



Year: First Year  
Course French (HSS)

Semester: III  
Course Code: 17YHS311

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Orals	Lab	
2	-	2	3	10	20	10	10	-	50	-	100
Max. Time, End Semester Exam									End Semester Orals –1 Hr.		

<b>Prerequisite</b>	1. Functional grammar-Parts of speech, Tenses, Sentence pattern
	2. Formal letter
	3. Fluency in reading and speaking

### Course Objectives

- 1 To enable the students to describe themselves (formally and informally)
- 2 To enable the students to say their mobile number, birthdate.
- 3 To enable the students to ask questions and identify the interrogative questions.
- 4 To enable the students to talk about their daily routine.
- 5 To enable the students to talk/write about their family and friends.

### Course Content

Unit No.	Module No.	Content	Hours
1	I	<b>Alphabets, Numbers 1-100, Salutations</b> Learn to pronounce the alphabets in French	1
	II	<b>Se présenter</b> To introduce once self in French. Months of the year & Days of the week	2
	III	Conjugation of “ER” ending verbs Regular and irregular Sentence formation using the verbs	2
	IV	W questions: What, How, Which, Where, Why, When, Who? Dailouge using the salutations and W questions.	2
2	I	<b>Les Accents ( Accents ):</b> Importance of the accents in French language. Basic info on France	1
	II	Negation: Affirmative sentence into negative sentence. Comprehension passage	2
	III	Labeling the objects in the classroom. Countries and their nationalities	2
	IV	Plural: changing the sentence from singular to plural Qualificative adjectives.(Masculine, Feminine and plural form)	2
	V	<b>Conjugation of the second group of verb:</b> verbs ending in “Re”.	1



3	I	<b>Interrogation Questions.</b> To be able to ask questions and to answer them. Likes and dislikes	2
	II	<b>Countries and Nationalities</b> Gender of the Nouns Singular and plural nouns	2
	III	<b>Definite articles</b> (Le, La, Les, L') <b>Indefinite articles</b> (un, une, des) Distinguish between definite and indefinite articles. Gender of the nouns	2
	IV	<b>Contracted articles</b> (au, à la) Preposition of places Describe a city ( using prepositions of places)	2
	V	Partitifs articles Food and drinks Eating habits	2
4	I	<b>Describe one's family</b> Vocabulary Mother, Father, Brother, Sister, Cousins, Uncle, Aunt, Grand father, Grand Father.	2
	II	<b>Describe one's friend.</b> Likes and dislike of a friend. Should be able to speak about the friend.	2
	III	Listening comprehension	1
<b>Total No. of Hrs</b>			30

Beyond the Syllabus

Self Introduction, SWOT/SWOC, Group Discussion



Course Outcome	
<b>Students should able to</b>	
<b>CO1</b>	Students will be able to greet others, say good bye and also frame and answer W-questions about themselves and ask these questions to others
<b>CO2</b>	Students can talk/write about their friends and hobbies.
<b>CO3</b>	Students can talk/write about the city they live in, the important buidings.
<b>CO4</b>	Students can/talk write about the food habits and know the accusative case..
<b>CO5</b>	Students can talk/write about their family.

List of Experiments	
Sr. No.	Description
1	Learning through Videos
2	Learning through activities in the class like : Role play, Games etc

RecommendedResources	
<b>Text Books</b>	<ol style="list-style-type: none"><li>1. Alter Ego A1 +</li><li>2. En Échange</li><li>3. Saisons A1</li><li>4. Méthode de français (level : 0,1,2 &amp;3)</li></ol>
<b>E-Resources</b>	<p><a href="https://www.youtube.com/watch?v=eq--V9P4rmM&amp;t=173s">https://www.youtube.com/watch?v=eq--V9P4rmM&amp;t=173s</a> <a href="https://www.youtube.com/watch?v=ISwRKftCH0s&amp;t=105s">https://www.youtube.com/watch?v=ISwRKftCH0s&amp;t=105s</a> <a href="https://www.youtube.com/watch?v=AdfwQXJ0ZVM">https://www.youtube.com/watch?v=AdfwQXJ0ZVM</a></p>



