JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

(Established by Govt. of A.P., Act. No. 30 of 2008)

ANANTHAPURAMU – 515 002 (A.P.) INDIA.

Course Structure for B.Tech-R15 Regulations

Mechanical Engineering

B.Tech III-II Semester (ME)

S. No.	Course Code	Subject	L	T	P	C
1.	15A03601	Operations Research	3	1	-	3
2.	15A03602	Design of Machine Members – II	3	1	-	3
3.	15A03603	Heat Transfer	3	1	-	3
4.	15A03604	Finite Element Method	3	1	-	3
5.	15A03605	Metal forming Process	3	1	-	3
6.	15A03606 15A03607 15A03608 15A01608	CBCC-I a. Non Conventional Source of Energy b. Total Quality Management c. Mechatronics d. Intellectual Property Rights	3	1	-	3
7.	15A03609	Heat Transfer Laboratory	-	-	4	2
8.	15A03610	Computer Aided Engineering Laboratory	-	-	4	2
9.	15A52602	Advanced English Language Communication Skills (AELCS) Laboratory (Audit Course)			2	-
10.	15A03611	Comprehensive Online Examination - II	-	-	-	1
		Total:	**18**	**6**	**11**	**23**

There shall be a comprehensive online examination conducted by the respective colleges with 60 objective questions for 60 marks on the subjects studied in the third year (I & II semesters). The Principals of the respective colleges are given the responsibility of preparing question bank/ question paper and conducting the online examination maintaining confidentiality. A student shall acquire 1 credit assigned to the comprehensive online examination only when he/she secures 40% or more marks. In case, if a student fails in comprehensive online examination, he shall reappear/ re-register by following a similar procedure adopted for the lab examinations.

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

L	T	P	C
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15A03601 OPERATIONS RESEARCH

Course Objective:

The subject should enable the students to the nature and scope of various decision making situations within business contexts, understand and apply operation research techniques to industrial applications,

To make the student capable of Formulating the various real life decision making problems as Mathematical programming problems. Students to learn the fundamental Techniques of Operations Research and to choose a suitable OR technique to solve problem on hand.

UNIT I

Introduction to OR and Linear Programming-1

OR definition– Classification of Models –Types of Operations Research models;

Linear Programming- Problem Formulation, Graphical Method, Simplex Method, Two–Phase Simplex Method, Big-M Method

Special Cases of LP- Degeneracy, Infeasibility and Multiple Optimal Solutions;

Learning Outcome & Suggested Student Activities:

At the end of the Unit, the student will be able to create mathematical models of the real life situations and capable of obtaining best solution using Graphical Method and Simplex Method.

(The student must refer to any of the text books and practice solving several problems as it is very common to make mistakes while solving due to lack of practice). The student should take up a real life problem and formulate it as a mathematical programming problem.

Further, the students may visit the following URL for live online tutorial for LPP formulation

http://www.www.mathsdoctor.tv

UNIT II

Linear programming-2: Duality- Principle, Economic Interpretation of Duality, Dual Simplex Method

Transportation Problem – Formulation; Different Methods of Obtaining Initial Basic Feasible Solution- North-West Corner Rule, Least Cost Method, Vogel's Approximation Method;

OptimalityTesting.

Special Cases -Unbalanced Transportation Problem, Degenerate Problem;

Assignment Problem – Formulation; Optimal Solution -Traveling Salesman problem.

Learning Outcome &Suggested Student Activities:

At the end of this Unit, the student must be able to implement the theory of duality for simplifying the solution procedure for certain LPPs, and solve the special cases of LPP such as Transportation and Assignment problems. A large number of problems are to be solved by the student in order to gain much required capability of handling the problems without mistakes.

The following URLs will be useful to the students for in-depth knowledge

http://nptel.iitm.ac.in/video.php?subjectId=112106134,

http://www. Math.harvard.edu/archive/20_spring_05/handouts

UNIT III

Game Theory: Introduction – Minimax (Maximin) Criterion and Optimal Strategy, Saddle Point, Solution of Games with Pure Strategy –Games with Mixed Strategies– Dominance Principle–Graphical Method, Algebraic methods, sub matrices method.

