

**MECHANICAL ENGINEERING (ME)**  
**FOUR YEAR B.TECH. DEGREE COURSE**

Scheme of Instruction and Examination

**I SEM ME**

**Scheme-2020**

S. No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T	P/D	End Exam Marks	CIA Marks	Total Marks
<b>I</b>		<b><u>Theory</u></b>							
1.	BSC	Engineering Mathematics- I	3	2	1		60	40	100
2.	BSC	Engineering Chemistry	3	3			60	40	100
3.	HSSC	English	3	3			60	40	100
4.	ESC	Engineering Drawing	3	1		4	60	40	100
5.	ESC	Programming for Problem Solving	3	3			60	40	100
6	Audit	English Proficiency Course				3			
<b>II</b>		<b><u>Practical</u></b>							
7	BSL	Engineering Chemistry Lab	1.5			3	60	40	100
8	HSSL	Phonetics & Communication Skills Lab	1.5			3	60	40	100
9	ESL	Programming for Problem Solving Lab	1.5			3	60	40	100
		<b>Total</b>	<b>19.5</b>						

**II SEM ME**

**Scheme-2020**

S. No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T	P/D	End Exam Marks	CIA Marks	Total Marks
<b>I</b>		<b><u>Theory</u></b>							
1.	BSC	Engineering Mathematics- II	3	2	1		60	40	100
2.	BSC	Applied Physics	3	3			60	40	100
3.	ESC	Elements of Electrical Engineering	3	2	1		60	40	100
4.	ESC	Engineering Mechanics	3	2	1		60	40	100
5.	ESC	Data Structures Through C	3	2		2	60	40	100
6	MC	Environmental Studies		2				100	100
<b>II</b>		<b><u>Practical</u></b>							
7	BSL	Applied Physics Lab	1.5			3	60	40	100
8	ESL	Elements of Electrical Engineering lab	1.5			3	60	40	100
9	ESL	Engineering Workshop	1.5			3	60	40	100
		<b>Total</b>	<b>19.5</b>						

## ENGINEERING MATHEMATICS – I (EM1)

<b>I Semester</b> : Common for <b>CSE, CST, CE &amp; ME</b>					<b>Scheme : 2020</b>			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS101	BSC	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>TOTAL</b>
		<b>2</b>	<b>1</b>	<b>-</b>	<b>3</b>	<b>40</b>	<b>60</b>	<b>100</b>
<b>Sessional Exam Duration : 1 ½ Hrs</b>					<b>End Exam Duration: 3 Hrs</b>			

**Course Outcomes** : At the end of the course the student will be able to

**CO1:** Find the solution for simultaneous system of linear equations and eigen values and eigen vectors.

**CO2:** Solve first order differential equations and its applications.

**CO3:** Solve higher order differential equations and its applications.

**CO4:** Understand Rolle's and Lagrange's mean value theorems. Evaluate maxima & minima, areas and volumes by multiple integrals.

**CO5:** Learn Laplace transform of a function and solve the differential equations using Laplace transforms

### UNIT – I

**Matrices**

Rank of a matrix, Consistency of systems of linear equations, Rouche's Theorem (Statement only). Eigen values and Eigen vectors, diagonalization of a matrix. Cayley-Hamilton Theorem, finding inverse of a matrix. Quadratic form, reduction of a quadratic form to canonical form by orthogonal transformation

### UNIT - II

**Differential Equations**

First order and first degree differential equations - Exact, Non-exact equations, Linear and Non-linear equations. Applications: Newton's law of cooling, law of natural growth and decay, L-R and C-R circuits.

### UNIT – III

**Higher Order Differential Equations**

Homogeneous linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type  $f(x) = e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ ,  $x^n$ ,  $e^{ax}v(x)$ ,  $xv(x)$  and General case. Applications to L-C-R circuits.

### UNIT – IV

**Differential Calculus**

Rolle's theorem, Lagrange's mean value theorem. Maxima and minima of functions of two variables.

**Multiple Integrals**

Double integrals, change of order of integration, Change to polar coordinates. Area and volume by double integration. Triple integrals, volume by triple integrals.

### UNIT - V

**Laplace Transforms**

Laplace transform of standard functions, first & second shifting theorems, Laplace transforms of derivatives, integrals, multiplication by t, division by t and periodic functions. Inverse Laplace transforms, Convolution Theorem. Applications of Laplace transforms to ordinary differential equations.

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**Text Books**

1. B.S. Grewal- Higher Engineering Mathematics. Khanna Publishers, 42<sup>nd</sup> Edition, 2012
2. T.K.V.Iyengar and others -A Text Book of Engineering Mathematics, Vol I & II - S.Chand & Company, 13<sup>th</sup> Edition 2014

**Reference Books**

1. B.V. Ramana -Higher Engineering Mathematics, TMH Publishers, 2<sup>nd</sup> Edition, 2006.
2. N.P.Bali and others -A Text Book of Engineering Mathematics, Lakshmi publishers, 7<sup>th</sup> Edition, 2009.
3. Erwyn Kreyszig -Advanced Engineering Mathematics, John wiley, 8<sup>th</sup> Edition 2006.

**Question Paper Pattern:****Sessional Exam :**

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions ( EITHER/ OR Type ) in each section. The student shall answer one question from each section.

**End Examination:**

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

**ENGINEERING CHEMISTRY (EC)**

I / II Semester : CE,EEE,ME /ECE					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		C	Continuous Internal Assessment	End Exam
BS109	BSC	3	-	-	3	40	60	100
		<b>Sessional Exam Duration : 1 ½ Hrs</b>				<b>End Exam Duration: 3 Hrs</b>		
<b>Course Outcomes :</b> At the end of the course students will be able to								
<b>CO1:</b> Understand the concept of electrochemistry, distinguishes primary and secondary cell, energy storage devices and explains the concept of corrosion with preventing methods.								
<b>CO2:</b> Describes the water quality issues for steam generation in the boilers and problems associated with treatment.								
<b>CO3:</b> Understand the basic concepts of phase rule and refractories.								
<b>CO4:</b> Judge the quality of coal, petrol, diesel and lubricants. Understands the efficiency of combustion.								
<b>CO5:</b> Understand the chemistry of polymers and composites.								
<b>UNIT – I</b>								
<b>Electrochemistry &amp; Corrosion</b>								
Single electrode potential- Determination. EMF of a cell and its measurement, Nernst equation, numerical problems. Electrochemical series & its applications. Electrochemical energy systems – primary batteries – dry cell, secondary batteries- lithium ion battery, Fuel cells-H <sub>2</sub> -O <sub>2</sub> Fuel cell. Conductometric titrations.								
Process of Chemical & electrochemical corrosion and their mechanisms. Galvanic series. Galvanic corrosion, stress corrosion. Concentration cell corrosion- differential aeration corrosion, metal ion concentration corrosion and pitting corrosion. Factors influencing corrosion. Corrosion control methods - Cathodic protection and corrosion inhibitors. Protective coatings - Metallic coatings - Hot dipping – Galvanization and Tinning, Organic coatings - Paints.								
<b>UNIT – II</b>								
<b>Water Chemistry</b>								
Hardness of water- Types, expression, units and numerical problems. Analysis of water-Determination of hardness of water by EDTA method, alkalinity & dissolved oxygen by Winkler's method. Disadvantages of hard water-boiler troubles-scale and sludge, caustic embrittlement, priming & foaming and boiler corrosion. Water softening methods – internal conditioning - calgon process, colloidal conditioning & external conditioning – zeolite process and ion exchange process. Desalination – reverse osmosis.								
<b>UNIT – III</b>								
<b>Phase rule &amp; Refractories</b>								
Terms involved in phase rule equation, definition, explanation with examples. Application to one component system - water and sulphur systems. Condensed phase rule-Two component alloy systems - Pb-Ag system.								
Refractory-classification. Properties- refractoriness, refractoriness under load, thermal spalling, porosity and thermal conductivity. Reasons for failure of refractory.								
<b>UNIT – IV</b>								
<b>Fuel Technology &amp; Lubricants</b>								
Fuels-Classification. Calorific value-types, units and its determination by Bomb calorimeter. Solid fuels-Coal-proximate and ultimate analysis. Liquid fuels – Petroleum-refining, cracking-catalytic cracking. Synthetic petrol-Fischer-Tropsch's & Bergius process, Reforming of petrol, knocking-octane number, diesel- cetane number. Preparation of biodiesel. Gaseous fuels-Composition & uses of Natural gas, LPG & CNG. Combustion- numerical problems - calculation of volume and mass of oxygen and air. Flue gas Analysis by Orsat's Apparatus.								

