & CIVIL ENGINEERING	3	2	0/1	0/0	Ty
<b>ANNUAL PATTERN (PRACTICALS)*</b>						
BES17ET1	BASIC ENGINEERING GRAPHICS	2	1	0/0	2/0	ETL
BPH17L01	ENGINEERING PHYSICS LAB	1	0	0/0	2/0	Lb
BCH17L01	ENGINEERING CHEMISTRY LAB	1	0	0/0	2/0	Lb
BES17L01	BASIC ENGINEERING WORKSHOP	1	0	0/0	2/0	Lb
BES17ET2	C PROGRAMMING AND LAB	2	1	0/0	2/0	ETL
BES17ET3	ENTREPRENEURIAL SKILL DEVELOPMENT & PROJECT LAB	1	0	0/0	2/0	ETL

**Credits Sub Total:26**

**SEMESTER – II**

Course Code	Course Title	C	L	T/SLr	P/R	Ty/Lb/ETL
BEN17002	TECHNICAL ENGLISH – II	2	1	0/0	2/0	Ty
BMA17003	MATHEMATICS – II /	4	3	1/0	0/0	Ty
BMA17004	BIO STATISTICS (FOR BIOTECH)					
BPH17002	MATERIAL SCIENCE	3	2	0/1	0/0	Ty
BCH17002	ENGINEERING CHEMISTRY – II	3	2	0/1	0/0	Ty
BES17003	ENVIRONMENTAL SCIENCE	3	3	0	0/0	Ty

**Credits SubTotal:15**

**C: Credits L : Lecture T: Tutorial S.Lr: Supervised Learning P: Problem / Practical R: Research Ty/Lb/ETL**  
**: Theory /Lab/Embeddded Theory and Lab \* Internal Evaluation**



**Dr. M.G.R.**  
**Educational and Research Institute**  
**University**  
(Declared as Deemed to be university u/s.3 of UGC Act 1956)  
**Maduravoyal, Chennai - 95**  
(An ISO 9001 : 2008 Certified Institution)



Form No. F /CM / 004 Rev.1 / 01.01.2014

**I Year B.Tech Full Time**  
**2017 Regulation Curriculum & Syllabus**

# I SEMESTER



**I Year B.Tech Full Time**  
**2017 Regulation Curriculum & Syllabus**  
**DEPARTMENT OF ENGLISH**

Subject Code : <b>BEN17001</b>	Subject Name : <b>TECHNICAL ENGLISH - I</b>					C	L	T/SLr		P/R		
	Prerequisite : None					<b>2</b>	<b>1</b>	<b>0/0</b>		<b>2/0</b>		
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. Strengthen their vocabulary in both technical and business situations 2. Get practice in functional grammar 3. Learn the effective way of corresponding with officials 4. Learn to give instructions, suggestions, recommendations and comprehend and infer the information from the given passages. 5. Strain learners in organized academic and professional writing in LSRW skills												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Strengthen their active and technical vocabulary											
CO2	Understand functional grammar and gain proficiency in technical writing											
CO3	Learn the appropriate technique of writing formal and business letters and prepare oneself to read the advertisement and prepare the resume relevantly											
CO4	Learn to give instructions, suggestions, recommendations and comprehend and infer the information from the given passages											
CO5	Focus on academic and technical writing											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				H						H		H
CO2				H						H		H
CO3				H		M			H	H		H
CO4				H					H	H		H
CO5				H					H	H		H
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills			
			√									
Approval												



BEN17001

**I Year B.Tech Full Time**  
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**TECHNICAL ENGLISH I**

2 1 0/0 2/0

**1. Vocabulary, Grammar and Usage - I**

(6)

Meanings of words and phrases, synonyms and antonyms – affixes: prefixes and suffixes and word formation – nominal compounds, expanding using numbers and approximation – Verb: tense, auxiliary and modal –Voice: active, passive and impersonal passive

**2. Vocabulary, Grammar and Usage – II**

(6)

Infinitives and Gerunds – preposition, prepositional phrases, preposition + relative pronoun-‘If’ clause, sentences expressing ‘cause and effect’, ‘purpose’,

Instructions, suggestions and recommendations

**3. Reading**

(6)

Questions: Wh-pattern, Yes/no questions, tag questions

Comprehension: extracting relevant information from the text, by skimming and scanning and inferring, identifying lexical and contextual meaning for specific information, identifying the topic sentence and its role in each paragraph, comprehending the passage and answering questions - Précis writing

**4. Writing**

(6)

Adjectives: degrees of comparison

Concord: subject-verb agreement

Interpretation of tables and flowcharts: writing a paragraph based on information provided in a table using comparison and contrast, classifying the data and flowchart, describing logical steps involved in specific functions, note - making from a given passage- letter writing, formal: seeking permission to undergo practical training, letter to an editor of a newspaper complaining about civic problems and suggesting suitable solutions

**6. Functional English and Practical Components**

(6)

**Listening :** Listening to stories, conversation, dialogue, speeches of famous people, and identifying the grammar components

**Speaking:** Scripting and enacting role plays/ narrating incidents

**Reading:** Review of books, articles, fiction- Extensive reading/ user manuals, pamphlets, brochures

**Writing:** paragraph and essay writing using academic vocabulary

**Total No of Periods : 30****Text Book**

1. Pushkala. R, PadmasaniKannan.S ,Anuradha. V,ChandrasenaRajeswaran.M: **Quest:**A Textbook of Communication Skills, Vijay Nicole

**References**

1. Pushkala R, P.A.Sarada, El Dorado: A Textbook of Communication Skills, Orient Blackswan, 2014
2. PadmasaniKannan.S., Pushkala.R. : Functional English
3. Hancock, Mark, English Pronunciation in Use; Cambridge Univ. Press, 2013
4. McCarthy, Michael et.al., English Vocabulary in Use, Advanced, Cambridge Univ. Press, 2011
5. Wren and Martin: Grammar and Composition, Chand & Co, 2006

**Web Resources**

1. <https://learnenglish.britishcouncil.org>
2. [www.englishpage.com](http://www.englishpage.com)
3. [www.writingcentre.uottawa.ca/hypergrammar/preposit.html](http://www.writingcentre.uottawa.ca/hypergrammar/preposit.html)
4. [www.better-english.com/grammar/preposition.html](http://www.better-english.com/grammar/preposition.html)
5. <http://www.e-grammar.org/infinitive-gerund/>
6. [www.idiomsite.com/](http://www.idiomsite.com/)



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**DEPARTMENT OF MATHEMATICS**

Subject Code : <b>BMA17001</b>	Subject Name : <b>MATHEMATICS – I</b>		C	L	T/SLr	P/R						
	Prerequisite : None		<b>4</b>	<b>3</b>	<b>1/0</b>	<b>0/0</b>						
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. <b>Apply the Basic concepts in Algebra</b> 2. <b>Use the Basic concepts in Matrices</b> 3. <b>Identify and solve problems in Trigonometry</b> 4. <b>Understand the Basic concepts in Differentiation</b> 5. <b>Apply the Basic concepts in Functions of Several variables</b>												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	<b>Find the summation of the given series</b>											
CO2	<b>Transform a non – diagonal matrix into an equivalent diagonal matrix using orthogonal transformation.</b>											
CO3	<b>Find expansion of trigonometric function into an infinite series and to separate a complex function into real and imaginary parts.</b>											
CO4	<b>Apply knowledge and concepts in finding the derivative of given function and to find the maxima / minima of the given function.</b>											
CO5	<b>Evaluate the partial / total differentiation and maxima / minima of a function of several variables.</b>											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	<b>H</b>	<b>L</b>			<b>M</b>	<b>M</b>			<b>H</b>	<b>H</b>		<b>H</b>
CO2	<b>H</b>	<b>M</b>			<b>H</b>	<b>L</b>						<b>H</b>
CO3	<b>M</b>	<b>L</b>			<b>M</b>				<b>M</b>	<b>H</b>		<b>L</b>
CO4		<b>L</b>			<b>L</b>				<b>M</b>	<b>H</b>		<b>M</b>
CO5		<b>L</b>				<b>M</b>			<b>M</b>	<b>M</b>		<b>H</b>
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills			
	√											
Approval												



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**BMA17002**

**MATHEMATICS – I**

**4 3 1/0 0/0**

**1. ALGEBRA**

(12)

Binomial, Exponential, Logarithmic Series (without proof of theorems) – Problems on Summation, Approximation and Coefficients.

**2. MATRICES**

(12)

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values – Cayley - Hamilton theorem(without proof) – Orthogonal reduction of a symmetric matrix to Diagonal form.

**3. TRIGONOMETRY**

(12)

Expansions of  $\sin n\theta$ ,  $\cos n\theta$  in powers of  $\sin\theta$  and  $\cos\theta$  – Expansion of  $\tan n\theta$  – Expansions of  $\sin^n\theta$  and  $\cos^n\theta$  in terms of Sines and Cosines of multiples of  $\theta$  – Hyperbolic functions – Separation into real and imaginary parts.

**4. DIFFERENTIATION**

(12)

Basic concepts of Differentiation – Elementary differentiation methods – Parametric functions – Implicit function – Leibnitz theorem(without proof) – Maxima and Minima – Points of inflection.

**5. FUNCTIONS OF SEVERAL VARIABLES**

(12)

Partial derivatives – Total differential – Differentiation of implicit functions – Taylor's expansion – Maxima and Minima by Lagrange's Method of undetermined multipliers – Jacobians.