Queuing Theory: Introduction –Terminology, Service Channel, Arrival Pattern, Population, Departure Pattern(Service Pattern), Queue Discipline, Birth & Death Process, Balking, Reneging, Jockeying; Single Channel Models with Poisson Arrivals, Exponential Service Times with finite queue length and non-finite queue length; Multichannel Models with Poisson Arrivals, Exponential Service Times with finite queue length and non finite queue length.

Learning Outcome & Suggested Student Activities:

At the end of this Unit, the student will have knowledge of choosing the best strategy out of the available strategies which is an essential skill for any business manager to successfully face the competition. The following web link will direct the students to the video lecture on Game Theory.

http://www.youtube.com/watch?feature=player_detailpage&v=h0bdo06qNVw

The student will be capable of identifying the suitable Queuing Model for real world waiting lines and make estimations like Average Waiting Times, Average Queue Length, Probability of Waiting in the queue etc.

The students may watch the following web video for better understanding of the subject.

http://www.youtube.com/watch?feature=player_detailpage&v=xGkpXk-AnWU#t=104s

The students should refer to any OR text book for more number of practice problems.

UNIT IV

Sequencing -Assumptions-n-jobs-2 Machines model, n-jobs-3-machines models & n jobs – m Machines models.

PERT & CPM: Introduction to Project Management, Activities, Events, Predecessor Relationships, AOA Diagram, Early Start, Early Finish, Late Start & Late Finish Times, Earliest Occurrence and Latest Occurrence of the Event, Total Float, Free Float, Independent Float

CPM- Deterministic Model- Critical Path, Crashing, Optimal Project Duration, Least Possible Project Duration

PERT- Probabilistic Model- Various types of Activity Time Estimates, Standard Deviation and Variance of the Activities and Projects, and Probability of Completing the Project within scheduled time

Learning Outcome & Suggested Student Activities:

At the end of this Unit, student will be able to represent any project in the form of a network and estimate the parameters like Project Completion Time, Project Costs, and Optimum Duration of the Project, Probabilities of completing Projects as per schedule etc by applying either CPM or PERT technique as per the suitability.

The following URL will lead us to a video lecture on this Unit

http://www.youtube.com/watch?feature=player_detailpage&v=H58TPQNr2kM

UNIT V

Dynamic Programming : Introduction – Bellman's Principle of Optimality – Applications of Dynamic Programming- Capital Budgeting Problem – Shortest Path Problem – Solution of Linear Programming Problem by DP

Replacement Models: Introduction –Types of Replacement Problem, Determination of Economic Life of an Asset, and Simple Probabilistic Model for Items which completely fail-Individual Replacement Model, Group Replacement Model.

Learning Outcome & Suggested Student Activities:

At the end of this Unit, the student will be aware of applying Dynamic Programming technique to solve the complex problems by breaking them into a series of sub-problems. The following URL contains a video lecture on Dynamic Programming and the students are advised to go through

http://www.youtube.com/watch?feature=player_detailpage&v=ug7O1ISZyg0

Further, the student will gain knowledge in different types of maintenance, failure patterns and the economic replacement policies which are very much important for the continuous functioning of machinery in an organization. The students may visit the following websites for better understanding of the subject.

http://www2.ensc.sfu.ca/undergrad/courses/ENSC201/Unit09/lecture9.html

http://pakaccountants.com/what-is-depreciated-replacement-cost/

Text Books:

1. *Operation Research, J.K.Sharma,MacMilan, 5th edition, 2013.*
2. *Introduction to Operations Research, H.A.Taha, PHI, 9th edition, 2013.*

Reference Books:

1. *Operations Research, Dr. C.Nadhamuni Reddy & Sri Gopal Krishna, Kurnool Publishers*
2. *Operations Research by R Panneerselvam, PHI, 2nd edition, 2012.*
3. *Operations Research, Wagner, PHI Publications , 2nd edition.*
4. *Operations Research, S.R.Yadav, A.K.Malik, Oxford, 2015*
5. *Operations Research, A.M.Natarajan,P.Balasubramani,A. Tamilarasi,Pearson Education, 8th edition, 2011.*

Web References:

http://www2.informs.org/Resources/
http://www.mit.edu/~orc/
http://www.ieor.columbia.edu/
http://www.universalteacherpublications.com/univ/ebooks/or/Ch1/origin.htm
http://www.wolfram.com/solutions/OperationsResearch/
http://nptel.iitm.ac.in/video.php?subjectId=112106134

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

L	T	P	C
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15A03602 DESIGN OF MACHINE MEMBERS– II

Course Objective:

To aware the student about basic concepts of curved beams with different cross sections, design of power transmission elements, understand the design concepts of various types of springs, various types of bearings and gears.