Lubricants- Classification of lubricants with examples. Definition and significance of the following characteristics of a good lubricating oil- viscosity, viscosity index, flash & fire point, acid number, saponification value, pour point and cloud point.

## UNIT – V

### ***Polymers & Composites***

Fundamentals of addition & condensation polymerization with examples. Thermoplastic and Thermosetting plastics. Preparation, properties and uses of PVC, TEFLON, Nylons, Bakelite, Polyurethane. Rubber – Processing of latex. Drawbacks of natural rubber, vulcanization, properties of vulcanized rubber. Synthetic rubber- Buna S, Buna N, Silicone and Butyl Rubbers. Polymer composites – definition and uses of FRP - laminar composites.

### **Text Books :**

1. P.C. Jain and Monika Jain, Engineering Chemistry, Dhanpat Rai and Sons, New Delhi 2010, 15<sup>th</sup> edition.

### **Reference Books :**

1. Shashi Chawla, A Reading of Engineering Chemistry, 3rd Edition, Dhanpat Rai and Co., New Delhi, 2011, 3<sup>rd</sup> edition.

2. Gowariker et al., Polymer Science and Technology, Prentice Hall of India Pvt. Ltd., New Delhi, 2004, 10<sup>th</sup> reprint.

3. Puri, Sharma and Pathania “ Principles of Physical Chemistry”. Vishal Publishing Co., Jalandhar. 1991, 3<sup>rd</sup> 1<sup>st</sup> edition.

4. Kuriacose, J.C and Rajaram, J, Engineering Chemistry, Volume I/II, Tata McGraw – Hill Publishing Co. Ltd. New Delhi, 2010, 2<sup>nd</sup> edition.

5. S.S.Dara, A Textbook of Engineering Chemistry, S. Chand & Co.Ltd. New Delhi, 2007, 10<sup>th</sup> Edition

### **Question Paper Pattern:**

#### **Sessional Exam :**

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions ( EITHER/ OR Type ) in each section. The student shall answer one question from each section.

#### **End Examination:**

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

**ENGLISH (ENG)**

I/II Semester : Common for CE, EEE, ME/ ECE, CSE & CST						Scheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
HU101	HSSC	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>TOTAL</b>
		<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>40</b>	<b>60</b>	<b>100</b>
<b>Sessional Exam Duration : 1 ½ Hrs</b>					<b>End Exam Duration: 3 Hrs</b>			
<b>Course Outcomes:</b> At the end of the course, Students will be able to								
<b>CO 1:</b> Use Grammatically acceptable English in Oral and Written communication.								
<b>CO 2:</b> Use appropriate Vocabulary in Technical and General Contexts.								
<b>CO 3:</b> Comprehend General and Technical Content using various Reading Skills like Skimming and Scanning.								
<b>CO 4:</b> Write Letters, Summaries and Essays of topical, Narrative, Descriptive, Analytical and Persuasive nature.								
<b>CO 5:</b> Write Job Applications, Resumes, Memos and E-mails.								
<b>UNIT – I</b>								
<b>I Have a Dream: An Independent, Development and Strong India – Dr. A.P.J. Abdul Kalam</b>								
Vocabulary: Synonyms and Antonyms								
Grammar: Parts of Speech, Types of Nouns, Pronouns and Adjectives								
Reading: Reading with a Purpose: Reading for Understanding, Note - Making								
Writing: Punctuation, Writing notes and Paragraphs, Note – Taking								
<b>UNIT – II</b>								
<b>The Doctor’s Word – R.K. Narayan</b>								
Vocabulary: One-word Substitutes, Idioms and Idiomatic Phrases								
Grammar: Adverbs, Verbs –Verb forms, Types of Verbs, Prepositions, Conjunctions and Articles, Word Order								
Reading: Skimming and Scanning, Reading Comprehension								
Writing: Business Letters & E-mail Writing								
<b>UNIT – III</b>								
<b>Stay Hungry, Stay Foolish - Steve Jobs</b>								
Vocabulary: Prefixes and Suffixes, Homophones and Homonyms								
Grammar: Tenses, Concord, Voices and Reported Speech								
Reading: Use of Dictionary, Thesaurus, Library and Internet for Information								
Writing: Writing Cover Letters for Job Applications and Resume Preparation								
<b>UNIT – IV</b>								
<b>Once there was a King – Rabindranath Tagore</b>								
Vocabulary: Words often Confused, Collocations and Proverbs								
Grammar: Question Tags, Degrees of Comparison, Transformation of Sentences and Correction of Sentences								
Reading: Précis Writing								
Writing: Memo Writing								
<b>Detailed Study Text:</b>								
1. The Enriched Reading by D. Sudha Rani, Pearson India Education Services Pvt. Ltd, Second Impression, 2017.								
<b>Reference Books:</b>								
1. Michael Swan, Practical English Usage, Third Edition, OUP, 2006.								
2. David Green, Contemporary English Grammar, Structure and Composition, , Second Edition, Lakshmi Publications, 2015.								

3. Oxford Advanced Learner's Dictionary of Current English, OUP, 2015.
4. Meenakshi Raman and Sangeetha Sarma, Technical Communication Principles and Practice, 3 <sup>rd</sup> Edition, OUP, 2015.
5. Raj N Bakshi, English Grammar Practice, Orient BlackSwan, 2005.
6. Sangeeta Sharma & Binod Mishra, Communication Skills for Engineers and Scientists, PHI Learning Private Limited.
7. M. Ashraf Rizvi, Effective Technical Communication, TataMcGraw-Hill Publishing Company Ltd., 2005.
8. Dr A. Ramakrishna Rao, Dr G. Natanam & Prof S.A. Sankaranarayanan, "English Language Communication : A Reader cum Lab Manual", Anuradha Publications, Chennai, 2006.