**Total no. of periods : 60**

**Text Books**

1. Kreyszig E., *Advanced Engineering Mathematics (10<sup>th</sup> ed.)*, John Wiley & Sons, (2011).
2. Veerarajan T., *Engineering Mathematics (for first year)*, Tata McGraw Hill Publishing Co., (2008).

**References**

1. Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers, (2012).
2. John Bird, *Basic Engineering Mathematics (5<sup>th</sup> ed.)*, Elsevier Ltd, (2010).
3. P.Kandasamy, K.Thilagavathy and K. Gunavathy, *Engineering Mathematics Vol. I (4<sup>th</sup> Revised ed.)*, S.Chand & Co., Publishers, New Delhi (2000).
4. John Bird, *Higher Engineering Mathematics (5<sup>th</sup> ed.)*, Elsevier Ltd, (2006).



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**DEPARTMENT OF MATHEMATICS**

Subject Code : <b>BMA17002</b>		Subject Name : <b>BIO MATHEMATICS</b>				C	L	T/SLr		P/R		
		Prerequisite : None				<b>4</b>	<b>3</b>	<b>1/0</b>		<b>0/0</b>		
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. Use the Basic concepts in Matrices 2. Understand the Basic concepts in Differentiation 3. Understand the Basic concepts in Integration 4. Apply the Basic concepts in Interpolation 5. Analyze the Basic concepts in Numerical Differentiation and Integration												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Find the sum, difference, product and inverse of matrixes											
CO2	Find the derivative of the given function and to find the maxima / minima of the given function.											
CO3	Integrate the given function by using the methods of integration and to find area under the given curve and the volume of the solid by revolution.											
CO4	Evaluate the value of function at the given point and to find the polynomial expressions of the given function.											
CO5	Find the differentiation of a function at the given point and to find the integration of the given function at the given point											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/P Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L			M	M			H	H		H
CO2	H	M			H	L						H
CO3	M	L			M				M	H		L
CO4	L	L			L	M			M	H		H
CO5	L	L				M			M	M		H
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills		Soft Skills		
	√											
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**BMA17002**

**BIO MATHEMATICS**

**4 3 1/0 0/0**

**1. MATRICES**

(12)

Elementary operations on Matrices – Inverse of a Matrix – Solving simultaneous equations (atmost three equations with three unknowns) using Cramer's rule.

**2. DIFFERENTIATION**

(12)

Basic concepts of Differentiation – Elementary differentiation methods – Parametric functions – Implicit function – Maxima and Minima (simple problems).

**3. INTEGRATION**

(12)

Basic concepts of Integration – Methods of Integration– Integration by substitution – Integration by parts – Definite Integrals – Properties of Definite Integrals – Problems on finding Area using single integrals (simple problems).

**4.INTERPOLATION**

(12)

Interpolation: Newton's forward, Newton's backward formulae – Newton's divided differences – Lagrange's polynomial (simple problems).

**5. NUMERICAL DIFFERENTIATION AND INTEGRATION**

(12)

Numerical differentiation with interpolation polynomials (Newton's forward and backward only) – Numerical integration by Trapezoidal and Simpson's (both  $1/3^{\text{rd}}$  &  $3/8^{\text{th}}$ ) rules (simple problems).

**Total no. of periods: 60**

**Text Books**

1. Veerarajan T., *Engineering Mathematics (for first year)*, Tata McGraw Hill Publishing Co., (2008).
2. H.K.Das, *Engineering Mathematics*, S.Chand Publishers
3. Veerarajan T., *Numerical Methods*, Tata McGraw Hill Publishing Co., (2007).

**References**

1. Shanti Narayanan, *Differential Calculus*, S.Chand& Co., New Delhi, (2005).
2. Shanti Narayanan, *Integral Calculus*, S.Chand& Co., New Delhi, (2005).
3. John Bird, *Basic Engineering Mathematics (5<sup>th</sup> ed.)*, Elsevier Ltd, (2010).





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**DEPARTMENT OF PHYSICS**

Subject Code : <b>BPH17001</b>	Subject Name : <b>ENGINEERING PHYSICS</b>	C	L	T/SLr	P/R
	Prerequisite : None	<b>3</b>	<b>2</b>	<b>0/1</b>	<b>0/0</b>

L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits  
T/L/ETL : Theory / Lab / Embedded Theory and Lab

**OBJECTIVES :**

- 1. Outline the relation between Science, Engineering & Technology.**
- 2. Demonstrate competency in understanding basic concepts.**
- 3. Apply fundamental laws of Physics in Engineering & Technology.**
- 4. To identify & solve applied Physics problems.**
- 5. Produce and present activities associated with the course through effective technical communication**

**COURSE OUTCOMES (Cos) : (3 – 5)**

Students completing this course were able to

CO1	<b>Demonstrate competency in understanding basic concepts.</b>
CO2	<b>Utilize scientific methods for formal investigations &amp; demonstrate competency with experimental methods and verify the concept to content knowledge.</b>
CO3	<b>Identify and provide solutions for engineering problems.</b>
CO4	<b>Relate the technical concepts to day to day life and to practical situations.</b>
CO5	<b>Think analytically to interpret concepts.</b>

**Mapping of Course Outcomes with Program Outcomes (POs)**

COs/P Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	<b>H</b>	<b>H</b>			<b>M</b>	<b>M</b>		<b>L</b>		<b>M</b>		
CO2	<b>H</b>	<b>H</b>	<b>M</b>		<b>M</b>	<b>M</b>		<b>L</b>		<b>M</b>		<b>L</b>
CO3	<b>H</b>	<b>H</b>	<b>H</b>	<b>M</b>		<b>M</b>				<b>M</b>		<b>L</b>
CO4	<b>H</b>	<b>H</b>	<b>M</b>		<b>M</b>			<b>M</b>				<b>M</b>
CO5	<b>H</b>	<b>M</b>	<b>L</b>	<b>H</b>								

H/M/L indicates strength of correlation H – High, M – Medium, L – Low

Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills
	√								
Approval									



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**BPH17001**

**ENGINEERING PHYSICS**

**3 2 0/1 0/0.**

**1. PROPERTIES OF MATTER & ACOUSTICS**

(9)

Elasticity – Twisting couple on a Wire (derivation) – Shafts – Comparison of Solid and Hollow Shaft – Bending moment – Depression of a Cantilever – Determination of Young's modulus by Depression of a Cantilever – Uniform and non uniform bending (Experiment) – I form of Girders.

Viscosity – Definitions – Lubrication – Properties & Types of Lubricant. Acoustics of Buildings – Reverberation – Reverberation time – Sabine's formula for Reverberation Time – Absorption Coefficient and its Determination – Factors affecting Acoustics of Buildings and its Remedial Measures.

**2. THERMAL PHYSICS**

(9)

Thermal conduction – Thermal Expansion – Expansion joints – Bimetallic strips – Thermal conductivity (k) – Lee's Disc method (theory and experiment) – Radial flow of heat – Thermal conductivity of Glass – Thermal conductivity of Rubber Tube – Flow of heat through Compound Media – Thermal Insulation of buildings – Thermal radiation – Concept of Black body radiation – Fundamentals of Low Temperature Physics.

**3. ULTRASONICS AND ITS APPLICATIONS**

(9)

Properties & Production of Ultrasonics – Piezoelectric method – Magnetostriction method – Acoustic Grating – Industrial Applications – Ultrasonic flaw detection (Block Diagram) – Medical Application: Velocity Blood Flow Meter – PhonoCardiography – Ultrasound imaging – Hazards and safety of Ultrasound – NDT of Materials using Ultrasonics.

**4. LASER & ITS APPLICATIONS**

(9)

Nature of Light – Laser Principle & Characteristics – Ruby laser – Nd- YAG Laser – He-Ne Laser – CO<sub>2</sub> Laser – Semiconductor laser – Homo junction & Hetero Junction Laser – Engineering applications – Holography, Surveying – Industrial applications – Cutting, Welding – Medical applications – Surgery

**5. FIBER OPTIC COMMUNICATION**

(9)

Total Internal Reflection – Propagation of Light in Optical Fibres – Numerical aperture and Acceptance Angle – Types of Optical Fibres (material, refractive index, mode) – Fibre Optical Communication system (Block diagram) – Attenuation – Transmitter, Receiver, Dispersion, Modulation/Demodulation Advantages of Fibre Optical Communication System – IMT, PMT, Wavelength Modulated & Polarization Modulated Sensors – Endoscope Applications.