To know the students how to apply design concepts in designing of IC engine parts like Piston, cylinder, connecting rod and crank shaft.

UNIT I

DESIGN OF CURVED BEAMS: Stresses in curved beams, Expression for radius of neutral axis for rectangular, circular, trapezoidal and T-Section. Design of crane hooks, C –clamps.

DESIGN OF POWER TRANSMISSIONS SYSTEMS: Design of Flat belt drives, V-belt drives & rope drives. Selection of wire ropes, design procedure for chain drives.

Learning Outcome & Suggested Student Activities:

After completion of this unit students are able to design crane hooks, C-clamps and various belt, rope and chain drives. In addition to text books, the following URLs will be highly useful to the students to understand various concepts of design of power transmission elements.

http://machinedesign.com/

http://www.youtube.com/watch?v=PEKfS2Q1WqM&list=PL3D4EECEFAA99D9BE&index=19

http://www.youtube.com/watch?v=nMsB6Soz4Hc&list=PL3D4EECEFAA99D9BE&index=30

UNIT II

DESIGN OF MECHANICAL SPRINGS: Stress and deflections of helical Springs- Springs for fatigue loading – Natural frequency of helical springs-Energy storage capacity- Helical Torsion springs- Design of leaf springs.

DESIGN OF POWER SCREWS: Design of screw- Square, ACME and Buttress screws- Efficiency of the screw. Design of compound screw, differential screw, ball screw- possible failures

Learning Outcome & Suggested Student Activities:

After completion of this unit, students are able to design helical sprigs for two wheel vehicle and laminated springs for trucks. Also students can apply design concepts in designing power screws. In addition to text books, the following URLs will be highly useful to the students to understand various concepts of design of springs and power screws.

http://machinedesign.com/

http://www.youtube.com/watch?v=PEKfS2Q1WqM&list=PL3D4EECEFAA99D9BE&index=19

http://www.youtube.com/watch?v=46quOD7V- cQ&list=PL3D4EECEFAA99D9BE&index=28

UNIT III

DESIGN OF BEARINGS: Types of Journal bearings – Lubrication – bearing materials – journal bearing design – Ball and roller bearings – Static loading of ball & roller bearings, bearing life –Failure of bearings.

Learning Outcome & Suggested Student Activities:

After completion of this unit students are able to design journal bearings, ball bearings and roller bearings and to know the advantages of rolling contact bearings against sliding contact bearings. In addition to text books, the following URLs will be highly useful to the students to understand various concepts of design of bearings.

http://machinedesign.com/

http://www.mae.ncsu.edu/klang/courses/mae442/Tranmission/Journal%20Bearing.ppt

http://nhbb.com/files/catalog_pages/HiTech_Catalog.pdf

UNIT IV

DESIGN OF SPUR & HELICAL GEARS: Spur gears- Helical gears – Bending strength – Design analysis of spur and Helical gears – Estimation of centre distance, module and face width. Check for dynamic and wear considerations.

Learning Outcome & Suggested Student Activities:

After completion of this unit students are able to design spur and helical gears for different input conditions. In addition to text books, the following URLs will be highly useful to the students to understand various concepts of design of gears.

http://machinedesign.com/

http://nptel.iitm.ac.in/courses/IIT-MADRAS/Machine_Design_II/pdf/2_9.pdf

http://www.youtube.com/watch?v=8bml2pK6Ra0

UNIT V

DESIGN OF IC ENGINE PARTS: Pistons– Design of piston. Cylinder, Connecting Rod. Crank shafts- Center and over hung cranks.