**Question Paper Pattern:**

**Sessional Exam**

**I Sessional Examination : 25 Marks**

1. Short Answer Questions – 4 Marks
2. Vocabulary – 4 Marks
3. Grammar – 4 Marks
4. Reading Comprehension – 5 Marks
5. Business Letter – 4 Marks
6. E-mail Writing – 4 Marks

**II Sessional Examination : 25 Marks**

1. Short Answer Questions – 4 Marks
2. Vocabulary – 4 Marks
3. Grammar – 4 Marks
4. Précis Writing – 4 Marks
5. Memo Writing – 4 Marks
6. Job Application Letter – 5 Marks

**End Exam :**

1. Short Answer Questions – 8 Marks
2. Vocabulary – 8 Marks
3. Grammar – 12 Marks
4. Reading Comprehension – 5 Marks
5. Précis Writing – 5 Marks
6. Job Application Letter – 10 Marks
7. E-mail Writing – 6 Marks
8. Memo Writing – 6 Marks

**ENGINEERING DRAWING (ED)**

I / II Semester : Common to CE, EEE,ME/ CSE,CST, ECE					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
ME101	ESC	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>TOTAL</b>
		<b>1</b>	<b>-</b>	<b>4</b>	<b>3</b>	<b>40</b>	<b>60</b>	<b>100</b>
<b>Sessional Exam Duration : 1 ½ Hrs</b>					<b>End Exam Duration: 3 Hrs</b>			
<b>Course Outcomes :</b> At the end of the course students will be able to								
<b>CO1:</b> Understand the concept of projections of an object and draw the projection of points, straight lines and planes								
<b>CO2:</b> Draw projection of regular solids								
<b>CO3:</b> Draw the sectional views of regular solids and their surface developments								
<b>CO4:</b> Draw the orthographic views from given isometric view								
<b>CO5:</b> Draw the isometric views from the orthographic views								
<b>UNIT – I</b>								
<b>Introduction to Engineering Drawing:</b> Drawing instruments and their uses, Lettering and Dimensioning. Introduction to polygons and conics. Introduction to scales ( <b>not for End examinations</b> )								
<b>Orthographic projections:</b> Introduction, planes of projections, projections of points. First angle projection- Projections of straight lines- parallel to one and inclined to other plane- Inclined to both the planes, traces of lines (treatment is limited to simple problems only)								
<b>Projection of planes:</b> Regular planes- perpendicular, parallel to one reference plane and inclined to other reference planes - Inclined to both the reference planes								
<b>UNIT – II</b>								
<b>Projections of solids:</b> Projections of right regular solids- prism, pyramid, cylinder and cone with axis inclined to one plane and inclined to both planes.								
<b>UNIT – III</b>								
<b>Sections of Solids:</b> Sectional views of right regular solids - prism, pyramid, cylinder and cone. True shapes of Sections (Treatment is limited to simple problems only)								
<b>Development of Surfaces:</b> Development of surfaces of right regular solids and their sections - prism, pyramid, cylinder and cone.								
<b>UNIT – IV</b>								
<b>Orthographic projections:</b> Conversion of pictorial views into orthographic views (Treatment limited to simple problems only)								
<b>UNIT – V</b>								
<b>Isometric Projections:</b> Principle of Isometric projection, Isometric scale. Isometric projections of simple planes, regular solids and compound solids.								

**Text Books**

1. K.L.Narayana and P.Kannaiah“ Text book on Engineering Drawing,” Second Edition Scitech Publications, Chennai.,2006

2. N.D.Bhatt and V.M.Panchal,“ Elementary Engineering Drawing “, 45<sup>th</sup> Edition , Charotar Publishing house , Anand, India., 2002

**Reference Books**

1. K.Venugopal, “ Engineering Drawing and Graphics with Auto CAD” , Fourth Edition,2001, New Age International(P) Limited, Publishers, New Delhi, 2001

2. Dhananjay A Jolhe, “ Engineering Drawing with an introduction to Auto CAD”, Tata Mc Graw-Hill Publishing Company Ltd. , New Delhi , 2008

3. M.B.Shaw & B.C.Rana “ Engineering Drawing “Second Edition Pearson Education , New Delhi, 2009

**Question Paper Pattern:****Sessional Exam :**

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions ( EITHER/ OR Type ) in each section. The student shall answer one question from each section.

**End Examination:**

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

## PROGRAMMING FOR PROBLEM SOLVING (PPS)

I Semester : Common for CE,CSE,CST,ECE,EEE & ME						Scheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS101	ESC	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>TOTAL</b>
		3	-	-	3	40	60	100
<b>Sessional Exam Duration : 1 ½ Hrs</b>					<b>End Exam Duration: 3 Hrs</b>			
<b>Course Outcomes :</b> At the end of the course the student will be able to								
<b>CO1:</b> Understand fundamentals of problem solving concepts with various data types and operators								
<b>CO2:</b> Apply conditional and iterative statements for solving a given problem								
<b>CO3:</b> Illustrate the applications of functions and storage classes.								
<b>CO4 :</b> Apply the concepts of pointers and dynamic memory management in problem solving.								
<b>CO5:</b> Understand the purpose of structures, unions and files.								
<b>UNIT – I</b>								
<b>General Problem Solving Concepts</b> Algorithm, Flowchart for problem solving with Sequential Logic Structure, Decisions and Loops.								
<b>Imperative Languages</b> Introduction to imperative language; syntax and constructs of a specific language (ANSI C) – Types Operator and Expressions with discussion of variable naming and Hungarian Notation: Variable Names, Data Type and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, Formatted input/output.								
<b>UNIT – II</b>								
<b>Control Flow with discussion on structured and unstructured programming</b> Statements and Blocks, If-Else-If, Switch, Loops – while, do, for, break and continue, goto labels, structured and un- structured programming.								
<b>UNIT - III</b>								
<b>Functions and Program Structure with discussion on standard library</b> Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialization, Recursion, Pre-processor, Standard Library Functions and return types.								
<b>UNIT - IV</b>								
<b>Pointers and Arrays:</b> Pointers and address, dynamic memory management, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multi-dimensional array and Row/column major formats, Initialization of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated.								
<b>UNIT - V</b>								
<b>Structures and Unions:</b> Basic Structure, Structures and Functions, Array of structures, Pointer of structures, Self-referral structures, Table look up, typedef, Unions, Bit-fields.								
<b>Files:</b> Introduction to Files, Opening and Closing files, Reading and Writing files, File I/O functions, Error								

Handling in files.

**Text Books :**

1. The C Programming Language, B. W. Kernighan and D. M. Ritchie, Second Edition, PHI.
2. Programming in C, B. Gottfried, Second Edition, Schaum Outline Series.

**Reference Books :**

1. C: The Complete Reference, Herbert Schildt, Fourth Edition, McGraw Hill.
2. Let Us C, Yashavant Kanetkar, BPB Publications.