Year: Second Year  
Course German (HSS)

Semester: III  
Course Code: 17YHS312

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Orals	Lab	
2	-		1	10	20	10	10	-	50	-	100
Written Practical Exam									End Semester Orals – 15 Mins in groups		

### Course Objectives

- To be able to greet others, say good bye and also frame and answer W-questions about themselves and ask these questions to others
- To be able to talk/write about their friends and their hobbies
- To be able to talk/write about the city they live in, the important buildings there and the means of transport
- To be able to talk/write about food habits and learn the accusative case in German
- To be able to talk/write about one's family

### Course Content

Unit No.	Module No.	Content	Hours
1	1	Self-introduction, Numbers 1-100, Alphabet, <b>5 W-Questions and their answers</b>	2
	2	Verb conjugation in all the first, second and third person Add one more Q-Question Interview 5 classmates, note down the info GD Write paragraphs using the infor	2
	3	Articles Objects in the classroom Audio practice of listening to numbers and noting them Who? What?	2
2	1	Days of the week Asking how the person is and answering Months of the year; Names of countries, people,	2
	2	Hobbys	2

		Talk about your hobby	
3	1	Infrastructure in the city Reading comprehension Plurals	3
	2	Revision of what has been learnt Worksheet	3
	3	Professions Reading comprehension	2
4	1	Food and Drink; Vocabulary about fruits, vegetables, provisions Reading comprehension; Introduction to the nominative and accusative case Items needed for typical Indian dishes	2
	2	Essay writing; how to go about it Write about your city in groups Write about your eating habits	2
	3	Listening comprehension	2
5		Vocabulary about family Write an essay about your family	6

### Beyond the Syllabus

Learning through videos, podcasts and learning softwares

### Course Outcome

#### Students should able to

<b>CO1</b>	Students will be able to greet others, say good bye and also frame and answer W-questions about themselves and ask these questions to others
<b>CO2</b>	Students can talk/write about their friends and hobbies.
<b>CO3</b>	Students can talk/write about the city they live in, the important buildings.
<b>CO4</b>	Students can talk write about the food habits and know the accusative case..
<b>CO5</b>	Students can talk/write about their family.

Recommended Resources

**Text Books**

5. Netzwerk A1
6. Studio-D A1
7. Moment Mal A1

**E-Resources** “Learn German” series on YouTube

Essay writing; how to go about it

Write about your city in groups

Write about your eating habits



Year: Second Year  
Course: Transforms, Vector Calculus and Complex Variables

Semester: III  
Course Code: 17YBS302

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	1	0	4	10	20	10	10	-	50	-	100
Max. Time, End Semester Exam (Theory) -3Hrs.									End Semester Exam (Lab) - NA		

Objectives	
1	To become familiar with linear differential equations of higher order applicable to Control systems.
2	To study Complex functions, conformal mappings, contour integration applicable to Electrostatics, Digital filters, Signal and Image processing.
3	To study differentiation and integration vectors.
4	To familiarize with Z-transform and their
5	To be through with applications to control systems and signal processing.

Unit Number	Details	Hours
1	<b>Linear Differential Equations and applications:</b> Solution of linear differential equations of first order, solution of nth order linear differential equations with constant coefficients, method of variation of parameters, applications in simple electrical circuit.	8
2	<b>Laplace Transform:</b> Laplace transforms, Inverse Laplace transform, properties and Theorems on them, Laplace transform of standard functions, Laplace transform of some special functions like - periodic, unit step, unit impulse; applications of Laplace transform for solving differential equations.	10
3	<b>Z - Transform:</b> Introduction and definition of Z - Transform, standard properties Z - Transform, Z - Transform of standard sequences and their region of convergence, Inverse Z-transform, solution of difference equations by using Z-Transform.	7
4	<b>Vector Differentiation and Integration:</b> Basics of vector differentiation, vector differential operator, gradient, divergence and curl, directional derivative, solenoidal, irrotational fields, scalar potential, standard vector identities, line integral, Green's Lemma and its applications.	8
5	<b>Complex Variables:</b> Functions of complex variables, analytic functions, Cauchy-Riemann equations, Cauchy's integral Theorem, Cauchy's integral formula, residue Theorem, bilinear transformation.	7
Total (Hrs)		40