Learning Outcome & Suggested Student Activities:

After completion of this unit students are able to know various forces acting on I C engine parts and failure criteria to be adopted for various parts. In addition to text books, the following URLs will be highly useful to the students to understand various concepts of design of IC Engine parts.

http://machinedesign.com/

http://umpir.ump.edu.my/1778/1/Design_Of_Cooecting_Rod_Of_Internal_Combustion_Engine_A_Topology_Optimization_Approach.pdf

http://www.d-p.com.gr/pistons/piston-designs.html

Text Books:

1. *MechanicalEngineeringDesign,JosephE.Shigely,TMH Publishers,NewDelhi, 9th edition, 2010.*
2. *Machine Design, R.L. Norton, Tata McGraw Hill Publishers, 2nd edition, 2012.*

Reference Books:

1. *MachineDesign,Schaum'sseries,TMHPublishers, NewDelhi, 1st edition, 2011*
2. *Design ofMachine Elements, V.B.Bhandari , TMH Publishers,NewDelhi, 2nd edition, 2013.*
3. *MachineDesign,SadhuSingh,KhannaPublishers, NewDelhi*
4. *DesignofMachineElements,M.F.Spotts,PHIPublishers, NewDelhi.*
5. *MachineDesign,PandyaandShah,CharotarPublishers,Anand, 17th edition, 2012.*

NOTE: *Design data books are permitted in the examinations.*

Web References:

http://www.uni.edu/~rao/Md-17%20Shaft%20Design.pdf

http://www.uni.edu/~rao/Md-15%20Keys%20and%20Couplings.pdf

http://etidweb.tamu.edu/ftp/ENTC463/Notes/ENTC463Key%20and%20Coupling.pdf

http://www.science.howstuffworks.com/transport/engines.../bearing1.html

http://www.fi.edu/time/Journey/Time/Escapements/gearint.html

Suggestions:

1. students may visit nearby automobile workshops and machine tool shops to know about different machine elements like gears, bearings, springs, power screws, flexible drives and I C engine parts.

2. In addition to the text books students may also go through the reference books authored by V.B. Bhandari, by Pandya and Shah for more number of numerical problems.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

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15A03603 HEAT TRANSFER

Course Objective:

The students will gain the ability to get an in-depth understanding of the principles governing the transfer of heat, the techniques , tools and skills required to solve typical thermal related problems, the analysis of energy flows in complicated systems and the design of efficient heat transfer equipments. Enables the student to utilize analogies to solve heat transfer problems. Further students gain hands-on experience in heat transfer experimentation through a number of laboratory tests.

UNIT I

Introduction: Modes and Mechanisms of Heat Transfer – Basic Laws of Heat Transfer – General Applications of Heat Transfer.

Conduction Heat Transfer: Fourier Rate Equation – General Heat Conduction Equation In Cartesian, Cylindrical and Spherical Coordinates.

Simplification and Forms of the Field Equation – Steady, Unsteady and Periodic Heat Transfer – Boundary and Initial Conditions.

One Dimensional Steady State Heat Conduction: In Homogeneous Slabs, Hollow Cylinders and Spheres – Overall Heat Transfer Coefficient – Electrical Analogy – Critical Radius/Thickness of Insulation – With Variable Thermal Conductivity – With Internal Heat Sources or Heat Generation

Learning Outcome & Suggested Student Activities:

After the completion of the unit, student can able to grasp the concept of steady state conduction. Student can learn representing conduction equation in various forms. Student can imply concept successfully to problems encounter in day to day life. The following URL's will be highly useful to students.

http://k12videos.mit.edu/content/heat-transfer;

http://www.youtube.com/watch?v=9WwSaIP5pbs

http://www.youtube.com/watch?v=HIYCR7gXXFo;

http://www.youtube.com/watch?v=S57nIs503fA

http://energy.concord.org/ir/experiments-page3.html

UNIT II

Heat Transfer in Extended Surface (Fins) – efficiency, effectiveness and temperature distribution on Long Fin, Fin with Insulated Tip and Short Fin, Application to Errors in Temperature Measurement.

One Dimensional Transient Heat Conduction: In Systems with Negligible Internal Resistance – Significance of Biot and Fourier Numbers – Chart Solutions of Transient Conduction Systems – Problems on Semi-infinite Body.

Learning Outcome & Suggested Student Activities:

After the completion of the chapter, student is expected understand the concept of extended surfaces and its applications. Also, student can aware transient heat conduction and how it vary w.r.t time. Student is expected to develop the ability to formulate practical conduction heat transfer problems by transforming the physical system into a Mathematical model and selecting an appropriate solution technique and evaluating the significance of results.