**Question Paper Pattern:**

**Sessional Exam :**

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions ( EITHER/ OR Type ) in each section. The student shall answer one question from each section.

**End Examination:**

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

**ENGINEERING CHEMISTRY LAB (CHP)**

<b>I / II Semester : CE, EEE, ME / ECE</b>					<b>Scheme :2020</b>			
<b>Course Code</b>	<b>Category</b>	<b>Hours/Week</b>			<b>Credits</b>	<b>Maximum Marks</b>		
		<b>L</b>	<b>T</b>	<b>P</b>		<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>
<b>BS113</b>	<b>BSL</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>1.5</b>	<b>40</b>	<b>60</b>	<b>100</b>

**End Exam Duration: 2 Hrs**

**Course Outcomes :** At the end of the course students will be able to

**CO1:** Understand and appreciate various analytical methods including instrumentation that acts as a tools in analysis of water.

**CO2:** Understand various analytical methods in analysis of an alloy.

**CO3:** Understand various analytical methods including instrumentation that acts as tools in analysis of different fuels.

**List of Experiments**

*Note : At least 12 of the following experiments shall be conducted*

**Volumetric Analysis**

1. Demonstration of analytical balance.
2. Preparation of standard sodium carbonate solution.
3. Estimation of magnesium by EDTA titration.
4. Estimation of copper by EDTA titration.
5. Estimation of total and permanent hardness of water by EDTA titration method.
6. Estimation of copper in brass alloy.
7. Estimation of dissolved oxygen by Winkler's method.

**Instrumentation**

8. Determination of calorific value of a solid fuel using Bomb calorimeter.
9. Determination of viscosity of lubricating oil using Engler's viscometer.
10. Determination of viscosity of lubricating oil using Redwood viscometer.
11. Determination of strength of mixture of acids (HCl and CH<sub>3</sub>COOH) by conductometric titrations.
12. Verification of Beer-Lamberts law using colorimeter.
13. Potentiometric titrations.
14. Determination of simple eutectic of two component system.

**PHONETICS AND COMMUNICATION SKILLS LAB (PCSP)**

<b>I/II Semester : Common for CE, EEE, ME/ ECE, CSE &amp; CST</b>						<b>Scheme : 2020</b>		
<b>Course Code</b>	<b>Category</b>	<b>Hours/Week</b>			<b>Credits</b>	<b>Maximum Marks</b>		
		<b>L</b>	<b>T</b>	<b>P</b>		<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>
<b>HU103</b>	<b>HSSL</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>1.5</b>	<b>40</b>	<b>60</b>	<b>100</b>

**End Exam Duration: 2 Hrs**

**Course Outcomes :** At the end of the course, Students will be able to

**CO1:** Speak Internationally Intelligible English without mother tongue accent.

**CO2:** Adopt appropriate intonation patterns for effective Oral Communication.

**CO3:** Identify International Phonetic Symbols to find the pronunciation of new words.

**CO4:** Integrate Listening Skills & Speak in English confidently, fluently and effectively.

**CO5:** Exhibit team playing & Leadership skills.

*List of Experiments*

**Phonetics Laboratory**

Focus in the lab is on accent neutralization for International Intelligibility

1. Introduction to English Phonetic Symbols and associated sounds.

2. Practice in Consonant sounds

3. Practice in Vowel sounds

4. Practice in Accent, Rhythm and Intonation

5. Practice sessions on Listening for General Information, Specific Information & Comprehension,

**Communication Skills Laboratory**

Focus in the lab is more on fluency than on accuracy

1. Inter-Personal Communication

a) Self Introduction

b) Introducing Others

c) Non-Verbal Communication

d) Posture, Gait and Body language

2. Communication in Formal Situations

a) Public Speaking – Extempore, Prepared Speech

b) Role-play

c) Situational Dialogues

d) Giving Directions

e) Sell-out

f) JAM

g) Telephone Etiquette

**Reference Books :**

1. Exercises in Spoken English Part – I, Part – II & Part – III Published by EFLU, Hyderabad.

2. A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice Hall of India, Pvt Ltd.

3. T. Balasubramanyam , A.Text Book of English Phonetics for Indian Students, Macmillan India Ltd.

4. Krishna Mohan and Meera Benerjee , Developing Communication Skills , Macmillan India Ltd.

5. D.Souza Eunice and Shahani. G, “Communication Skills in English”, Noble Publishing House.

## PROGRAMING FOR PROBLEM SOLVING LAB [PPS(P)]

<b>I Semester : Common for CE, CSE, CST, ECE, EEE &amp; ME</b>					<b>Scheme : 2020</b>			
Course Code	Category	Hours / Week			Credits	Maximum Marks		
CS107	ESL	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		-	-	3	1.5	40	60	100
<b>End Exam Duration : 3 Hrs</b>								
<b>Course Outcomes :</b> At the end of the course students will be able to								
CO1: Implement programs using conditional and loop statements in C.								
CO2: Develop programs using 1-Dimensional and 2-Dimensional arrays.								
CO3: Perform Call by value, Call by reference and Recursion through functions.								
CO4: Implement programs using pointers.								
CO5: Develop programs using structures and file concepts.								
<b>List of Experiments</b>								
1. Conditional Statements: Quadratic equations, usage of switch statement.								
2. Loop Statements : Adam Number, Cosine series								
3. Arrays: Max Min problem, standard deviation and variance.								
4. Character Arrays: Palindrome, implementation of string handling functions.								
5. Functions and Recursion : Matrix operations, Towers of Hanoi, GCD								
6. Pointers: Interchanging problem, implementation of dynamic memory allocation.								
7. Structures: Usage of structures in various applications.								
8. Files: Reading contents from files and writing contents to files.								
<b>Reference Books :</b>								
1. Yashavanth P.Kanetkar , Let US C , BPB Publications, 7 <sup>th</sup> Edition,2007.								
2. B.W. Kernignan and Dennis M.Ritchie, The C Programming Language , (PHI), 2 <sup>nd</sup> Edition 2003.								

## ENGINEERING MATHEMATICS – II (EM2)

II Semester : Common for CSE, CST, CE & ME					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS104	BSC	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>TOTAL</b>
		2	1	-	3	40	60	100
<b>Sessional Exam Duration : 1 ½ Hrs</b>					<b>End Exam Duration: 3 Hrs</b>			