**Total No. of Periods : 45**

**Text Books**

1. M. Arumugam, "Engineering Physics", Anuradha Publication (2004)
2. Dr. Senthil Kumar "Engineering Physics I" VRB Publishers (2016)
3. N.S.Shubhashree&R.Murugesan., "Engineering Physics", Sreelakshmi Publishers(2008)

**References**



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4. K. Gaur & S.L. Gupta, "Engineering. Physics", Dhanpat Raj & Sons, VI Edition, (1988)
5. Palanisamy, P.K., "Engineering Physics", Scitech Publications (P) Ltd., (2006)

**DEPARTMENT OF CHEMISTRY**

Subject Code : <b>BCH17001</b>		Subject Name : <b>ENGINEERING CHEMISTRY – I</b>				C	L	T/SLr		P/R		
		Prerequisite : None				<b>3</b>	<b>2</b>	<b>0/1</b>		<b>0/0</b>		
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES :												
1. Providing an insight into basic concepts of chemical thermodynamics.												
2. To create awareness about the water quality parameters, water analysis and softening of water from industrial perspective.												
3. Imparting fundamentals of emf, storage and fuel cells.												
4. Creating awareness about corrosion and its control methods.												
5. Introducing modern materials such as composites along with basic concepts of polymer chemistry and plastics.												
COURSE OUTCOMES (Cos) : (3 – 5)												
CO1	Gain a clear understanding of the basics of chemical thermodynamics which include concepts such as Enthalpy, Entropy and Free energy.											
CO2	Obtain an overall idea of Water quality parameters, Boiler requirements, problems, Water softening and Domestic Water treatment.											
CO3	Improving the basic knowledge in electrical conductance and emf and also understand the chemical principles of storage devices.											
CO4	Observe the information about corrosion and understand the mechanisms of corrosion and the methods of corrosion control.											
CO5	Articulate the science of polymers and composites.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/P Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	M										M
CO2	M	L	M	L		L	H			L		M
CO3	L	M	L				L					L
CO4	M		L	L								L
CO5	M		L		M							M
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills			
	√											
Approval												



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**BCH17001**

**ENGINEERING CHEMISTRY – I**

**3 2 0/1 0/0**

**1. CHEMICAL THERMODYNAMICS**

(8)

Introduction, Terminology in thermodynamics –System, Surrounding, State and Path functions ,Extensive and intensive properties. Laws of thermodynamics – I and II laws-Need for the II law.Enthalpy, Entropy, Gibbs free energy, Helmholtz free energy - Spontaneity and its criteria.Maxwell relations, Gibbs -Helmholtz equation (relating E & A) and (relating H & G), Van't Hoff equations.

**2. TECHNOLOGY OF WATER**

(9)

Water quality parameters – Definition and expression. Analysis of water – alkalinity, hardness and its determination (EDTA method only).Boiler feed water and Boiler troubles-Scales and sludges, Caustic embrittlement, Priming and Foaming and Boiler corrosion. Water softening processes – Internal and external conditioning – Lime soda, Zeolite, Demineralisation methods. Desalination processes-RO and Electrodialysis .Domestic water treatment.

**3. ELECTROCHEMISTRY AND ENERGY STORAGE DEVICES**

(10)

Conductance – Types of conductance and its Measurement. Electrochemical cells – Electrodes and electrode potential, Nernst equation – EMF measurement and its applications. Types of electrodes- Reference electrodes- Standard hydrogen electrode- Saturated calomel electrode-Quinhydrone electrode – Determination of  $P^H$  using these electrodes.  
Reversible and irreversible cells– Fuel cells-  $H_2$ - $O_2$  fuel cell, Batteries-Lead storage battery,Nickel– Cadmium and Lithium-Battery.

**4. CORROSION AND PROTECTIVE COATING**

(9)

Introduction–Causes of Corrosion–Consequences- Factors affecting corrosion. Theories of corrosion-Chemical corrosion and Electrochemical corrosion. Methods of corrosion control – corrosion inhibitors, Sacrificial anode and Impressed current cathodic protection.  
Protective coatings- Metallic coatings- Chemical conversion coatings-paints-Constituents and functions.

**5. POLYMERS AND COMPOSITES**

(9)

Monomers – Functionality – Degree of polymerization-Tacticity.Polymers – Classification, Conducting Polymers,Biodegradable polymers- Properties and applications.Plastics – Thermoplastics and thermosetting plastics,Compounding of plastics – Compression moulding, injection moulding and extrusion processes.  
Polymer composites-introduction-Types of composites-particle reinforced-fiber reinforced-structural composites-examples.Matrix materials, reinforcement materials-Kevlar, Polyamides, fibers, glass, carbon fibers, ceramics and metals .

**Total number of periods : 45**

**Textbooks**

1. P.C. Jain & Monika Jain, “Engineering Chemistry”, Dhanpat Rai publishing Co., (Ltd.) (2013).
2. Dr.R.Sivakumar and Dr.N.Sivakumar”Engineering Chemistry” Tata McGraw Hill Publishing Company Ltd, Reprint 2013.



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**References**

1. S.Nanjundan&C.SreekuttanUnnithan, “Applied Chemistry”, Sreelakshmi Publications, (2007)
2. J. C. Kuriacose& J. Rajaram, “Chemistry in Engineering & Technology”, Tata McGraw Hill (1996).
3. B. R. Puri ,L.R. Sharma &M.S.Pathania, “Principles of Physical Chemistry”, Vishal publishing co., (2013).

**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

Subject Code : <b>BES17001</b>	Subject Name : <b>BASIC ELECTRICAL &amp; ELECTRONICS ENGINEERING</b>					C	L	T/SLr	P/R			
	Prerequisite : None					<b>3</b>	<b>2</b>	<b>0/1</b>	<b>0/0</b>			
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. Understand the concepts of circuit elements, circuit laws and coupled circuits. 2. Acquire knowledge on conventional &non conventional energy production. 3. Gain information on measurement of electrical parameters. 4. Identify basic theoretical principles behind the working of modern electronic gadgets. 5. Demonstrate digital electronic circuits and assemble simple devices.												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Students understand Fundamental laws and theorems and their practical applications											
CO2	Predict the behavior of different electric and magnetic Circuits.											
CO3	Identify conventional and Non-conventional Electrical power Generation, Transmission and Distribution.											
CO4	Identify & Apply schematic symbols and understand the working principles of electronic devices											
CO5	Analyze basics of digital electronics and solving problems and design combinational circuits											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/P Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H							M	L
CO2	H	H	H	M	M		M				M	
CO3	H	M	H	M	H		M		M			L
CO4	H	M		M			M				M	L
CO5	H	M	H	M	H				M		M	L
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills			
		√										

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Approval	
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<b>BES17001</b>	<b>BASIC ELECTRICAL &amp; ELECTRONICS ENGINEERING</b>	<b>3</b>	<b>2</b>	<b>0/1</b>	<b>0/0</b>
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## 1. ELECTRIC CIRCUITS (9)

Electrical Quantities – Ohms Law – Kirchhoff's Law – Series and Parallel Connections – Current Division and Voltage Division Rule - Source Transformation – Wye (Y) – Delta ( $\Delta$ ) , Delta ( $\Delta$ ) – Wye (Y) Transformation – Rectangular to Polar and Polar to Rectangular.

## 2. MACHINES & MEASURING INSTRUMENTS (9)

Construction & Principle of Operation of DC motor & DC Generator – EMF equation of Generator – Torque Equation of Motor – Construction & Principle of operation of a Transformer – PMMC – Moving Iron types of meter – Single Phase Induction Type Energy Meter.

### 3. BASICS OF POWER SYSTEM (9)

Generation of Electric Power (Thermal, Hydro, Wind and Solar) – Transmission & Distribution of Electric Power – Types of Transmission & Distribution Schemes – Representation of Substation.

#### 4. ELECTRON DEVICES (9)

Passive Circuit Components-Classification of Semiconductor-PN Junction Diode-Zener diode- Construction and Working Principle –Applications--BJT-Types of configuration-JFET.

## 5. DIGITAL SYSTEM (9)

Number System – Binary, Decimal, Octal, Hexadecimal – Binary Addition Subtraction, Multiplication & Division– Boolean Algebra – Reduction of Boolean Expressions – Logic Gates - De-Morgan's Theorem , Adder – Subtractor.

**Total no of Periods : 45**

### Text Books

1. D P Kothari, I J Nagrath, Basic Electrical Engineering, Second Edition, , Tata McGraw-Hill Publisher
2. A Course In Electrical And Electronic Measurements And Instrumentation,A.K. Sawhney, publisher DHANPAT RAI&CO
3. Text Book of Electrical Technology: Volume 3: Transmission, Distribution and Utilization,B.L.Theraja, A.K.Theraja, publisher S.CHAND
4. Morris Mano, M. (2002) Digital Logic and Computer Design. Prentice Hall of India
5. Millman and Halkias1991, Electronic Devices and Circuits , Tata McGraw Hill,

## References

1. R.Muthusubramanian, S.Salivahanan, K A Muraleedharan, Basic Electrical, Electronics And Computer Engineering, Second Edition, .Tata McGraw-Hill publisher.