The following URLs will be highly useful to the students
http://www.youtube.com/watch?v=cMmREKOhIV8
http://www.youtube.com/watch?v=HiX7DKUlAOM

UNIT III

Convective Heat Transfer: Dimensional Analysis – Buckingham Π Theorem and Its Application for Developing Semi – Empirical Non-Dimensional Correlations for Convective Heat Transfer – Significance of Non-Dimensional Numbers – Concepts of Continuity, Momentum And Energy Equations.

Forced Convection: External Flows: Concepts of Hydrodynamic and Thermal Boundary Layer and Use of Empirical Correlations for Convective Heat Transfer for Flow Over – Flat Plates, Cylinders and Spheres.

Internal Flows: Division of Internal Flow through Concepts of Hydrodynamic and Thermal Entry Lengths – Use of Empirical Relations for Convective Heat Transfer in Horizontal Pipe Flow, Annular Flow.

Free Convection: Development of Hydrodynamic and Thermal Boundary Layer along a Vertical Plate – Use of Empirical Relations for Convective Heat Transfer on Plates and Cylinders in Horizontal and Vertical Orientation.

Learning outcome & Suggested Student Activities:

At the end of the chapter, Student will have the ability to formulate practical forced and natural convection heat transfer problems by transforming the physical system into a mathematical model, selecting an appropriate solution technique and evaluating the significance of results. Students will also demonstrate an ability to analyze the performance.

The following URLs will be highly useful to the students
http://www.youtube.com/watch?v=HIYCR7gXXFo
http://www.youtube.com/watch?v=S57nIs503fA;
http://energy.concord.org/ir/experiments-page3.html

UNIT IV

Heat Transfer with Phase Change:

Boiling: Pool Boiling – Regimes, Determination of Heat Transfer Coefficient in Nucleate Boiling, Critical Heat Flux and Film Boiling.

Condensation: Filmwise and Dropwise Condensation – Nusselt's Theory of Condensation on a Vertical Plate – Film Condensation on Vertical snd Horizontal Cylinders Using Empirical Correlations.

Heat Exchangers: Classification of Heat Exchangers – Overall Heat Transfer Coefficient and Fouling Factor – Concepts of LMTD and NTU Methods – Problems using LMTD And NTU Methods.

Learning outcome & Suggested Student Activities:

After the completion of the chapter, student will be able to calculate heat transfer in condensation and boiling systems, turbulent and laminar film condensation. Student can understand the concepts of critical heat flux and different models of critical heat flux. Student can able to grasp the fundamentals of heat exchangers and its analysis. The following URLs will be highly useful to the students to understand simple heat exchangers.

MIT: Professor Z. S. Spakovszky's Lecture Notes on Thermodynamics & Propulsion: "Section 18.5: Heat Exchangers" (HTML)

Lecture: YouTube: Stanford University: Professor Channing Robertson's Introduction to Chemical Engineering: "Lecture 12: Heat Exchangers"

http://www.youtube.com/watch?v=Gu1ApKpcxQc

UNIT V

Radiative Heat Transfer: Emission Characteristics and Laws of Black-Body Radiation – Irradiation – Total and Monochromatic Quantities– Laws of Planck, Wien, Kirchoff, Lambert, Stefan And Boltzmann – Heat Exchange Between Two Black Bodies – Concepts of Shape Factor – Emissivity – Heat Exchange Between Gray Bodies – Radiation Shields – Electrical Analogy for Radiation Networks.

Learning outcome & Suggested Student Activitie:

At the end of the unit, student can have knowledge on fundamental laws of radiative heat transfer. Also, student can understand the concept of radiative heat transfer between black bodies and grey bodies. Student can know radiation shields and their applications. Student can determine shape factor for different geometries and can know its importance in determining radiative heat transfer.