<b>Course Outcomes :</b> At the end of the course the student will be able to
<b>CO1:</b> Utilize Numerical Methods and principles of least square methods in engineering problems.
<b>CO2:</b> Determine the Fourier series of a function and its expansion.
<b>CO3:</b> Understand the Fourier and Z-transforms.
<b>CO4:</b> Use Partial differential equations and method of separation of variables in solving the one dimensional wave and Heat equations.
<b>CO5:</b> Understand vector differentiation & integration and its applications.
<b>UNIT – I</b>
<b>Numerical Methods</b> Solution of Algebraic and Transcendental Equations – Method of False Position, Iteration method, Newton Raphson method. Solution of Simultaneous Equations – Gauss Seidel iteration method. Curve Fitting – Least squares method. Fitting a straight line $y = a + bx$ and parabola $y = a + bx + cx^2$ .
<b>UNIT - II</b>
<b>Fourier Series</b> Determination of Fourier coefficients, Dirichlet's conditions. Fourier series of Even and Odd functions. Functions having points of discontinuity. Change of interval. Half-Range Fourier Sine and Cosine series.
<b>UNIT – III</b>
<b>Fourier Transforms</b> Infinite Fourier Transforms, Fourier Sine and Cosine transforms. Finite Fourier Sine and Cosine Transforms, Inverse Fourier Transforms. <b>Z-Transforms</b> Z-Transforms, Inverse Z-Transformation, Properties, Damping rule, Shifting rule. Application of Z-Transforms to Difference equations.
<b>UNIT - IV</b>
<b>Partial Differential Equations</b> Formation of Partial differential equations by elimination of arbitrary constants and arbitrary functions. Linear equations of first order – Lagrange's Linear equation. Applications - Method of separation of variables. One dimensional Wave equation, One dimensional Heat equation.
<b>UNIT - V</b>
<b>Vector Calculus</b> Scalar and Vector point functions. Divergence, curl, gradient, solenoidal and irrotational vectors. Repeated operations by del. Green's theorem, Stoke's theorem and Gauss - Divergence theorem (Statement only). Applications to theorems.

<b>Text Books</b>
1. B.S. Grewal- Higher Engineering Mathematics. Khanna Publishers, 42 <sup>nd</sup> Edition, 2012.
2. T.K.V. Iyengar and others - A Text Book of Engineering Mathematics, Vol. I & II - S.Chand & Company, 13 <sup>th</sup> Edition 2014.
<b>Reference Books</b>
1. B.V. Ramana -Higher Engineering Mathematics, TMH Publishers, 2 <sup>nd</sup> Edition, 2006.

2. N.P. Bali and others - A Text Book of Engineering Mathematics, Lakshmi publishers, 7<sup>th</sup> Edition, 2009.

3. Erwyn Kreyszig - Advanced Engineering Mathematics, John wiley, 8<sup>th</sup> Edition 2006.

**Question Paper Pattern:**

**Sessional Exam :**

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions ( EITHER/ OR Type ) in each section. The student shall answer one question from each section.

**End Examination:**

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

## APPLIED PHYSICS (AP)

I /II Semester : <b>Common for</b> CSE,CST,ECE / CE,ME,EEE					Scheme : <b>2020</b>			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS110	BSC	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>TOTAL</b>
		3	-	-	3	40	60	100
Sessional Exam Duration : 1 ½ Hrs.					End Exam Duration: 3 Hrs.			
Course Outcomes : At the end of the course students will be able to								
<b>CO1:</b> Understand the origin of magnetism, hysteresis, soft and hard magnetic materials; Dielectrics and their characteristics; superconductivity, types, characteristics, Meissner, Josephson effects.								
<b>CO2:</b> Understand the phenomenon of interference, diffraction of light and their applications.								
<b>CO3:</b> Understand the Production, detection, properties and applications of ultrasonic waves, determination of velocity of ultrasonic waves in liquids. Principles of quantum mechanics, Schrodinger's equation and its applications.								
<b>CO4:</b> Understand the theory and different production methods of lasers and their applications, different types of optical fibers, losses in fibers and applications of optical fibers.								
<b>CO5:</b> Understand the Properties, synthesis, applications of Nanomaterials and Carbon Nanotubes.								
<b>UNIT – I</b>								
<b>Magnetic Materials:</b> Introduction – Basic definitions in Magnetism, their relations – Origin of permanent magnetic moment, Bohr magneton – Classification and properties of magnetic materials (Dia, Para, Ferro, Antiferro and Ferri)– Hysteresis, Soft and Hard magnetic materials, Applications								
<b>Dielectrics:</b> Introduction - Dielectric polarization, Dielectric Polarizability, Susceptibility and Dielectric constant – Types of Polarizations: Electronic, Ionic, Orientation polarizations – Derivation of Expression for Electronic polarizability – Dielectric Loss – Applications of dielectrics.								
<b>Superconductivity:</b> Introduction – Critical Temperature, Critical magnetic field, Critical Current , Meissner effect, Flux quantization – Type – I & Type – II Superconductors, Josephson's effect – Applications of Superconductors – SQUID.								
<b>UNIT – II</b>								
<b>Interference:</b> Introduction - Conditions for interference - Interference due to thin uniform film (Reflected light), wedge shaped film, Newton's rings. Applications of interference: Testing of flatness, determination of wavelength, radius of curvature, refractive index of liquid - Non-reflective coatings.								
<b>Diffraction:</b> Introduction - Differences between Interference and Diffraction - Types of Diffraction - Fraunhofer diffraction due to single slit, double slit, circular aperture, N-Slits (grating) (qualitative analysis only) - Determination of wavelength using grating - Resolving power, Rayleigh's criterion for resolution, Resolving power of grating and telescope.								
<b>UNIT – III</b>								
<b>Ultrasonics:</b> Introduction - Properties of ultrasonics - Production of ultrasonics by Magnetostriction method, Piezoelectric method - Detection of ultrasonics - Determination velocity of ultrasonics in liquids. Applications: SONAR, NDT, general applications.								
<b>Quantum Mechanics:</b> Wave – Particle duality; de Broglie Concept of Matter Waves – Properties of Matter Waves – Heisenberg's Uncertainty Principle. Schrödinger's Time Independent and Time Dependent Wave equation, Significance of Wave Function - Application of Schrodinger's equation for : particle in a box (one dimensional								

problem)

## UNIT – IV

### Lasers:

Spontaneous and Stimulated emission of radiation – Einstein coefficients and their relation - Characteristics of Lasers – Pumping mechanisms – Components of Laser – Ruby, He-Ne and Semiconductor lasers - Applications of Lasers.

### Fibre Optics:

Principle and propagation of light in Optical fibers – Structure of optical fibres – Acceptance angle – Numerical aperture – Classification of optical fibres – Applications of Optical fibres: Fibre optic communication system, Fibre optic sensors(Temperature, Pressure, Displacement and Water level indicator)– Losses in optical fibres.

## UNIT – V

### Nanomaterials:

Introduction - Significance and Properties of Nano particles - Synthesis Methods: Ball Milling method, Sol-Gel method, CVD method, its applications - PVD method, its applications - Pulsed Laser Deposition method - Wire explosion method - Applications of Nano materials.

### Carbon Nano tubes:

Properties of Graphene - Classification of CNTs – properties - Synthesis methods: Ball Milling method, CVD method, Arc method, Sputtering - Applications of carbon Nano tubes - Effect of nanotechnology on Environment.

### Text Books :

1. M.N.Avadhanulu and P.G.Kshirsagar, A text Book of Engineering Physics, S. Chand & Company
2. V.Rajendran, Engineering Physics, McGraw Hill Education (India) Pvt. Limited.
3. Dr. K.Vijaya Kumar, Engineering Physics, S. Chand & Company
4. S.L.Gupta & S.G.Gupta, Unified Physics (vol. 3) – Electricity, Magnetism and Electronics. Jai Prakash nath Publications, Meerut.