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**DEPARMENT OF MECHANICAL ENGINEERING**

Subject Code : <b>BES17002</b>	Subject Name : <b>BASIC MECHANICAL &amp; CIVIL ENGINEERING</b>	C	L	T/SLr	P/R
	Prerequisite : None	<b>3</b>	<b>2</b>	<b>0/1</b>	<b>0/0</b>

L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits

T/L/ETL : Theory / Lab / Embedded Theory and Lab

**OBJECTIVES :**

1. Learn Basics of Internal Combustion Engines, power plants and boilers
2. Demonstrate How metals are formed, joined, using machining operations Lathe, Milling and Drilling machines
3. To identify & solve problems in Engineering Mechanics
4. Learn basics of Building materials and construction
5. Know the basic process of concrete, types of masonry Construction of Roads , Railways, Bridges and Dams

**COURSE OUTCOMES (Cos) : (3 – 5)**

Students completing the course were able to

CO1	<b>Demonstrate the working principles of power plants, IC Engines and boilers..</b>
CO2	<b>Utilize the concept of metals forming, joining process and apply in suitable machining process</b>
CO3	<b>Identify and provide solutions for problems in engineering mechanics</b>
CO4	<b>Utilize the concept of Building materials and construction able to perform concrete mix and masonry types</b>
CO5	<b>Demonstrate how Roads ,Railways, dams , Bridges have been constructed</b>

**Mapping of Course Outcomes with Program Outcomes (POs)**

COs/P Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	<b>M</b>					<b>M</b>		<b>H</b>	<b>H</b>	<b>H</b>		<b>H</b>
CO2	<b>H</b>				<b>L</b>	<b>M</b>		<b>M</b>	<b>M</b>	<b>M</b>		<b>M</b>
CO3	<b>H</b>	<b>H</b>			<b>L</b>	<b>L</b>		<b>M</b>	<b>M</b>	<b>M</b>		<b>M</b>
CO4	<b>H</b>				<b>L</b>	<b>L</b>			<b>M</b>	<b>M</b>		<b>M</b>
CO5	<b>H</b>				<b>L</b>	<b>L</b>		<b>M</b>	<b>M</b>	<b>M</b>		<b>M</b>

H/M/L indicates strength of correlation H – High, M – Medium, L – Low





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Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills
		√							
Approval									

**BES17002**

**BASIC MECHANICAL & CIVIL ENGINEERING**

**3 2 0/1 0/0**

**UNIT- I : THERMAL ENGINEERING**

(9)

Classification of internal combustion engine – two stroke, four stroke petrol and diesel engines. Classification of Boilers – Cochran boiler – Locomotive boilers – Power plant classification – Working of Thermal and Nuclear power plant.

**UNIT- II : MANUFACTURING PROCESS**

(13)

Metal forming processes – Rolling, forging, drawing, extrusion and sheet metal operations- fundamentals only. Metal Joining processes – Welding - arc and gas welding, Soldering and Brazing. Casting process – Patterns -Moulding tools - Types of moulding - Preparation of green sand mould -Operation of Cupola furnace.

Basics of metal cutting operations – Working of lathe- parts-Operations performed. Drilling machine – Classification – Radial drilling machine - Twist drill nomenclature.

**UNIT- III : MECHANICS**

(9)

Stresses and Strains – Definition – Relationship – Elastic modulus – Centre of gravity – Moment of Inertia – Problems. (Simple Problems Only).

**UNIT- IV : BUILDING MATERIALS AND CONSTRUCTION**

(7)

**Materials:** Brick - Types of Bricks - Test on bricks - Cement – Types, Properties and uses of cement – Steel - Properties and its uses – Ply wood and Plastics.

**Construction:** Mortar – Ingredients – Uses – Plastering - Types of mortar - Preparation – Uses – Concrete – Types – Grades – Uses – Curing – Introduction to Building Components (foundation to roof) – Masonry – Types of masonry (Bricks & Stones)

**UNIT- V : ROADS, RAILWAYS, BRIDGES & DAMS**

(7)

Roads – Classification of roads – Components in roads – Railways -Components of permanent way and their function – Bridges – Components of bridges – Dams – Purpose of dams – Types of dams.

**Total No. of Periods : 45**

**Text books**

1. S. Bhaskar, S. Sellappan, H.N.Sreekanth,, (2002), “*Basic Engineering*” –Hi-Tech Publications
2. K. Venugopal, V. Prabhu Raja, (2013-14), “*Basic Mechanical Engineering*”, Anuradha Publications.
3. K.V. Natarajan (2000), *Basic Civil Engineering*, Dhanalakshmi Publishers
4. S.C. Sharma(2002), *Basic Civil Engineering*, Dhanpat Raj Publications

**References**

1. PR.SL. Somasundaram, (2002), “*Basic Mechanical Engineering*” –, Vikas Publications.
2. S.C. Rangawala(2002), *Building Material and Construction*, S. Chand Publisher





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**DEPARTMENT OF MECHANICAL ENGINEERING**

Subject Code : <b>BES17ET1</b>	Subject Name : <b>BASIC ENGINEERING GRAPHICS</b>	C	L	T/SLr	P/R
	Prerequisite : None	<b>2</b>	<b>1</b>	<b>0/0</b>	<b>2/0</b>

L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits  
T/L/ETL : Theory / Lab / Embedded Theory and Lab

**OBJECTIVES :**

1. Learn to know what kind of pencils to be used to sketch lines, numbers, Letters and Dimensioning In drawing sheet.
2. Draw Projection of points, line, planes and solids using Drafters
3. To identify the angle of projection and development of surfaces, isometric projection and Orthographic projection
4. Know the basics of elevation and plan of building.
5. Learn the basics of Drafting using AutoCAD Software

**COURSE OUTCOMES (Cos) : (3 – 5)**

Students completing the course were able to

CO1	Utilize the concept of Engineering Graphics Techniques to draft letters, Numbers , Dimensioning in Indian Standards
CO2	Demonstrate the drafting practice visualization and projection skills useful for conveying ideas in engineering applications.
CO3	Identify basic sketching techniques of engineering equipments
CO4	Demonstrate the projections of Points , Lines ,Planes and Solids.
CO5	Draw the sectional view of simple buildings and utilize Auto CAD Software.

**Mapping of Course Outcomes with Program Outcomes (POs)**

COs/POs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	M	M			H	H		H
CO2	H	H	H	M	M	M			H	H		H
CO3	M	H	H	L		M			M	M		M
CO4	H	H	M	M		H		M	H	H		H
CO5	H	H	H	M	H	L		M	H	H		H



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H/M/L indicates strength of correlation H – High, M – Medium, L – Low									
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills
							√		
Approval									

**BES17ET1**

**BASIC ENGINEERING GRAPHICS**

**2 1 0/0 2/0**

**CONCEPTS AND CONVENTIONS (Not for examination)**

(3)

Introduction to drawing, importance and areas of applications – BIS standards – IS: 10711 – 2001 : Technical products Documentation – Size and layout of drawing sheets – IS 9606 – 2001: Technical products Documentation – Lettering – IS 10714 & SP 46 – 2003: Dimensioning of Technical Drawings – IS : 15021 – 2001 : Technical drawings – Projections Methods – drawing Instruments, Lettering Practice – Line types and dimensioning – Border lines, lines title blocks Construction of polygons – conic sections – Ellipse, Parabola, Hyperbola and cycloids.

**UNIT- I : PROJECTION OF POINTS, LINES AND PLANE SURFACES**

(6)

Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations – projection of polygonal surface and circular lamina in simple position only.

**UNIT- II : PROJECTION OF SOLIDS**

(6)

Projection of simple solids like prism, pyramid, cylinder and cone in simple position  
Sectioning of above solids in simple vertical position by cutting plane inclined to one reference plane and perpendicular to the other.

**UNIT- III : DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTION**

(6)

Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders, and cones.  
Principles of isometric projection – isometric scale – isometric projections of simple solids, like prisms pyramids, cylinders and cones.

**UNIT- IV : ORTHOGRAPHIC PROJECTIONS**

(6)

Orthographic projection of simple machine parts – missing views

**BUILDING DRAWING**

Building components – front, Top and sectional view of a security shed.

**UNIT- V : COMPUTER AIDED DRAFTING**

(3)

Introduction to CAD – Advantages of CAD – Practice of basic commands – Creation of simple components drawing using CAD software.

**Total No. of periods:30**

**Note:First angle projection to be followed.**

**Text Books**

1. Bhatt, N.D. and Panchal, V.M. (2014) Engineering Drawing Charotar Publishing House
2. Gopalakrishnan, K.R. (2014) Engineering Drawing (Vol.I& II Combined) Subhas Stores, Bangalore.



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**References**

1. Natarajan, K.V (2014) A Text Book of Engineering Graphics, DhanalakshmiPublisheres, Chennai
2. Venugopal, K and Prabhu Raja, V. (2010) Engineering Graphics, New Age International (P) Limited

**Special Points applicable to University examinations on Engineering Graphics**

1. There will be five questions, each of either or type covering all UNIT-s of the syllabus
2. All questions will carry equal marks of 20 each making a total of 100
3. The answer paper shall consists of drawing sheets of A2 size only. The students will be permitted to use appropriate scale to fit solution within A2 size.



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**DEPARTMENT OF PHYSICS**

Subject Code : <b>BPH17L01</b>	Subject Name : <b>ENGINEERING PHYSICS LAB</b>	C	L	T/SLr	P/R
	Prerequisite : None	<b>1</b>	<b>0</b>	<b>0/0</b>	<b>2/0</b>

L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits  
T/L/ETL : Theory / Lab / Embedded Theory and Lab

**OBJECTIVES :**

1. Demonstrate an ability to make physical measurements & understand the limits of precision in measurements.
2. Display the ability to measure properties of variety of electrical, mechanical, optical systems.