Course Outcome	
Students should be able to	
CO1	Student will be able to solve linear differential equations and apply them on simple electric circuit.
CO2	Student will gain the basic knowledge of Laplace transform and their applicability in solving initial value problems.
CO3	Student understands the new notion of Z- transform and their usability in solving difference equations.
CO4	Student will be able to solve the problems on vector derivatives and integrations.
CO5	Student will be able to gain the knowledge of complex analysis and its application electrical engineering problem.

Resources	
<b>Recommended Books</b>	1. Erwin Kreyszig, "Advanced Engineering Mathematics", 9e, (Wiley India).
<b>Reference Books</b>	1. M. D. Greenberg, "Advanced Engineering Mathematics", 2e, Pearson Education. 2. Higher Engineering Mathematics By. Dr. B. S. Grewal 3. Higher Engineering Mathematics By. B.V. Ramana. 4. Advanced Engineering Mathematics By-H. K. Das.
<b>E-Resources</b>	<a href="http://nptel.ac.in/">http://nptel.ac.in/</a>

Tutorial:
Tutorial assessment shall be conducted for the Project, Tutorials, Industrial Visit report and Seminar. Tutorial is continuous assessment based on work done, submission of work in the form of report/journal, timely completion, attendance, and understanding. It should be assessed by subject teacher of the institute. At the end of the semester, the final grade for a Tutorial shall be assigned based on the performance of the student and is to be submitted to the University.





Year: Second Year  
Course: Materials Science

Semester: III  
Course Code: 17YEE301

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	0	2	4	10	20	10	10	25	50	25	150
Max. Time, End Semester Exam (Theory) -3Hrs.									End Semester Exam (Lab) – 2Hrs.		

Objectives	
1	To introduce the concepts, atomic structure, electrical properties and applications of conducting, superconducting, insulating, dielectric and magnetic materials.
2	To get familiar with IS Standard
3	To learn Testing of Materials as per IS Standard
4	To understand concept and properties of conducting material
5	To understand properties and application of insulating gases.

Unit Number	Details	Hours
I	<b>Dielectric Properties of insulating Materials:</b> Static Field, Parameters of Dielectric material, Introduction to Polar and Non-Polar dielectric materials. Mechanisms of Polarizations, Piezo-Electric & Ferro-Electric Materials, Dielectric loss and loss tangent. Dielectric strength, factors, dielectric loss, dissipation factor. <b>Dielectric Breakdown:</b> Introduction, Concept of Primary and Secondary Ionization of Gases, Breakdown Voltage, Breakdown Strength, Factors affecting BD Strengths of Solid, Liquid and Gaseous dielectric materials.	10
II	<b>Insulating Materials:</b> Properties- thermal, chemical, mechanical & electrical. Classification. <b>Properties of Solid Insulating Materials:</b> Paper, Press Board, Fibrous Materials, Ceramics, Mica, Asbestos, Resins, Ceramics. <b>Properties of Liquid Insulating Materials:</b> Transformer Oil, Mineral Insulating Oil, Synthetic Insulating Oil, Varnish. <b>Properties of Insulating Gases:</b> Air, SF <sub>6</sub> , Nitrogen, Hydrogen. <b>Application of Insulating Materials:</b> Power & Distribution Transformers, Rotating Machines, Cables, and Line Insulators.	10
III	<b>Conducting Materials:</b> General, Classification of conducting materials, Low resistivity Materials - Copper, Aluminium, steel and its properties, Copper Alloy-brass and bronze, High resistivity materials, Tungsten Constantan, Carbon and nichrome, Superconductivity Materials and application. <b>Application of Conducting materials</b> For overhead lines, underground cables, electrical machines winding, resistor, bus bar. Thermal conductivity of matter, superconductivity. Materials of MHD generator, Fuel cells, Thermoelectric generators, Thermionic conductors.	8
IV	<b>Magnetic Materials:</b> Characteristics, Parameters of Magnetic material, B-H curve for different magnetic materials, Factors affecting permeability and hysteresis, Magnetic	10