### Reference Books :

1. Hitendra K. Malik & A.K. Singh, Engineering Physics, Tata McGraw Hill Education Pvt. Ltd.
2. P.K Palaniswamy, Engineering Physics, SCITECH Publications (India) Pvt. Ltd.
3. R. Murugashan and Er.K.Siva Prasanth, Modern Physics, S. Chand & Company

### Question Paper Pattern:

#### Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions ( EITHER/ OR Type ) in each section. The student shall answer one question from each section.

#### End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

## ELEMENTS OF ELECTRICAL ENGINEERING (EEE)

I/II Semester : Common for ECE, CSE, CST / ME					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
EE101	ESC	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>TOTAL</b>
		2	1	-	3	40	60	100
<b>Sessional Exam Duration : 1 ½ Hrs</b>					<b>End Exam Duration: 3 Hrs</b>			
<b>Course Outcomes :</b> At the end of the course students will be able to								
<b>CO1:</b> Understand the basic essentials of DC circuits.								
<b>CO2:</b> Understand the basic essentials of AC circuits.								
<b>CO3:</b> Understand the construction and working of DC machines.								
<b>CO4:</b> Understand the construction and working of transformers, induction motors and AC generators.								
<b>CO5:</b> Understand the basics of illumination and earthing.								
<b>UNIT – I</b>								
<i><b>DC Circuits:</b></i> Definition of current, potential, resistance, power and energy, symbol and units, Ohm’s law, Kirchhoff’s laws, solution of series, parallel and series parallel circuits, analysis of circuits using loop current method and node voltage method, source transformation. (Elementary treatment only) (Simple problems only).								
<b>UNIT – II</b>								
<i><b>AC Circuits:</b></i> Instantaneous, average, r.m.s and maximum values of sinusoidal wave, concept of phase and phase difference, Phasor representation of sinusoidal wave, A.C through pure resistance, pure inductance and pure capacitance, Series R-L-C Circuits (Simple Problems), power factor, concept of 3- $\Phi$ system - voltage and current relations in star and delta connections (No derivation -Problems with R load only - Elementary treatment only)								
<b>UNIT – III</b>								
<i><b>DC Machines:</b></i> Electromagnetic Induction, Faraday’s law, Lenz’s law and Flemings rules, Construction and working principle of a DC machine, emf equation of a D.C Generator, DC motor principle, voltage equation of generator and motor (Elementary treatment only-Simple Problems).								
<b>UNIT – IV</b>								
<i><b>Transformers:</b></i> Working principle and construction of 1- $\Phi$ Transformer, transformer ratio, emf equation (Elementary treatment only) (Simple problems). <i><b>Induction Motors:</b></i> Construction and principle of operation of induction motor, slip (Elementary treatment only) (Theoretical aspects only). <i><b>AC Generators</b></i> Construction, EMF equation (Elementary treatment only) (Theoretical aspects only).								
<b>UNIT – V</b>								
<i><b>Illumination:</b></i> Units and laws of Illumination, Types of lamps, Incandescent lamps, Fluorescent lamps and Sodium-vapour lamps. (elementary treatment only). <i><b>Earthing:</b></i> Difference between neutral wire and earth wire, Concept of earthing, applications of fuse and MCB’s, electrical shock, precautions against shock, treatment of electrical shock. (elementary treatment only).								
<b>Text Books :</b>								
1. V.K.Mehta and Rohith Mehta, “Basic electrical engineering”, S.Chand publishers, 14th edition.								
2. M.S. Naidu and S. Kamakshaiah, “Introduction to Electrical Engineering”, Tata McGraw Hill Publishers, 1st edition, 2004.								
3. B.L. Thereja, “Electrical technology-Vol-I & II”, S. Chand Publishers, 23rd edition, 2004.								
4. Dr.S.L.Uppal, “Electrical Wiring, Estimating and Costing”, Khanna publishers, 1st edition, 2008.								

**Reference Books :**

1. H. Cotton, "Electrical Technology", CBS Publishers, 7th edition, 2005.
2. Joseph Edminister, "Electric Circuits" Tata McGraw Hill Publishers, 5th edition, 2010.
3. K.B.Raina and S.K.Battacharya, "Electrical Design Estimating and Costing" New age publishers, 1st edition, 1991.
4. V.N.Mittle, "Basic electrical engineering", Tata McGraw Hill Publishers, 2nd edition, 2005.

**Web References:**

1. <http://nptel.ac.in/downloads/108105053/>
2. <https://www.electrical4u.com/>
3. <http://www.smps.us/references.html>

**Question Paper Pattern:****Sessional Exam :**

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions ( EITHER/ OR Type ) in each section. The student shall answer one question from each section.

**End Examination:**

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

**ENGINEERING MECHANICS (EGM)**

<b>II Semester : Common to CE &amp; ME</b>						<b>Scheme : 2020</b>		
<b>Course Code</b>	<b>Category</b>	<b>Hours/Week</b>			<b>Credits</b>	<b>Maximum Marks</b>		
<b>CE102</b>	ESC	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>TOTAL</b>
		<b>2</b>	<b>1</b>	<b>-</b>	<b>3</b>	<b>40</b>	<b>60</b>	<b>100</b>
<b>Sessional Exam Duration : 1 ½ Hrs</b>					<b>End Exam Duration: 3 Hrs</b>			
<b>Course Outcomes :</b> At the end of the course students will be able to								
<b>CO1 :</b> Calculate the resultant of different force systems								
<b>CO2 :</b> Determine the unknown forces in determinate structures using equilibrium conditions								
<b>CO3 :</b> Determine the axial forces in the members of determinate trusses								
<b>CO4 :</b> Understand the concept of friction								
<b>CO5 :</b> Determine the centroid and moment of inertia of areas								
<b>CO6 :</b> Compute the stresses and strains of axially loaded members, elastic constants of different materials								
<b>UNIT - I</b>								
<b>Forces and Force Systems</b> Types of force systems – Resultant of coplanar, concurrent and non concurrent force systems – Concept of moment – Varignon’s theorem.								
<b>Equilibrium of Systems of Forces</b> Equilibrium concept in mechanics – Free body diagram - Equilibrium of coplanar force systems								
<b>UNIT - II</b>								
<b>Reactions in Beams</b> Types of loads, supports and beams – Support reactions for simply supported beams, cantilever and overhanging beams subjected to different types of loads.								
<b>Static Analysis of Simple Plane Trusses</b> Analysis of simple trusses by method of joints and method of sections.								
<b>UNIT - III</b>								
<b>Friction</b> Introduction to Friction, Impending Motion, Ladder Friction, Friction in square threaded screws - simple screw jack. Belt Friction, friction in flat & V-belt, Ratio of tensions, Power transmission by belts.								
<b>UNIT - IV</b>								
<b>Central Points</b> Concept of first moment – Definition of centroid and centre of gravity – Centroid of composite areas.								
<b>Area Moment of Inertia</b> Moment of inertia for areas – Parallel and perpendicular axis theorems – Moment of inertia of compound sections – Radius of gyration.								
<b>UNIT - V</b>								
<b>Mechanics of Deformable Solids</b> Mechanical properties of materials – Simple stresses and strains – Types of stresses – Hooke’s law – Stress–strain curve for ductile material – Factor of safety and working stress.								
<b>Relation Between Elastic Constants</b> State of simple shear – Complimentary shear stress – Relation between Young’s modulus, Rigidity modulus, Bulk modulus and Poisson’s ratio								

**Text Books :**

1. R.K. Bansal, “A text book of Engineering Mechanics”, Laxmi Publications
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, “Mechanics of materials”, Laxmi Publications.
3. Basudeb Bhattacharyya, “Engineering Mechanics”, Oxford University Press.