**COURSE OUTCOMES (Cos) : (3 – 5)**

Students completing the course were able to

CO1	<b>Recognize the correctness and precision in the results of measurements.</b>
CO2	<b>Construct and compare the properties of variety of electrical, mechanical, electronic and optical systems.</b>
CO3	<b>Practice the handling of Electrical, Electronic, Optical &amp; Mechanical Equipments</b>
CO4	<b>Identify and compare the theoretical and practical usage of various instruments</b>
CO5	

**Mapping of Course Outcomes with Program Outcomes (POs)**

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	<b>H</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>M</b>							
CO2	<b>H</b>	<b>M</b>	<b>M</b>	<b>H</b>						<b>M</b>		
CO3	<b>H</b>	<b>M</b>	<b>M</b>	<b>H</b>	<b>M</b>				<b>M</b>	<b>M</b>		<b>M</b>
CO4	<b>H</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>H</b>				<b>M</b>			<b>L</b>

H/M/L indicates strength of correlation H – High, M – Medium, L – Low

Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills
							√		

Approval



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**BPH17L01**

**ENGINEERING PHYSICS LAB**

**1 0 0/0 2/0**

**LIST OF EXPERIMENTS (Any Seven)**

1. Torsional Pendulum Without Masses–Determination of Rigidity Modulus and Moment of Inertia
2. Torsional Pendulum With Masses–Determination of Rigidity Modulus and Moment of Inertia
3. Non Uniform Bending – Determination of Young`s Modulus
4. Uniform Bending – Determination of Young`s Modulus
5. Poiseuille`s Method - Determination of Coefficient of Viscosity of a given liquid
6. Lee`s Disc – Determination of Thermal Conductivity of Bad Conductor
7. Spectrometer – Determination of Refractive Index of a Prism
8. Laser Grating – Determination of Wavelength of a given Source
9. Spectrometer –Determination of Wavelength of Mercury Spectrum using Grating
10. Transistor Characteristics.



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**DEPARTMENT OF CHEMISTRY**

Subject Code : <b>BCH17L01</b>	Subject Name : <b>ENGINEERING CHEMISTRY LAB</b>	C	L	T/SLr	P/R
	Prerequisite : None	<b>1</b>	<b>0</b>	<b>0/0</b>	<b>2/0</b>

L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits  
T/L/ETL : Theory / Lab / Embedded Theory and Lab

**OBJECTIVES :**

1. To familiarize the students in the determination of water quality parameters
2. To help learners measure conductivity and EMF using electrical equipment.
3. To create awareness about corrosion.
4. To determine the essential parameters of polymers

**COURSE OUTCOMES (Cos) : (3 – 5)**

Students completing the course were able to

**CO1 Awareness of water quality parameters and its determination.**

**CO2 Familiarizing the conductometric titration method.**

**CO3 Ability to measure EMF and perform potentiometric titrations.**

**CO4 Measuring the Molecular weight of macromolecules**

**CO5 Gaining awareness about corrosion.**

**Mapping of Course Outcomes with Program Outcomes (POs)**

COs/P Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	<b>M</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>H</b>							<b>L</b>
CO2	<b>M</b>	<b>H</b>		<b>L</b>					<b>L</b>			
CO3	<b>L</b>	<b>M</b>		<b>L</b>					<b>L</b>			
CO4	<b>M</b>	<b>M</b>		<b>L</b>					<b>L</b>			
CO5	<b>L</b>	<b>M</b>	<b>L</b>	<b>L</b>	<b>H</b>							<b>M</b>

H/M/L indicates strength of correlation H – High, M – Medium, L – Low

Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills
							√		
Approval									



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**BCH17L01**

**ENGINEERING CHEMISTRY LAB**

**1 0 0/0 2/0**

**LIST OF EXPERIMENTS (Any Seven)**

- (1) Estimation of temporary, permanent and total hardness of water.
- (2) Determination of type and extent of alkalinity in water.
- (3) Estimation of dissolved oxygen in a water sample.
- (4) Conductometric titration of strong acid vs. strong base
- (5) Conductometric precipitation titration using barium chloride and sodium sulphate.
- (6) Determination of Equivalent conductance of strong electrolyte at infinite dilution.
- (7) Determination of single electrode potential.
- (8) Estimation of  $\text{Fe}^{2+}$  ion by potentiometry.
- (9) Determination of Molecular Weight and Degree of Polymerisation of Polymer by viscometry.
- (10) Determination of rate of corrosion by weight loss method.



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**DEPARTMENT OF ENGINEERING SCIENCES**

Subject Code : <b>BES17L01</b>	Subject Name : <b>BASIC ENGINEERING WORKSHOP</b>					C	L	T/SLr	P/R			
	Prerequisite : None					<b>1</b>	<b>0</b>	<b>0/0</b>	<b>2/0</b>			
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. Familiarize the plumbing tools, fittings, carpentry tools, etc. 2. Identify basic electrical wiring and measurement of electrical quantities. 3. Identify Electronic components ,logic gates and soldering process 4. Display simple fabrication techniques 5. Execute a project independently and make a working model												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Demonstrate fitting tools and carpentry tools, & Perform the process of Filing, Chipping, Cutting.											
CO2	Perform the process of fabrication of tray, cones and funnels, Tee Halving Cross, Lap Joint Martise& Joints											
CO3	Demonstrate various types of wirings and other equipments.											
CO4	Measure fundamental parameters using the electronic instruments											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	H	H	M	M			L	M			L
CO2	M		H	L	M			L	L			
CO3	M		M	L				L	L			
CO4	L	H	M	L				L	L			M
CO5												
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills			
							√					
Approval												





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**BES17L01**

**BASIC ENGINEERING WORKSHOP**

**1 0 0/0 2/0.**

**MECHANICAL WORKSHOP**

**FITTING SHOP PRACTICE:**

Study of fitting tools and Equipments – Practicing, filing, chipping and cutting – making V-joints, half round joint, square cutting and dovetail joints.

**SHEET METAL PRACTICE:**

Study of tools and equipments – Fabrication of tray, cones and funnels.

**CARPENTRY:**

Introduction – Types of wood – Tools – Carpentry processes – Joints – Planning practice – Tee Halving Joint – Cross Lap Joint – Maritse and Tenon Joint – Dovetail Joint

**CIVIL ENGINEERING PRACTICE**

1. Study of Surveying and its equipments
2. Preparation of plumbing line sketches for water supply and sewage lines
3. Basic pipe connection using valves, laps, couplings, unions, reduces and elbows in house hold fittings

**ELECTRONICS ENGINEERING PRACTICE**

1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CR
2. Soldering practice – Components Devices and Circuits – Using general purpose PCB
3. Study of Logic Gates.
4. Generation of clock signal.

**ELECTRICAL ENGINEERING PRACTICE**

1. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
2. Measurement of energy using single phase energy meter.
3. Measurement of resistance to earth of an electrical equipment.
4. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
5. Fluorescent lamp wiring.
6. Stair case wiring



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**DEPARTMENT OF COMPUTER SCIENCE**

Subject Code : <b>BES17ET2</b>	Subject Name : <b>C PROGRAMMING AND LAB</b>					C	L	T/SLr	P/R			
	Prerequisite : None					<b>2</b>	<b>1</b>	<b>0/0</b>	<b>2/0</b>			
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. Outline the basics of C Language. 2. Apply fundamentals in C programming. 3. Produce and present activities associated with the course.												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Acquire knowledge how to write and execute c programs											
CO2	Understand the fundamental expression and statements of C Language.											
CO3	Work with arrays, functions, pointers, structures, Strings and Files in C.											
CO4	Identify and provide solutions for engineering problems in C programming											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	L			M	M		H	M			H
CO2	M	M			H	L		M	H			M
CO3	M			H		M		M	H			M
CO4	M			M		M		H	M			M
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills			
							√					
Approval												



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**BES17ET2**

**C PROGRAMMING AND LAB**

**2 1 0/0 2/0**

**1. INTRODUCTION**

(6)

Fundamentals, C Character set, Identifiers and Keywords, Data Types, Variables and Constants, Structure of a C Program, Executing a C Program.

**2. EXPRESSION AND STATEMENT**

(6)

Operators, Types-Complex and Imaginary, Looping Statement-For, While, Do, Break, continue, Decision Statement-If, If else, Nested if, Switching Statement, Conditional Operator.

**3. ARRAYS AND FUNCTIONS**

(6)

Defining an Array, Using Array elements as counters, Generate Fibonacci number, Generate Prime Numbers, Initializing Arrays, Multidimensional Arrays, Defining a Function, Function call -types of Function calls -Function pass by value -Function pass by reference, Write a Program in Recursive Function.

**4. STRUCTURES AND POINTERS**

(6)

Working with Structures -Introduction -Syntax of structures -Declaration and initialization -Declaration of structure variable - Accessing structure variables, Understanding Pointers -Introduction -Syntax of Pointer.

**5. STRINGS AND FILE HANDLING**

(6)

Strings -Syntax for declaring a string -Syntax for initializing a string -To read a string from keyboard, Files in C -File handling functions -Opening a File closing a file --example: fopen, fclose -Reading data from a File- Problem solving in C

**Total No of Periods: 30**

1. [www.spoken-tutorials.org](http://www.spoken-tutorials.org)

2. <http://www.learn-c.org/>

**Reference :**

1. Stephen G. Kochen“ Programming in C- A complete introduction to the C Programming Language. Third Edition, Sams Publishing -2004
2. Ajay Mital, “ Programming in C: A Practical Approach”, Pearson Publication-2010

**List of Programs**

1. Write a program to check 'a' is greater than 'b' or less than 'b' Hint: use if statement.
2. Write another program to check which value is greater 'a', 'b' or 'c'. Hint: use else-if statement. (Take values of a, b, c as user inputs)
3. Write a Program to find the sum of the series :  $x + X^3/3! + X^5/5! + \dots X^n/n!$
4. Write a C Program to solve a Quadratic Equation by taking input from Keyboard
5. Write a C Program to arrange 20 numbers in ascending and descending Order. Input the Numbers from Keyboard
6. Write a C Program to Multiply a 3 x 3 Matrix with input of members from Keyboard
7. Write a program that takes marks of three students as input. Compare the marks to see which student has scored the highest. Check also if two or more students have scored equal marks.
8. Write a program to display records of an employee. Like name, address, designation, salary.
9. Write a C program, declare a variable and a pointer. Store the address of the variable in the pointer. Print the value of the pointer.
10. Write a C program to concatenate String 'best' and String 'bus'. Hint: strcat(char str1, char str2);
11. Explore the other functions in string library.