	resonance, loss of magnetism, eddy current loss. <b>Classification of Magnetic Materials:</b> Magnetic circuit, Electromagnet, permanent magnet, Diamagnetism, Para-magnetism, Ferromagnetism, Ferri-magnetism, Curie-Weiss law, Ferrites , Ferro-magnetic Materials, Magnetic materials for Electric Devices such as Transformer Core, Core of Rotating Machines, Hard Magnetic Materials.	
V	<b>Testing of materials as per IS standard</b> <b>Testing of Materials:</b> Explanation of following with objectives, equipment required, circuit diagrams and observations to be taken. 1. Measurement of Dielectric Strength of Solid Insulating Material-IS 2584. 2. Measurement of Dielectric Strength of Liquid Insulating Material – IS 6798. Measurement of Dielectric Strength of Gaseous Insulating Material as per IS. <b>Material for special purposes:</b> thermocouples, bimetals and lead, fuse material, soft and hard solder, material used for contacts.	8
<b>Total</b>		<b>46</b>

Course Outcome	
Students should able to	
CO1	Understand dielectric breakdown and dielectric properties of insulating material
CO2	Apply insulating material in power and distribution transformer, rotating machines and cables in addition to line insulators by comprehensive understanding of insulating property
CO3	Understand utilization of conducting material and its application in electrical gadgets
CO4	Classify various magnetic material
CO5	Capable to apply various testing techniques by IS standards.

Practical Objective	
<b>1</b>	To study different types of materials & their properties
<b>2</b>	To study testing of materials as per IS standards

Sr. No.	Description
<b>1</b>	To measure dielectric strength of solid insulating materials.
<b>2</b>	To measure dielectric strength of liquid insulating materials.
<b>3</b>	To measure dielectric strength of gases insulating materials.
<b>4</b>	To measure dielectric strength of mixed insulating materials.
<b>5</b>	To understand the principle of thermocouple & to obtain characteristics of different Thermocouples.
<b>6</b>	To measure Insulation Resistance & kVA capacity of power capacitor
<b>7</b>	To measure Resistivity of High Resistive Alloys.
<b>8</b>	Testing of various insulating materials as per IS standards.

Notes	
1	Each student should perform at least 7 experiments from the list of experiments.
2	The experiments from the regular practical syllabus will be performed.
3	The regular attendance of students during the syllabus practical course will be monitored and marks will be given accordingly.
4	Good Laboratory Practices
5	Minimum one visit should be arranged to electrical insulators company or where electrical instruments manufactured, where insulators can be seen or observed.



**Practical/Oral/Presentation:**

Practical/Oral/Presentation shall be conducted and assessed jointly by internal and external examiners. The performance in the Practical/Oral/Presentation examination shall be assessed by at least a pair of examiners appointed as examiners by the University. The examiners will prepare the mark/grade sheet in the format as specified by the University.

**Resources**

<b>Recommended Books</b>	<ol style="list-style-type: none"><li>1. Gupta and Sharma, "Electrical Engineering Materials", Satya Prakashan</li><li>2. S. P. Seth, "A Course in Electrical Engineering Materials", Dhanpat Rai and Sons Publication.</li><li>3. P.K. Palanisamy, "Material Science for Electrical Engineering", SciTech Pub. (India)Pvt. Ltd., Chennai</li></ol>
<b>Reference Books</b>	<ol style="list-style-type: none"><li>1 K. B. Raina &amp; S. K. Bhattacharya, "Electrical Engineering Materials", S.K. Kataria&amp; Sons.</li><li>2 D. M. Tagare, "Electrical Power Capacitors-Design &amp; Manufacture", Tata McGrawHill Publication.</li><li>3 C. S. Indulkar&amp; S. Thiruvengadam, "Electrical Engineering Materials", S. Chand &amp;Com. Ltd</li></ol>
<b>E-Resources</b>	<a href="http://nptel.ac.in/">http://nptel.ac.in/</a>



Year: Second Year  
Course: Electrical Measurement & Instrumentation

Semester: III  
Course Code: 17YEE302

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	2	4	10	20	10	10	25	50	25	150
Max. Time, End Semester Exam (Theory) -3Hrs.									End Semester Exam (Lab) - 2Hrs.		