**Reference Books :**

1. Thimoshenko & Young, “Engineering Mechanics”, Tata McGraw–Hill Publications
2. Bhavikatti and Rajasekharappa, “Engineering Mechanics”, New Age Intl. Publications
3. A.K. Tayal, “Engineering Mechanics –Statics & Dynamics”, Umesh Publications
4. R.K.Rajput, “Applied Mechanics”, Laxmi Publications.

**Web References:**

1. [www.nptel.ac.in/courses](http://www.nptel.ac.in/courses)
2. <https://www.coursera.org>

**Question Paper Pattern:****Sessional Exam :**

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions ( EITHER/ OR Type ) in each section. The student shall answer one question from each section.

**End Examination:**

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

## DATA STRUCTURES THROUGH C (DSTC)

<b>II Semester : Common for CE and ME</b>					<b>Scheme : 2020</b>			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS105	ESC	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>TOTAL</b>
		2	-	2	3	40	60	100
<b>Sessional Exam Duration : 1 ½ Hrs</b>					<b>End Exam Duration: 3 Hrs</b>			
<b>Course Outcomes :</b> At the end of the course the student will be able to								
<b>CO1:</b> Understand the concepts of array data structure and its applications								
<b>CO2:</b> Understand the linked list data structure and its operations.								
<b>CO3:</b> Illustrate the operations on stack data structure.								
<b>CO4:</b> Illustrate the operations on queue data structure.								
<b>CO5:</b> Understand the concepts of trees and recursive traversals on binary trees.								
<b>UNIT – I</b>								
<b>Introduction to Data Structures</b> Definition, Classification of Data structures- Linear and Non Linear								
<b>Sequential Storage Representation</b> Arrays, Operations on Arrays- Insertion, Deletion, Traversing; Applications of arrays–Linear Search, Binary Search, Bubble Sort, Selection Sort.								
<b>UNIT – II</b>								
<b>Linked Storage Representation –Linked Lists</b> Introduction, Types of Linked Lists–Single linked list, Double linked list, Operations on linked lists- Traversing, Searching, Insertion and Deletion.								
<b>UNIT – III</b>								
<b>Linear Data Structures – Stacks</b> Representation of Stack using sequential storage and linked allocation methods, Operations on Stacks- Push, Pop, and Display.								
<b>UNIT – IV</b>								
<b>Linear Data Structures - Queues</b> Representation of Queue using sequential and linked allocation, Operations on Queues- Insertion, Deletion and Traversing.								
<b>UNIT – V</b>								
<b>Non Linear Data Structures-Trees</b> Basic terminology, Binary trees, Representation of Binary tree in memory using arrays and linked lists, Binary Search Trees, Recursive Traversals- Preorder, Inorder and Postorder.								
<b>Text Books :</b>								
1. Jean Paul Tremblay and Paul G.Sorenson[2007], An Introduction to DataStructures With Applications, TMH.								
2. Debasis Samantha, Classic Data Structures Second Edition (2009), PHI.								
<b>Reference Books :</b>								
1. Pradip Dey, Manas Ghosh and Reema Tereja, Computer Programming and DataStructures, Oxford University Press.								
2. S.K.Srivatsava and Deepali Srivatsava, Data Structures through ‘C’ in depth, BPB Publications.								
<b>Web References :</b>								
1. <a href="https://www.tutorialspoint.com/data_structures_algorithms">https://www.tutorialspoint.com/data_structures_algorithms</a>								
2. <a href="http://www.geeksforgeeks.org/data-structures">http://www.geeksforgeeks.org/data-structures</a>								

**Question Paper Pattern:****Sessional Exam :**

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions ( EITHER/ OR Type ) in each section. The student shall answer one question from each section.

**End Examination:**

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

**DATA STRUCTURES LAB****II Semester : Common for CE & ME****Scheme : 2020*****List of Experiments***

1. Array Data Structures:
  - a) Array Operations
  - b) Merging of two sorted arrays.
2. Applications of Array Data Structures:
  - a) Linear Search
  - b) Binary Search
3. Applications of Array Data structures:
  - a) Bubble Sort
  - b) Selection Sort
4. Implementation of single linked list and its operations
5. Implementation of double linked list and its operations
6. Implementation of stack operations using static allocation
7. Implementation of stack operations using dynamic allocation
8. Implementation of queue operations using static allocation
9. Implementation of queue operations using dynamic allocation

**Reference Books :**

1. Yashavanth P.Kanetkar , Let US C , BPB Publications, 7<sup>th</sup> Edition,2007.
2. B.W. Kernignan and Dennis M.Ritchie, The C Programming Language , (PHI), 2<sup>nd</sup> Edition 2003.

## ENVIRONMENTAL STUDIES (ES)

II Semester: ECE,CSE,CST,CE,EEE & ME					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
<b>MC101</b>	<b>MC</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>Total</b>
		2	-	-	-	100	-	100
<b>Course Outcomes :</b> At the end of the course students will be able to								
<b>CO1:</b> Apply the knowledge of environmental issues in his area of work. Understands the need for the conservation of Natural resources for sustainable development.								
<b>CO2:</b> Understands the importance of Ecosystem and conservation of biodiversity								
<b>CO3:</b> Understands the problems due to environmental pollution with remedial measures and issues related to environment.								
<b>CO4:</b> Understands the disaster management in prevention of loss of life and property								
<b>CO5:</b> Understands the use of IT & related technology to conserve environment & human health.								
<b>UNIT – I</b>								
<b>Introduction to Environmental studies and Natural resources</b>								
Definition, scope, importance and multidisciplinary nature of Environmental studies. Need for public awareness. Energy resources-Growing energy needs, nonrenewable and renewable energy resources: Hydroelectric, solar, wind and nuclear energy resources. Water resources- Use and over exploitation of surface and ground water. Dams and its effects on forest and tribal people. Forest resources- uses of forest, deforestation causes and its effects. Food resources- changes caused by agriculture and over grazing. Modern agriculture and its effects.								
<b>UNIT – II</b>								
<b>Concepts of ecosystem</b>								
Structure and function of an ecosystem. Energy flow in an ecosystem (single channel energy flow model). Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristics and functions of grasslands, desert, pond and ocean ecosystems.								
<b>UNIT – III</b>								
<b>Biodiversity and its conservation</b>								
Definition and levels of biodiversity. Values of biodiversity- consumptive, productive, social, ethical, aesthetic and ecological services. Hot spots of biodiversity. Bio geographical classification of India. Endangered and endemic species of India. Threats to biodiversity-Habitat loss, poaching of wild life and man-wild life conflict. Conservation strategies- In situ and ex situ conservation.								
<b>UNIT – IV</b>								
<b>Environmental pollution</b>								
Air Pollution - sources, types, causes and Effects of air pollutants on humans, plants and animals. Global effects-global warming, acid rains and ozone layer depletion. Air Pollution control measures for suspended particulate matter (SPM) and gaseous pollutants. Water Pollution – sources, causes and effects of water pollution. sewage water treatment. Disaster management- Floods, Earth quake and cyclone. Municipal solid waste management. Role of an individual in prevention of pollution.								
<b>UNIT – V</b>								
<b>Social issues and the environment</b>								
From unsustainable development to sustainable development. Consumerism and waste products. Salient features of Air Act, water Act and Forest conservation Act. Process involved in the enforcement of environmental legislation. Role of Information Technology in environment and human health.								
<b>Text books</b>								
1. C.P.Kaushik and Anubha Kaushik, — Environmental Studies    New Age International (p) Ltd., New Delhi								
2. R. Rajagopalan — Environmental Studies, Oxford University press, Chennai								
3. Y. Anjaneyulu — Introduction to Environmental sciences, BS Publications, Hyderabad								
<b>Reference books</b>								
1. Benny Joseph — Environmental Studies, Tata McGraw Hill, New Delhi.								
2. Barucha Erach — Environmental studies, Universities press.								