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12. Write a program to create a file TEST. Write your name and address in the file TEST. Then display it on the console using C program.

**DEPARTMENT OF ENGINEERING SCIENCES**

Subject Code : <b>BES17ET3</b>	Subject Name : <b>ENTREPRENEURIAL SKILL DEVELOPMENT &amp; PROJECT LAB</b>					C	L	T/SLr		P/R		
	Prerequisite : None					<b>1</b>	<b>0</b>	<b>0/0</b>		<b>2/0</b>		
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. Understand how entrepreneurship Education transforms individuals into successful leaders. 2. Identify individual potential &Shape career dreams 3. Understand difference between ideas & opportunities 4. Understand the “flow” & create Entrepreneurial CV. 5. Identify components & create action plan. 6. Use brainstorming in a group to generate ideas.												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Develop a Business plan & improve ability to recognize business opportunity											
CO2	Do a self analysis to build a entrepreneurial career.											
CO3	Articulate an effective elevator pitch.											
CO4	Analyze the local market environment & demonstrate the ability to find an attractive market											
CO5	Apply an ethical understanding & perspective to change opportunities to business situations											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/P Os	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		M	M	H	M	M	M		M	M	M	L
CO2	H	M		H	M	H	M	H	H	H	M	M
CO3		M	M	M		H		H	H	H		
CO4		H	M	M	M	M		H	M	M	H	
CO5		M	M	H	M	M	H	H	M	M	H	L
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project		Internships / Technical Skills		Soft Skills	
							√					
Approval												



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**BES17ET3      ENTREPRENEURIAL SKILL DEVELOPMENT & PROJECT LAB      1 0 0/0 2/0**

**1. CHARACTERISTICS OF A SUCCESSFUL ENTREPRENEUR**

(3)

Introduction to entrepreneurship education – Myths about entrepreneurship – How has entrepreneurship changed the country – Dream it. Do it - Idea planes - Some success stories – Global Legends – Identify your own heroes – entrepreneurial styles – Introduction, concept & Different types - Barrier to Communication – Body language speaks louder than words

**2. DESIGN THINKING & RISK MANAGEMENT**

(3)

Introduction to Design thinking – Myth busters – Design thinking Process - Customer profiling – Wowing your customer – Personal selling – concept & process – show & tell concept – Introduction to the concept of Elevator Pitch - Introduction to risk taking & Resilience – Managing risks (Learning from failures, Myth Buster) – Understanding risks through risk takers – Why do I do? – what do I do ?

**3.IDEA GENERATION & EVALUATION**

(3)

Introduction – Finding your flow – Entrepreneurial CV – your draft action plan - D.I.S.R.U.P.T - A model for ideation – Let's ID8 – Mind mapping for ideas – build your own idea bank – Concept of Decision matrix & paired comparison analysis – 5Q framework.

**4. ENTREPRENEURIAL OUTLOOK & CUSTOMER DISCOVERY**

(3)

Effectuation – Start with your means – Segmentation & targeting – Niche marketing – Find your Niche – Drawing & mapping the consumption chain - outcome driven innovation – This is my customer

**5. VALUE PROPOSITION& CAP STONE PROJECT PRESENTATION**

(3)

Introduction – Value proposition design – customer segment – validation exercise – value propositions & assessing fit – Refine your value proposition – Blue ocean strategy - What is prototyping – Design your experiment – Design your MVP – Learning cards & Capstone Presentation.



**Dr. M.G.R.**  
**Educational and Research Institute**  
**University**  
(Declared as Deemed to be university u/s.3 of UGC Act 1956)  
**Maduravoyal, Chennai - 95**  
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# **II SEMESTER**



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**DEPARTMENT OF ENGLISH**

Subject Code : BEN17002		Subject Name : TECHNICAL ENGLISH - II					C	L	T/SLr		P/R	
		Prerequisite : None					2	1	0/0		2/0	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. strengthen the academic and interpersonal advanced vocabulary 2. strengthen their writing skill such as summarizing, describing and report writing 3. learn to keep the simple conversations in day to day life 4. get to know certain life skills such as marketing , advertising and do presentation 5 .improve the reading skill with comprehension												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	strengthen their active vocabulary and appropriate language usage through reading poems, stories, texts, newspapers, magazines and research articles											
CO2	use appropriate technical vocabulary in interpreting data											
CO3	engage effectively in role-play, dialogue, conversation and interviews											
CO4	equip them for effective interaction with people in all situations both academic and professional											
CO5	learn English language as a ‘life skill’ and prepare for placement interviews											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				H						H		H
CO2				H						H		H
CO3				H		M			H	H		H
CO4				H					H	H		H
CO5				H					H	H		H
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills			
			√									



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**BEN17002**

**TECHNICAL ENGLISH II**

**2 1 0/0 2/0**

**Unit I Vocabulary, Grammar and Usage – I**

(6)

Verbal analogy – picking out the odd one from a series –finding one word substitute – paragraph writing: using discourse markers, defining / describing an object / device / instrument / machine using topic sentence and its role, unity, coherence and use of cohesive expressions Essay writing with due emphasis on features such as topical sentence, unity, coherence and cohesive devices

**Unit II Vocabulary, Grammar and Usage – II**

(6)

Cloze – completion of sentences suitably, phrases and idioms, homophones – collocation -  
Techniques of formatting and drafting reports: writing newspaper reports on accidents, thefts and festivals

**Unit III Reading**

(6)

Correcting errors in sentences Editing a passage (correcting the mistakes in grammar, spelling and punctuation) -interpreting pie and bar charts

**Unit IV Writing**

(6)

Register: formal and informal – using ellipses in dialogues- framing dialogues-Email: Job Application, Resume

**Unit V Functional English and Practical Components**

(6)

**Listening:** Media Advertisement

**Speaking:** oral practice- activities related to professional skills (e.g. Marketing, advertising etc.), role play activities using different speech functions (persuasion, negotiation, giving directions and guidance), conversational etiquette (politeness, strategies, turn-taking, body language).

**Reading:** reading newspaper/ magazine articles for gathering information

**Writing:** Note-making from newspaper and magazine articles- follow BEC method

**Writing and speaking** dialogue writing followed by role play in different situations such as asking permission, requesting and instructing, introducing oneself – activities based on BEC

**Total No of Periods :30**

**Text Book**

1. Pushkala. R, PadmasaniKannan.S ,Anuradha. V,ChandrasenaRajeswaran.M Quest : A Textbook of ommunication Skills, Vijay Nicole,

**References**

1. Pushkala R, P.A.Sarada, El Dorado: A Textbook of Communication Skills, Orient Blackswan, 2014
2. PadmasaniKannan.S., Pushkala.R. : Functional English
3. Hancock, Mark, English Pronunciation in Use; Cambridge Univ. Press, 2013
4. McCarthy, Michael et.al., English Vocabulary in Use, Advanced, Cambridge Univ. Press, 2011
5. Wren and Martin: Grammar and Composition, Chand & Co, 2006

**Web Sources**

1. <https://learnenglish.britishcouncil.org>
2. [www.englishpage.com](http://www.englishpage.com)
3. [www.writingcentre.uottawa.ca/hypergrammar/preposit.html](http://www.writingcentre.uottawa.ca/hypergrammar/preposit.html)





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4. [www.better-english.com/grammar/preposition.html](http://www.better-english.com/grammar/preposition.html)
5. <http://www.e-grammar.org/infinite-gerund/>
6. [www.idiomsite.com/](http://www.idiomsite.com/)

**DEPARTMENT OF MATHEMATICS**

Subject Code : BMA17003		Subject Name : MATHEMATICS – II Prerequisite : None					C 4	L 3	T/SLr 1/0		P/R 0/0	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1.Understand the Basic concepts in Integration 2. Identifiy the Basic concepts in Multiple integrals 3. Use the Basic concepts in Ordinary Differential equations 4. Apply the Basic concepts of Analytical Geometry 5. Analyze the Basic concepts of Vector Calculus												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Integrate given function by using methods of integration and to find the area under curve and the volume of a solid by revaluation.											
CO2	Evaluate the multiple integrals / area /volume and to change the order of integration.											
CO3	Solve the ordinary differential equation and to solve Eulers differential equation.											
CO4	Find the equation of planes, lines and sphere and to find the shortest distance between to skew lines.											
CO5	Find the gradient, maximum directional derivative and work done by a force and to verify Green/ Stokes/ Gauss divergence theorem											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	M			M	M			M	M		H
CO2	L	M			M	H			H	H		M
CO3	L	M			M	H			H	H		M
CO4	L	M			L	M			M	H		M
CO5	L	M			M	M			M	H		M
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills			
	√											



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**BMA17003**

**MATHEMATICS – II**

**4 3 1/0 0/0**

**1. INTEGRATION**

(12)

Basic concepts of Integration – Methods of Integration– Integration by substitution – Integration by parts – Definite integrals– Properties of definite integrals – Problems on finding Area and Volume using single integrals (simple problems).