The following URLs will be highly useful to the students - http://energy.concord.org/ir/experiments-page5.html

Text Books:

1. *Fundamentals of Engg. Heat and Mass Transfer, R.C. Sachdeva, 4/e, New Age International, 2010.*

Reference Books:

1. *Heat Transfer, P.K.Nag, 3/e, TMH, 2011*
2. *Heat Transfer, S.P.Sukhatme, University Press, 4th edition, 2005*
3. *Heat Transfer, Holman.J.P, 10/e, TMH, 2012*
4. *Heat and Mass Transfer, R.K.Rajput, S.Chand& Company Ltd, 2001*
5. *Fundamentals of Heat and Mass Transfer, Kondandaraman, C.P., 3/e, New Age Publ.*
6. *Heat and Mass Transfer, D.K.Dixit, McGrawHill,2016*
7. *Thermal Engineering Data Book, B.S.Reddy and K.H.Reddy Rev/e, I.K. International, 2007*

NOTE: *Heat transfer Data books are permitted for Exam.*

Suggestion:

1. *Student is advised to visit heat transfer laboratory to understand the concept of three modes of heat transfer.*

Web References:

IIT video lecturers (NPTEL)
http://www.wisc-online.com/Objects/ViewObject.aspx?ID=SCE304
http://web.cecs.pdx.edu/~gerry/heatAnimations/sphereTransient/#TOC
http://rpaulsingh.com/animated%20figures/animationlisttopic.htm

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

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15A03604 FINITE ELEMENT METHODS

Course objective:

The subject should enable the students to learn the principles involved in discretization in finite element approach, form stiffness matrices and force vectors for simple elements, find the various approach followed in finite element approach, use the various elements for discretization and learn about shape functions.

To learn the application of FEM to various structural problems incorporating temperature.

and boundary conditions and heat transfer problems.

UNIT I

INTRODUCTION: Equilibrium equations in elasticity subjected to body force, traction forces and point loads, stress strain relations in 3D elasticity, plane stress and plane strain, Boundary conditions, Initial conditions. Governing equation for Steady state heat conduction with convective boundary conditions.

Approximate methods for solving the differential equations: Rayleigh-Ritz method, Weighted residual methods, Galerkin's method.

Integral formulation: Principle of a minimum potential energy, principle of virtual work, Generalized Finite element approach in solving these problems.

Solution methods for solving simultaneous equations.

Learning Outcome & Suggested Student Activities:

After completion of this unit students are able to know introductory basic principles and approaches for solving FEM problems in different fields. In addition to text books, the following URLs will be highly useful to the students to understand basic approaches to formulate and solving of FEM problems.

http://www.youtube.com/watch?v=NYiZQszx9cQ&list=PLA4CBD0C55B9C3878&index=1

http://www.youtube.com/watch?v=RQBXWF9b-Fs&list=PLA4CBD0C55B9C3878

UNIT II

Problems with One-dimensional geometry:

Bars: Formulation of stiffness matrix, Load vectors, Incorporation of boundary conditions: Elimination approach and penalty approach.

Trusses: Plane truss and space truss elements, Example problems involving plane truss elements. Examples involving multipoint constrains. Stress calculations.

Beams & Frames: Bending of beams, Interpolation functions, formulation of stiffness matrix and load vectors. Plane frames, space frames. Transformations of stiffness and load vectors.

Learning Outcome & Suggested Student Activities:

After completion of this unit students are able to formulate FEM model for simple problems. In addition to text books, the following URLs will be highly useful to the students to formulate FEM models for simple problems using different elements.

http://web.iitd.ac.in/~achawla/public_html/429/fem/overview.pdf

http://www.cmmacs.ernet.in/cmmacs/Lect_notes/sangeeta1.pdf

http://www.mecheng.iisc.ernet.in/~suresh/me237/fea/Chapter4.pdf

UNIT III

INTERPOLATION MODELS: Polynomial form of interpolation functions - linear, quadratic and cubic, simplex, complex, Multiplex elements, Selection of the order of the interpolation polynomial, Convergence requirements, 2D Pascal Triangle, Linear interpolation polynomials in terms of global coordinates for triangular (2D simplex) elements, Linear interpolation polynomials in terms of local coordinates for triangular (2D simplex) elements, quadrilateral element.

HIGHER ORDER AND ISOPARAMETRIC ELEMENTS: Lagrangian interpolation, Higher order one dimensional elements- quadratic, Cubic element and their shape functions, properties of shape functions, Shape functions of 2D quadratic triangular element in natural coordinates, 2D quadrilateral element shape functions – linear, quadratic, Biquadric rectangular element Tetrahedral and hexahedral elements.