## APPLIED PHYSICS LAB [AP(P)]

I/II Semester :Common for ECE,CSE, CST/ ME, CE,EEE					Scheme : 2020			
Course Code	Category	Hours / Week			Credits	Maximum Marks		
<b>BS114</b>	<b>BSL</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>Total</b>
		-	-	<b>3</b>	<b>1.5</b>	<b>40</b>	<b>60</b>	<b>100</b>
<b>End Exam Duration: 2 Hrs</b>								
<b>Course Outcomes:</b> At the end of the course students will be able to								
<b>CO1:</b> Apply the knowledge of physics laboratory in measuring the standard values.								
<b>CO2:</b> Apply theoretical knowledge to experimental values.								
<b>List of Experiments</b>								
<i>Note : At least 12 of the following experiments shall be conducted</i>								
1. Determination of size of small particles using a laser.								
2. B-H curve to study the magnetic behavior of ferromagnetic materials.								
3. Determination of Numerical Aperture of an Optical Fiber.								
4. Verification of Faraday's Laws.								
5. Determination of wavelength using a single slit.								
6. Study of magnetic field along the axis of a circular coil (Steward Gees Apparatus).								
7. LCR Series and Parallel Resonance.								
8. Determination of wavelengths using a grating.								
9. Hall Effect-determination of Hall coefficient and charge density.								
10. Determination of radius of curvature of a plano-convex lens using Newton's rings.								
11. Double refraction - determination of refractive indices of e-ray and o-ray.								
12. Determination of small thickness by forming parallel fringes.								
13. Determination of rigidity modulus by using torsion pendulum.								
14. Determination of energy gap of a semiconductor by four probe method.								

## ELEMENTS OF ELECTRICAL ENGINEERING LAB (EEE(P))

I/II-Semester: ECE/ ME					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
EE104	ESL	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>Total</b>
		-	-	3	1.5	40	60	100
<b>End Exam Duration:</b> 3 Hrs								
<b>Course Outcomes :</b> At the end of the course students will be able to								
<b>CO1:</b> Verify basic laws and measure the electrical parameters.								
<b>CO2:</b> Obtain the various performance characteristics of DC machines.								
<b>CO3:</b> Obtain the various performance characteristics of AC machines.								
<b>LIST OF EXPERIMENTS</b>								
NOTE: A minimum of <b>Eight</b> experiments should be conducted.								
1. Verification of KVL and KCL.								
2. Determination of equivalent resistance								
3. Verification of Mesh and Nodal analysis for a given network.								
4. Determination of Self & Mutual Inductance								
5. Swinburne's Test on DC Shunt Machine.								
6. Brake test on DC Shunt Motor.								
7. Open circuit characteristics of DC shunt generator.								
8. Brake test on three phase Squirrel Cage Induction Motor.								
9. Open Circuit test on single phase Transformer.								
10. Short Circuit test on single phase Transformer.								
11. Load test on single phase Transformer.								
12. Load test on single phase squirrel cage induction motor.								
13. Measurement of Earth resistance.								
14. Speed control methods of DC machine.								
15. Study of wiring of power distribution arrangement using single phase MCB distribution board with ELCB, Main switch and Energy meter.								

## ENGINEERING WORKSHOP (EWP)

II Semester : Common to CE & ME						Scheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
ME102	ESL	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Continuous Internal Assessment</b>	<b>End Exam</b>	<b>TOTAL</b>
		-	-	3	1.5	40	60	100
<b>End Exam Duration: 3 Hrs</b>								
<b>Course Outcomes :</b> At the end of the course students will be able to								
<b>CO1:</b> To understand the usage of tools and equipments in fitting, carpentry, house wiring, soldering, Foundry and smithy.								
<b>CO2:</b> To prepare of simple models in carpentry, fitting and smithy								
<b>CO3:</b> To prepare sand mould using foundry tools								
<b>CO4:</b> To do soldering of circuit boards and								
<b>CO5:</b> To give electrical connections in house wiring.								
<b>LIST OF EXPERIMENTS</b>								
Introduction to tools and equipment used in each trade								
<b>Cycle – I (Carpentry)</b>								
<ol style="list-style-type: none"> <li>1. Dovetail joint</li> <li>2. Mitre-faced Bridle joints</li> <li>3. Mortise and Tenon joint</li> </ol>								
<b>Cycle – II (Fitting)</b>								
<ol style="list-style-type: none"> <li>1. V – fitting</li> <li>2. Stepped fitting</li> <li>3. Half round fitting</li> </ol>								
<b>Cycle – III (Black smithy and Foundry)</b>								
<ol style="list-style-type: none"> <li>1. Making Round to square cross section</li> <li>2. Making eye bolt</li> <li>3. Preparation of mould with split piece pattern.</li> </ol>								
<b>Cycle – IV (House wiring)</b>								
<ol style="list-style-type: none"> <li>1. One bulb controlled by one-way switch and two-way switches.</li> <li>2. Two bulbs in series and parallel</li> </ol>								
<b>Cycle – IV (Soldering)</b>								
<ol style="list-style-type: none"> <li>1. Soldering Practice</li> <li>2. Soldering Resistances in Series</li> <li>3. Soldering Resistances in parallel</li> </ol>								
<b>Student has to perform at least two jobs from each trade.</b>								
<b>Reference Books :</b>								
1. P. Kannaiah and K.L. Narayana [2010], “ Workshop Manual “, Second Edition, Scitech Publication , Chennai								
2. K.Venkata Reddy [2003],”First year Workshop manual”, Bhagyasri Publishers, Tirupathi								
3. Hazrachowdhury and S.K. Bose [2003], “Workshop Technology Vol.I”, Media Promoters and Publication, New Delhi.								