**2. MULTIPLE INTEGRALS**

(12)

Double integral in Cartesian and Polar Co-ordinates – Change of order of integration – Triple integral in Cartesian Co-ordinates – Spherical Polar Co-ordinates – Change of variables (simple problems).

**3.ORDINARY DIFFERENTIAL EQUATIONS**

(12)

First order differential equations – Second and higher order linear differential equations with constant coefficients and with RHS of the form:  $e^{ax}$ ,  $x^n$ ,  $\sin ax$ ,  $\cos ax$ ,  $e^{ax}f(x)$ ,  $x f(x)$  where  $f(x)$  is  $\sin bx$  or  $\cos bx$  – Differential equations with variable coefficients (Euler's form) (simple problems).

**4.THREE DIMENSIONAL ANALYTICAL GEOMETRY**

(12)

Direction Cosines and Ratios – Equation of a straight line – Angle between two lines – Equation of a plane – Co-planar lines – Shortest distance between skew lines – Sphere – Tangent plane.

**5. VECTOR CALCULUS**

(12)

Scalar and Vector functions – Differentiation – Gradient, Divergence and Curl – Directional derivatives – Irrotational and Solenoidal fields– Line, Surface and Volume integrals – Green's, Stoke's and Gauss divergence theorems (statement only) – Verification.

**Total no. of :periods : 60**

**Textbooks**

1. Kreyszig E., *Advanced Engineering Mathematics (10<sup>th</sup> ed.)*, John Wiley & Sons, (2011).
2. Veerarajan T., *Engineering Mathematics (for first year)*, Tata McGraw Hill Publishing Co., (2008).

**References**

1. Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers, (2012).
2. John Bird, *Basic Engineering Mathematics (5<sup>th</sup> ed.)*, Elsevier Ltd, (2010).
3. P.Kandasamy, K.Thilagavathy and K. Gunavathy, *Engineering Mathematics Vol. I (4<sup>th</sup> Revised ed.)*, S.Chand& Co., Publishers, New Delhi (2000).
4. John Bird, *Higher Engineering Mathematics (5<sup>th</sup> ed.)*, Elsevier Ltd, (2006).



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**DEPARTMENT OF MATHEMATICS**

Subject Code : <b>BMA17004</b>		Subject Name : <b>BIO STATISTICS</b>					C	L	T/SLr		P/R	
		Prerequisite : None					<b>4</b>	<b>3</b>	<b>1/0</b>		<b>0/0</b>	
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. Understand the Basic concepts in Statistics 2. Use the Basic concepts in Correlation 3. Understand the Basic concepts in Probability theory 4. Apply the Basic concepts in Testing of Hypothesis 5. Analyze the Basic concepts in Design of Experiments												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	<b>Find the measures of central tendency and to find the measures of dispersion.</b>											
CO2	<b>Evaluate the moments measures of skewness and kurtorsls and to evaluate correlation and regression.</b>											
CO3	<b>Apply knowledge and concepts in finding the probability of a random variable and use addition and multiplication laws of Probability</b>											
CO4	<b>Have ability to test and to give conclusion in testing of hypothesis.</b>											
CO5	<b>Analyze and interpret results through one way and two way ANOVA</b>											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		<b>L</b>				<b>H</b>			<b>M</b>		<b>M</b>	<b>M</b>
CO2	<b>L</b>	<b>M</b>				<b>H</b>			<b>L</b>			<b>H</b>
CO3	<b>L</b>	<b>H</b>	<b>L</b>		<b>L</b>	<b>M</b>			<b>L</b>		<b>L</b>	<b>H</b>
CO4		<b>H</b>	<b>L</b>		<b>L</b>	<b>M</b>			<b>M</b>			<b>H</b>
CO5		<b>M</b>	<b>H</b>	<b>M</b>					<b>M</b>			<b>H</b>
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project		Internships / Technical Skills		Soft Skills	



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**BMA17004**

**BIO STATISTICS**

**4 3 1/0 0/0**

**1. BASICS OF STATISTICS**

(12)

Variables – Uni-variate Data – Frequency Distribution – Measures of Central Tendency – Mean –Median –Mode – Quartiles – Measures of Dispersion – The Range – Quartile Deviation –Standard Deviation.

**2. CORRELATION**

(12)

Measures of Skewness& Kurtosis – Bi-variate data – Correlation & Regression.

**3. PROBABILITY AND RANDOM VARIABLE**

(12)

Definition of Random Experiment - Sample Space – Events: Mutually exclusive events - Exhaustive events - Dependent events and Independent events - Mathematical and Statistical definition of probability - Theorems of addition and multiplication laws of Probability (Without proof) - Conditional probability (Simple problems).

**4. SAMPLING**

(12)

Tests of Significance – Large Sample Tests – Mean – Proportions – Small Sample Tests – t, F & Chi-square Tests – Independence of Attributes – Goodness of Fit.

**5. DESIGN OF EXPERIMENTS**

(12)

Analysis of Variance: One Way & Two-Way Classification – Design of Experiments – Randomized Block Design – Completely Randomized Block Design – Latin Square Design.

**Total no. of Periods : 60**

**Text books**

1. Gupta S.C, Kapoor V.K, *Fundamentals of Mathematical Statistics*, S.Chand& Co, New Delhi (2003).
2. Veerarajan T., *Probability, Statistics and, Random Processes*, Tata McGraw Hill Publishing Co., (2008).

**References**

1. Gupta S.P, *Statistical Methods*, S.Chand& Co., New Delhi (2003).
2. Singaravelu, *Probability and Random Processes*, Meenakshi Agency, (2017).
3. Richard Johnson A., *Miller & Freund's Probability and statistics for Engineers (9<sup>th</sup> ed)*, Prentice Hall of India, (2016).



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**DEPARTMENT OF PHYSICS**

Subject Code : <b>BPH17002</b>	Subject Name : <b>MATERIAL SCIENCE</b>						C	L	T/SLr		P/R	
Prerequisite : None						<b>3</b>	<b>2</b>	<b>0/1</b>		<b>0/0</b>		
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. Design, conduct experiment and analyze data. 2. Develop a Scientific attitude at micro and nano scale of materials 3. Understand the concepts of Modern Physics 4. Apply the science of materials to Engineering & Technology												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1	Demonstrate skills necessary for conducting research related to content knowledge and laboratory skills.											
CO2	Apply knowledge and concepts in advanced materials and devices.											
CO3	Acquired Analytical, Mathematical skills for solving engineering problems.											
CO4	Ability to design and conduct experiments as well as function in a multi disciplinary teams.											
CO5	Generate analytical thought to interpret results & place them within a broader context											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	M	M	L				M		L
CO2	H	H		M	M							L
CO3	H	H	H	H	M					M		
CO4	H	H	H	H	M				H	M		L
CO5	H	M	M	M	M	L			M	M		L
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project		Internships / Technical Skills		Soft Skills	



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**BPH17002**

**MATERIAL SCIENCE**

**3 2 0/1 0/0**

**1. CRYSTAL PHYSICS**

(9)

Space Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Ceramic Materials & Graphite Structures – Crystal Growth Techniques (Slow Evaporation Method & Melt Growth)

**2. CONDUCTING & SUPERCONDUCTING MATERIALS**

(9)

Introduction - Classical Free electron theory of Metals – Derivation of Electrical conductivity – Thermal Conductivity – Deduction of Wiedemann Franz law – Fermi Energy & Fermi Function – Density of Energy States – Qualitative Analysis of Conductors, Semiconductors and Insulators – Some Examples of Important Electrical Materials  
Superconducting Materials: Transition temperature – BCS Theory – Properties of Superconductors – Type I & Type II Superconductors – Superconducting materials - Low & High Temperatures Superconductors – AC & DC Josephson Effects – Applications of Superconductors – Basic Concepts of SQUID, Magnetic Levitation.

**3. SEMICONDUCTING MATERIALS**

(9)

Bonds in Semiconductors – Types – Importance of Germanium & Silicon – Other Commonly Used Semiconducting materials - Carrier concentration in Intrinsic Semiconductors (Electron and Hole Density) – Band Gap Determination – Carrier Transport in Semiconductors – Drift, Mobility and Diffusion – Hall effect – Determination of Hall Coefficient and its Applications – Dilute Magnetic Semiconductors (DMS) & their Applications – Schottky diodes.

**4. MAGNETIC & DIELECTRIC MATERIALS**

(9)

Magnetic Materials: Types – Comparison of Dia, Para and Ferro Magnetism – Heisenberg's interpretation – Domain theory – Hysteresis – Soft and Hard Magnetic Materials – Application of Magnetic Resonance Imaging – Important Magnetic, Insulating & Ferro electric materials.

Dielectric Materials: Electrical Susceptibility – Dielectric Constant – Concept of Polarization – Frequency and Temperature Dependence of Polarization – Dielectric loss – Dielectric breakdown – Commonly used Dielectric materials and their practical applications.