**Prerequisite**

1. Basic knowledge of fundamental physics.
2. Solution of simultaneous equation.

### Course Objectives

- 1 To provide the knowledge of system of units, classification and essentials of measuring instruments.
- 2 To get the knowledge about the range extension methods for DC & AC instruments.
- 3 To implement the measuring instruments in real life application.
- 4 To get the knowledge about various types of energy meter.
- 5 To get the knowledge about various types of transducers.

### Course Outcome

Students should be able to

- CO1 Understand various characteristics of electrical measuring instruments and their working.
- CO2 Understand the range extension methods for DC & AC instruments.
- CO3 Apply measurement techniques for measurement of resistance.
- CO4 Understand operating principle of energy meter.
- CO5 Apply operation of transducer in instrumentation.



Unit No.	Module No.	Content	Hours
1	I	<b>Introduction to Electrical Measuring Instruments</b> Standards and their classification, absolute and secondary instruments, types of secondary instruments, static and dynamic Characteristics of measuring instruments, Error & Error analysis	6
	II	<b>Analog Instrument</b> Definition of analog & digital instruments, Classification of analog instruments, their operating principle, Operating force, Types of supports, Damping, Controlling	3
2	I	<b>Different types of Ammeter &amp; Voltmeter</b> Construction, working principle, torque equation, advantages and disadvantages of Permanent Magnet Moving Coil (PMMC) and Moving Iron (MI) (attraction and repulsion).	4
	II	<b>Introduction to Range Extension:</b> PMMC ammeters and voltmeters using shunts, multipliers. Universal shunt, universal multiplier.	4
3	I	<b>Instrument Transformers:</b> Construction, connection of CT & PT in the circuit, advantages of CT / PT over shunt and multipliers, transformation ratio, turns ratio, nominal ratio, burden, ratio and phase angle error.(descriptive treatment only).	6
	II	<b>Measurement of Resistance:</b> Measurement of low, medium and high resistance. Wheatstone bridge, Kelvin's double bridge, ammeter-voltmeter method, Megger, loss of charge method.	4
4	I	<b>Measurement of Power:</b> Construction, working principle, torque equation, errors and their compensation, advantages and disadvantages of Electrodynamometer type wattmeter. Active & reactive power measurement in three phase system for balanced and unbalanced load using three wattmeter method, two wattmeter method.	5
	II	<b>Measurement of Energy:</b> Construction, working principle, torque equation, errors and adjustments of single phase conventional (induction type) energy meter. Block diagram and operation of electronic energy meter. Three phase energy meter.	5
5	I	<b>Transducers:</b> Introduction, classification, basic requirements for transducers, Primary & secondary transducers, types of electrical transducers: resistive, inductive, capacitive	3
	II	<b>Displacement Measurement:</b> LVDT & RVDT – construction, working, application, null voltage, specifications, advantages & disadvantages, effect of frequency on performance.	5
<b>Total No. of Hrs</b>			45



#### Beyond the Syllabus

Introduction of various types of ohmmeter.  
Introduction of strain gauge.  
Introduction of sensor.

#### List of Experiments

Sr. No.	Description
1	To calibrate the Voltmeter and to Study the Construction of Voltmeter.
2	Measurement of active & reactive power in three phase circuit using two wattmeter methods (balanced & unbalanced loads).
3	Extension of instrument range: ammeter, voltmeter, watt meter using CT & PT.
4	Calibration of single phase static energy meter at different power factors.
5	Measurement of resistance by ammeter voltmeter method.
6	Measurement of low resistance using Kelvin's double bridge.
7	Displacement measurement by LVDT.
8	Measurements of Earth resistance by using Earth tester.
9	To study the operation of Wheatstone bridge and measuring the value of unknown resistance of Wheatstone bridge.