Learning Outcome &Suggested Student Activities:

After completion of this unit students are able to write interpolation functions to higher order isoparametric elements. In addition to text books, the following URLs will be highly useful to the students to understand basic concepts of isoparametric elements.

http://www.kochmann.caltech.edu/ae108a/IsoparametricElements.pdf

http://www.me.mtu.edu/~bettig/MEEM4405/Lecture08.pdf

http://site.iugaza.edu.ps/marafa/files/FEM-Chapter-10.pdf

UNIT IV

FINITE ELEMENT APPLICATION IN SOLID MECHANICS:

Problem modeling and Finite element analysis in 2D plane elasticity with triangular and quadrilateral elements, Isoparametric, subparametric and superparametric elements. Interpolation, Jacobian, matrices relating strain and nodal displacements, stiffness matrix formulation, Consistent and lumped load vectors, Numerical integration Gaussian quadrate.

Axi-symmetric triangular elements: formulation of stiffness and load vectors.

Introduction to 3D stress analysis.

Learning Outcome &Suggested Student Activities:

After completion of this unit students are able to derive element matrices for applying the principles to find stresses in beams and trusses and temperature distribution in composite walls and fins. In addition to text books, the following URLs will be highly useful to the students to develop and solve FEM models using beam and truss elements.

http://www.youtube.com/watch?v=UeatU9OpDNA&list=PLA4CBD0C55B9C3878

http://uqu.edu.sa/files2/tiny_mce/plugins/filemanager/files/4041296/ComputerApplicationsInStructures/LeturesTutorialsDowloadedFromWeb/Lecture%202%20Truss%20and%20Beam%20FEM.pdf

http://www.engineering.uiowa.edu/~sxiao/class/058-153/lecture-24.pdf

www.rpi.edu/~des/CST.ppt

UNIT V

HEAT TRANSFER AND FLUID MECHANICS PROBLEMS:

Steady state heat conduction with convective and heat flux boundary conditions, Functional approach, Galerkin approach formulation of element characteristic matrices and vectors in 1D and 2D problems. Temperature distribution in composite walls one dimensional and two dimensional fins and extended surfaces.

Two dimensional potential flow problems: Potential function formulation and stream function formulation.

Learning Outcome & Suggested Student Activities:

After completion of this unit students are able to solve bars, trusses, beams and heat transfer problems using FEM and also to apply boundary conditions in realistic problems. In addition to text books, the following URLs will be highly useful to the students to develop and solve FEM models using different elements. The students are also advised to use FEM software to solve all application problems.

http://www.mecheng.iisc.ernet.in/~suresh/me237/fea/Chapter6.pdf

http://www.colorado.edu/engineering/cas/courses.d/IFEM.d/IFEM.Ch22.d/IFEM.Ch22.pdf

Text Books:

1. *Introduction to Finite Element in Engineering, TirupatiChandrapatla and Bellagundu ,*
   Pearson Education, New Delhi.
2. *Finite Element Methods, S. S. Rao , Pergamom Press, New York*

Reference Books:

1. *Finite Element Method by R. Dhanaraj, K. Prabhakaran Nair Oxford University Press*
2. *Introduction to FEM, J. N. Reddy, TMH Publishers, New Delhi.*
3. *Finite Element Analysis, C.S. Krishna Moorthy, TMH Publishers, New Delhi.*
4. *Fundamentals of Finite Element Analysis, David V. Hutton , TMH Publishers, New Delhi.*
5. *Introduction to the Finite Element Methods, Desai and Abel , CBS Publishers, New Delhi.*
6. *Finite and Boundary Methods in Engineering, O.P.Gupta, Oxford and IBH Publishers, New Delhi.*
7. *Finite Element Modeling for Stress Analysis, R. D. Cook, John. Wiley & Sons, 1995.*

WEB REFERENCES

1. *Finite Element Method IIT Kanpur Course, Prof. C.S. Upadhyay* http://nptel.iitm.ac.in/video.php?subjectId=112104115

2. *Computational Methods in Design and Manufacturing by Dr. R. Krishnakumar, Department of Mechanical Engineering, IIT Madras*
http://nptel.iitm.ac.in/video.php?subjectId=112106135

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

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15A03605 METAL FORMING PROCESSES

Course Objective:

Metal forming processes are highly non linear because they involve geometric, material and contact non linearity. And so this subject introduce the concepts of one, two and three dimensional stress analysis, theory of plasticity, strain hardening, hot and cold working process. The students also will get the awareness on various types of rolling mills, forgings, extrusions, wire drawing processes, sheet metal operations, concepts on plastic manufacturing processes and rapid manufacturing process and its applications.