**5. OPTICAL, OPTOELECTRONIC AND NEW MATERIALS**

(9)

Properties & Classification of Optical Materials – Absorption in Metals, Insulators & Semiconductors – Composite Materials – Nano Materials – Bio Materials – MEMS – NEMS – LED's – Organic LED's – LCD's – Laser diodes – Photodetectors – Tunneling – Resonant Tunneling Diodes (RTD's) – Carbon Nanotubes – Various Types of Optical Materials with Properties.



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**Total No. of Periods : 45**

**Text Books**

1. V. Rajendran&Mariakani “Materials Science”, Tata McGraw Hill (2004).
2. P.K.Palanisamy, “ Materials science”, Scitech Publication(2002).

**Reference Books**

1. Dr. SenthilKumar, “Engineering Physics II” VRB Publishers (2016).
2. V. Arumugam, “Materials Science”, Anuradha Agencies, (2003 Edition).
3. Pillai S.O., “Solid State Physics”, New Age International, (2005).

**DEPARTMENT OF CHEMISTRY**

Subject Code : <b>BCH17002</b>	Subject Name : <b>ENGINEERING CHEMISTRY – II</b>					C	L	T/SLr	P/R			
	Prerequisite : None					<b>3</b>	<b>2</b>	<b>0/1</b>	<b>0/0</b>			
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES :												
1. Imparting the basic concepts of phase rule and apply the same to one and two component systems.												
2. Introducing the chemistry of engineering materials such as cement, lubricants, abrasives, refractories, alloys and nano materials.												
3. To impart a sound knowledge on the principles of chemistry involving different application oriented topics												
4. Introducing salient features of fuels and combustion.												
5. To give an overview on modern analytical techniques												
COURSE OUTCOMES (Cos) : (3 – 5)												
Students completing the course were able to												
CO1	1. Understand the science of phase equilibria and apply the phase rule to different systems.											
CO2	2. Gain an overview of Engineering Materials such as Lime, Cement, Lubricants, Abrasives, Refractories, Alloys and Nanomaterials.											
CO3	3. Recognize the essential information about consumer products such as Soaps and Detergents, also gaining the basic knowledge about Explosives and Propellants.											
CO4	4. Discover the fuel Chemistry and Combustion process.											
CO5	5. Demonstrate few important Analytical Techniques and study their applications.											
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	<b>L</b>											<b>L</b>
CO2	<b>M</b>		<b>L</b>			<b>L</b>	<b>M</b>					<b>L</b>
CO3	<b>M</b>					<b>L</b>						<b>L</b>



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CO4	M	M	L	L			M					M
CO5	M				M							H
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills			
	√											
Approval												

**BCH17002**

**ENGINEERING CHEMISTRY – II**

**3 2 0/1 0/0**

**1. PHASE EQUILIBRIA**

(8)

Introduction – Definition of terms involved in phase rule. Derivation of Gibbs phase rule – Applications to one component system – water system. Binary system – Eutectic system – Pb – Ag system, Bi – Cd system .Thermal analysis – Cooling curves.

**2. MATERIAL CHEMISTRY**

(10)

Cement – Manufacture , Chemistry of setting and hardening .Lubricants – Requirements of good lubricants, Mechanism, Properties of lubricants, Classification – Examples.Abrasives–Classification –Moh'sscale-Hardandsoftabrasives,Preparation ofartificial abrasives(siliconcarbide,boroncarbide),Applications ofabrasives.Refractories– Classification, Properties-Refractoriness, RUL, Porosity, ThermalspallingAlloys- Classification ofalloys–Purposeofmakingalloys-Ferrous andnon-Ferrousalloys-Heat treatment Nano materials – properties, carbonnano tubes – properties, fabrication – carbon arc method, laser vapourization method.

**3. APPLIED CHEMISTRY**

(9)

Soapsanddetergents:Soaps – Saponification of oils and fats, manufacture of soaps, classification of soap – soft soap, medicated soap, herbal soap, shaving soap and creams.

Detergents – Anionic detergents – manufacture and applications, Comparison of soaps and detergents.

Rocket propellants and explosives:Rocket propellants – characteristics, solid and liquid propellants – examples.Explosives-Introduction, characteristics, classification, Oxygen balance , preparation, properties and uses of detonators, low explosives and high explosives, Dynamites, Gun cotton, Cordite.

Food adulterants- Common adulterants in different foods – milk and milk products, vegetableoils, and fats, spices and condiments, cereals, pulses, sweetening agents and beverages, Contamination with toxic chemicals – pesticides and insecticides.

**4. FUELS & COMBUSTION**

(9)

Introductionto Fuels – classification – Calorific value – GCV, LCV.SolidFuels–Coal-Proximate Analysis, MetallurgicalCoke– ManufactureofMetallurgicalCoke– LiquidFuel–Refining of Petrol, Synthetic Petrol–ManufacturingProcess– HydrogenationofCoal, Polymerization,Cracking–Knocking–OctaneNumber–LeadedPetrol(or)Anti-knocking – Cetane Number– IgnitionLag–Gaseousfuels–CNG–LPG–WaterGas, Producer gas–Biogas- Combustion– FlueGasanalysis– Orsat's method.

**5. ANALYTICAL AND CHARACTERIZATION TECHNIQUES**

(9)





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Electron microscopes: Scanning electron microscope & Transmission electron microscope, instrumentation and applications. Absorption and Emission Spectrum - Beer - Lambert's law. Visible and UV Spectroscopy – instrumentation – Block diagram - working. IR Spectroscopy – instrumentation - Block diagram – molecular vibrations – stretching and bending – H<sub>2</sub>O, CO<sub>2</sub>. –Characterization of some important organic functional groups. Chromatographic techniques – column, thin layer and paper.

**Total number of periods : 45**

**Textbooks**

1. C. S. Unnithan, T. Jayachandran & P. Udhayakala, "Industrial Chemistry", Sreelakshmi Publications (2009).
- 2.

**References**

1. P.C. Jain & Monika Jain, "Engineering Chemistry", Dhanpat Rai publishing Co., (Ltd.) (2013).
2. B. R. Puri, L.R. Sharma & M.S. Pathania, "Principles of Physical Chemistry", Vishal publishing co., (2013).

**DEPARTMENT OF ENGINEERING SCIENCES**

Subject Code : <b>BES17003</b>		Subject Name : <b>ENVIRONMENTAL SCIENCE</b>					C	L	T/SLr	P/R		
		Prerequisite : None					<b>3</b>	<b>3</b>	<b>0/0</b>	<b>0/0</b>		
L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits T/L/ETL : Theory / Lab / Embedded Theory and Lab												
OBJECTIVES : 1. To acquire knowledge of the Environment and Ecosystem & Biodiversity 2. To acquire knowledge of the different types of Environmental pollution 3. To know more about Natural Resources 4. To gain understanding of social issues and the Environment 5. To attain familiarity of human population and Environment												
COURSE OUTCOMES (Cos) : (3 – 5) Students completing the course were able to												
CO1		To known about Environment and Ecosystem & Biodiversity										
CO2		To clearly comprehend air, water, Soil, Marine, Noise, Thermal and Nuclear Pollutions and Solid Waste management and identify the importance of natural resources like forest, water, and food resources										
CO3		To discover water conservation and watershed management										
CO4		To identify its problems and concerns climate change, global warming, acid rain, ozone layer depletion etc.,										
CO5		To explain family welfare programmes and role of information technology in human health and environment										
Mapping of Course Outcomes with Program Outcomes (POs)												
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12



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CO1						M	H	M				M
CO2						M	H			M		M
CO3						M	H	M				M
CO4						M	H	M		M		M
CO5						M	H			M		M
H/M/L indicates strength of correlation H – High, M – Medium, L – Low												
Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills			
			√									
Approval												

**BES17003**

**ENVIRONMENTAL SCIENCE**

**3 3 0 0/0**

**Unit I Environment and Ecosystem**

**(9)**

Definition, Scope and Importance of environment – need for public awareness – concept, structure and function of an ecosystem - producers, consumers and decomposers – energy flow in the ecosystem. Biodiversity at national and local levels – India

**Unit II Environment Pollution**

**(9)**

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Nuclear hazards (g) E-Wastes and causes, effects and control measures

**Unit III Natural Resources**

**(9)**

Forest resources: Use and over-exploitation, deforestation. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems.

**Unit – IV Social Issues and the Environment**

**(9)**

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns climate change, global warming, acid rain, ozone layer depletion, nuclear accidents ,central and state pollution control boards- Public awareness.

**Unit – V Human Population and the Environment**

**(9)**

Population growth, variation among nations – population explosion, environment and human health – human rights – value education – HIV/AIDS  
– women and child welfare – role of information technology in environment and human health

**Total Number of Periods : 45**

**Text Books**

B.Tech Regulations 2017 Approved by the Academic Council----- Revision 3



**I Year B.Tech Full Time**  
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1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGrawHill, New Delhi, (2006).

**References**

1. Vairamani, S. and Dr. K. Sankaran. **Elements of Environmental and Health Science**. Karaikudi: KPSV Publications, 5<sup>th</sup> Edition, July, 2013.
2. Ifthikarudeen, Etal, **Environmental Studies**, Sooraj Publications, 2005.
3. R.Murugesan, **Environmental Studies**, Millennium Publishers and Distributors, 2<sup>nd</sup> Edition, July, 2009.