#### Recommended Resources

<b>Text Books</b>	<ol style="list-style-type: none"><li>1. A K. Sawhney, "A Course in Electrical and Electronic Measurements &amp; Instrumentation", Dhanpat Rai &amp; Co.</li><li>2. J. B. Gupta, "A Course in Electronics and Electrical Measurements and Instrumentation", S. K. Kataria &amp; Sons.</li><li>3. R. K. Jain, "Mechanical and Industrial Measurements", Khanna Publishers.</li><li>4. R.K.Rajput, "Electrical Measurements and Measuring Instrumentation", S Chand</li></ol>
<b>Reference Books</b>	<ol style="list-style-type: none"><li>1. E. W. Golding &amp; F. C. Widdies, "Electrical Measurements &amp; Measuring Instruments", Wheeler Pub.</li><li>2. Dr. Rajendra Prasad, "Electronic Measurements &amp; Instrumentation", Khanna Publishers.</li><li>3. Arun K. Ghosh, "Introduction to Measurements and Instrumentation", PHI.</li><li>4. Vijay Singh, "Fundamentals of Electrical &amp; Electronic Measurements", New Age International Publishers</li></ol>
<b>E-Resources</b>	<ol style="list-style-type: none"><li>1. <a href="http://nptel.ac.in/syllabus/108106070/">http://nptel.ac.in/syllabus/108106070/</a></li><li>2. <a href="http://nptel.ac.in/courses/108105053/42">http://nptel.ac.in/courses/108105053/42</a></li></ol>

Year: Second Year  
Course: Network Analysis

Semester: III  
Course Code: 17YEE303

Teaching Scheme (Hrs/Week)				Formative Assessment -Continuous Internal Assessment (CIA)						Summative Assessment		Total
Theory	Tutorial	Lab	Credits	CIA-1	CIA-2	CIA-3	CIA-4	Tutorial	Lab	Theory	Lab	
3	-	2	4	10	20	10	10	-	25	50	25	150
<b>Max. Time, End Semester Exam (Theory) : 3Hrs.</b>								<b>End Semester Exam (Lab) : 2Hrs.</b>				

Course Objectives	
1	To familiarize the basic laws, theorems and the methods of analyzing electrical circuits.
2	To develop analytical qualities in electrical circuits by application of various theorems.
3	To understand the concept of graph theory and coupled circuit.
4	To understand the behavior of circuits by analyzing the transient response using classical methods and Laplace Transform approach.
5	To apply knowledge of Network theory for analysis of 2-port networks.

Course Outcome	
After completion of this course, students are able to	
CO1	Analyze circuit systems using direct application of Kirchoff's Current and Voltage Laws along with Ohm's Law.
CO2	Apply theorem to express complex circuits in their simpler equivalent forms.
CO3	Demonstrate graph theory and Coupled circuit.
CO4	Apply basic concept to compute time response of RL, RC and RLC circuits in the time domain. Apply Laplace transforms technique to analyse the RL, RC and RLC circuits in the frequency domain.
CO5	Analyze two port networks and its application in power systems solution.

Course Content		
Module Number	Details	Hours
I	<b>Basics of Network:</b> Types of Network- Linear and Non-Linear, Lumped and Distributed, Bilateral and Unilateral, Time variant and Time-invariant, Introduction to circuit elements-Resistance, Inductance and Capacitance , Types of Voltage and current sources, Ideal and practical Voltage Sources, Ideal and practical Current Sources, Open and short circuit, Series and Parallel circuit, Voltage divider and current divider rule, KCL and KVL analysis, Nodal & Mesh analysis, Concept of Duality, Source transformation, Super node and super mesh Analysis.	8



II	<b>Network Theorem for AC &amp; DC circuits:</b> Superposition Theorem, Thevenin's Theorem, Norton's Theorem, maximum power transfer Theorem, Reciprocity Theorem, Millman Theorem, Tellegen's Theorem applied to various networks. Problems with dependent & independent sources.	10
III	<b>Graph Theory:</b> Network topology, concept of Network graph, Tree, Tree branch & link, Incidence matrix, cut set matrix and tie set matrix. <b>Coupled Circuit:</b> analysis of magnetically coupled circuits, Self Inductance, Mutual Inductance, Dot Convention, coupling coefficient, Inductive coupling in series, Inductive coupling in Parallel, Conductively coupled equivalent Circuit.	8
IV	<b>Analysis of Transient Response in Circuits-Classical Method:</b> Introduction of the transient and steady state response, Transient analysis of Source free RL and RC circuit, Transient analysis of Source driven RL and RC circuit, General and Particular Solution, Time constant, Initial and Final Condition of the network. Transient analysis of R-L-C circuits using classical method. <b>Analysis of Transient Response in Circuits-Laplace Transform Approach:</b> Standard test inputs: Step, Ramp, Impulse, Their Laplace transform, Representation of R, L, C in S domain, transformed network, Laplace transform solution of Integro-differential equations, Initial & final value Theorem,	11
V	<b>Two Port Network and Network Functions:</b> Network & Transfer functions for one port & two ports, poles and zeros, Restrictions on poles and zeroes, Necessary condition for driving point & transfer function. Two port parameters – Z, Y, ABCD, Hybrid parameters, Relationship between parameters, Interconnection of two port networks, Terminated two port network.	8
<b>Total</b>		<b>45</b>

**Beyond Syllabus:**

Illustrative Problems; Resonance Curves



**List of Experiments (Expandable):**

Sr. No.	Description
1	To verify KCL and KVL.
2	To Verify Thevenin Theorem.
3	To Verify Superposition Theorem.
4	To Verify Reciprocity Theorem.
5	To Verify Maximum Power Transfer Theorem.
6	To Determine Open Circuit parameters of a Two Port Network
7	To Determine Short Circuit parameters of a Two Port Network
8	To Determine A, B, C, D parameters of a Two Port Network
9	To Determine h parameters of a Two Port Network
10	To Find Frequency Response of RLC Series Circuit.

Resources	
<b>Text Books</b>	<ol style="list-style-type: none"> <li>1. M. E. Van Valkenburg, "Network Analysis", 3e, Prentice Hall of India Private Limited.</li> <li>2. Ravish R Singh, "Network Analysis and synthesis", 3e, Tata McGraw Hill education (India) Pvt. Ltd.</li> <li>3. Samarajit Ghosh, "Network Theory Analysis and Synthesis", PHI Learning.</li> </ol>
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>4. William H. Hayt, Jr. Jack E. Kemmerly, "Engineering Circuit Analysis", McGraw Hill Publication.</li> <li>5. Sudhakar &amp; Pillai; Circuit &amp; Networks- Analysis and Synthesis; TMH</li> <li>6. N.C. Jagan, "Network Analysis", 2e, BS Publication, Hyderabad.</li> <li>7. K. Sureshkumar, "Electric Circuits &amp; Network", Pearson Publications.</li> <li>8. M S Sukhija, T K Nagsarkar; Circuits and Networks, Oxford University Press, 2015</li> <li>9. Decarlo lin, "Linear circuit Analysis", Oxford University Press</li> <li>10. D. Roy Choudhary, "Network and systems", New Age Pub.</li> <li>11. Abhijit Chakraborti, "Circuit theory", 7e, Dhanpat Rai &amp; Co.</li> </ol>
<b>E Reference</b>	<ol style="list-style-type: none"> <li>1. <a href="http://nptel.ac.in/courses/108102042/">http://nptel.ac.in/courses/108102042/</a></li> </ol>



Year: Second Year  
Course: Thermodynamics (MOOC)

Semester: III  
Course Code: 17YEE304

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	0	0	3	10	20	10	10	-	50	-	100
Max. Time, End Semester Exam (Theory) -3Hrs.									End Semester Exam (Lab) - NA		

Objectives	
1	Understand and use the concept of system.
2	Evaluate Thermo physical properties of substances.
3	Perform basic comprehension on several forms of work energy and heat and evaluate thermodynamic systems.
4	Apply conservation of energy for the control mass and control volume processes.
5	Understand second law of thermodynamics and irreversibility's and how to predict correct direction of physical processes.

Unit Number	Details	Hours
1	<b>Fundamental definitions and concepts in thermodynamics:</b> Definitions & concepts; Energy; Thermodynamic Equilibrium; Work, State Postulate; Zeroth Law of Thermodynamics; Temperature Scale, Thermodynamic Properties of Fluids; Ideal gas Van der Waals Equation of state; Compressibility chart; Thermodynamic Diagrams including Mollier diagram; Steam Tables, First law of Thermodynamics; Steady state Steady flow and Transient flow processes, Applications of First Law of Thermodynamics to Chemically Reacting Systems; Second Law of Thermodynamics	8
2	First Law of Thermodynamics & its consequences, Applications of First Law for elementary processes, First Law analysis of Non-flow processes; Use of steam tables & Mollier diagram, Application of First Law of Thermodynamics for Flow Process-Steady state, steady flow processes, Throttling process; Transient Flow Processes-Charging & discharging of tanks. First Law Applications to Chemically Reacting Systems: Fuels & Combustion, Theoretical Air/Fuel ratio, Standard heat of Reaction and effect of temperature on standard heat of reaction, Adiabatic flame temperature.	10
3	<b>Second Law of Thermodynamics &amp; its Applications:</b> Limitations of the First Law of Thermodynamics, Heat Engine, Heat Pump/Refrigerator. Second Law of Thermodynamics - Kelvin Planck and Clausius statements & their equivalence, Reversible & irreversible processes, Criterion of reversibility, Carnot cycle & Carnot principles, Thermodynamic Temperature scale, Clausius inequality, Entropy, Calculations of entropy change, Principle of entropy increase, T- S diagram, II Law analysis of Control volume.	7
4	<b>Thermodynamic Potentials;</b> Maxwell relations; Available energy, Availability; Second law efficiency. Thermodynamic relations, Jacobian methods, Clapeyron and Kirchoff equations, Phase rule.	8
5	<b>Power Cycles:</b> Rankine cycle- Ideal, Reheat and Regenerative Rankine cycles. Gas Power Cycles: Otto cycle, Diesel cycle, Dual cycle and Brayton cycle, Refrigeration Cycles: Vapor compression refrigeration, Absorption refrigeration and Gas refrigeration Cycles.	7
Total (Hrs)		40

Course Outcome	
Students should able to	
CO1	Apply mathematical fundamentals to study the properties of steam, gas and gas mixtures.
CO2	Evaluate Thermo physical properties of substances.
CO3	Perform basic comprehension on several forms of work energy and heat and evaluate thermodynamic systems.
CO4	Apply conservation of energy for the control mass and control volume processes.
CO5	Understand second law of thermodynamics and irreversibility's and how to predict correct direction of physical processes.

Resources	
<b>Recommended Books</b>	<ol style="list-style-type: none"> <li>1. Nag.P.K., "Engineering Thermodynamics", 4thEdition, Tata McGraw-Hill, New Delhi, 2008.</li> <li>1. Natarajan E., "Engineering Thermodynamics: Fundamentals and Applications", Anuragam Publications, 2012.</li> </ol>
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. Cengel. Y and M.Boles, "Thermodynamics - An Engineering Approach", 7th Edition, Tata McGraw Hill, 2010.</li> <li>2. Rathakrishnan. E., "Fundamentals of Engineering Thermodynamics", 2nd Edition, Prentice-Hall of India Pvt. Ltd, 2006</li> <li>3. Chattopadhyay, P, "Engineering Thermodynamics", Oxford University Press, 2010. Venkatesh. A, "Basic Engineering Thermodynamics", Universities Press (India) Limited, 2007.</li> </ol>
<b>E-Resources</b>	<a href="http://nptel.ac.in/">http://nptel.ac.in/</a>