UNIT 1

Stress, strain, Two dimensional stress analysis and three dimensional stress analysis, relation between engineering stress and true stress, relation between engineering strain and true strain, yield criteria, yield locus, theory of plasticity, Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth, Comparison of properties of Cold and Hot worked parts

Learning Outcome & Suggested Student Activities:

Students can understand the basic concept on one, two and three dimensional stress analysis, theory of plasticity, strain hardening, hot and cold working process. The students are advised to visit the URLs http://www.nptel.iitm.ac.in/iitkgp.ac.in, http://www.learnerstv.com/Free-Engineering-Video-lectures-ltv234-Page1.htm.

UNIT II

ROLLING: Bulk deformation processes – Economics of bulk forming, principles and theory of rolling, types of Rolling mills and products. Forces in rolling and power requirements, applications and, limitations, defects in rolled products – machinery and Equipment.

FORGING PROCESSES: Principles of forging –Types Forging – Smith forging, Drop Forging – Roll forging – Forging hammers: Rotary forging – forging defects, Forces in forging of strip, disc and power requirements, applications, Equipment and their selection.

Learning Outcome & Suggested Student Activities:

Students can understand the principles of rolling and forging processes, their applications and defects. The students are advised to visit URLs http://www.nptel.iitm.ac.in/iitkgp.ac.in, http://www.learnerstv.com/Free-Engineering-Video-lectures-ltv234-Page1.htm

UNIT III

EXTRUSION PROCESSES: Basic extrusion process and its characteristics. Mechanics of hot and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion Hydrostatic extrusion, forces in extrusion of cylindrical and non cylindrical components – characteristics and defects in extruded parts.

Wire Drawing: Process Mechanics and its characteristics, determination of degree of drawing, drawing force, power, and number of stages-defects in products.

Learning Outcome & Suggested Student Activities:

Students can understand the fundamentals of extrusion process and wire drawing processes and their industrial applications. The students are advised to visit the URLs http://www.nptel.iitm.ac.in/iitkgp.ac.in, http://www.learnerstv.com/Free-Engineering-Video-lectures-ltv234-Page1.htm.

UNIT IV

Sheet Metal Working – Economical Considerations - Stamping, forming and other cold working processes: Blanking and piercing – Bending and forming – Drawing and its types – Cup drawing and Tube drawing – coining – Hot and cold spinning. Force and power requirement in sheet metal operations, defects in sheet metal products – Equipment, tooling and their characteristics.

Learning Outcome &Suggested Student Activities:

Students can understand the various press working processes, their advantages and disadvantages. The students are advised to refer the text book Workshop Technology by H***ajra Choudhary. Students are advised to visit nearby sheet metal works industries.***

UNIT V

Processing of plastics, injection and blow moulding, calendaring, thermo forming, compression moulding, transfer moulding, High energy rate forming methods Rapid manufacturing: - Introduction – concepts of rapid manufacturing, information flow for rapid prototyping, classification of rapid prototyping process, sterer holography fused deposition modeling, selective laser sintering, Applications of rapid prototyping process

Learning Outcome &Suggested Student Activities:

Students can understand the concept of plastic manufacturing process, rapid manufacturing process and its applications. Students are advised to visit the following URLs http://www.nptel.iitm.ac.in/iitkgp.ac.in, http://www.learnerstv.com/Free-Engineering-Video-lectures-ltv234-Page1.htm.

Text Books:

1. *Manufacturing Technology, Schmid and kalpakjin, Pearson Education.*
2. *Manufacturing Technology, Foundry forming and welding, Vol I , P.N. Rao,TMH*

Reference Books:

1. *Production Technology, R.K. Jain, Khanna Publishers,17th edition, 2012*
2. *Process and materials of manufacturing –Lindberg, PE*
3. *Principles of Metal Castings, Rosenthal.*
4. *Welding Process, Parmar*
5. *Manufacturing Technology, R.K. Rajput, Laxmi Pub*
6. *Rapid Prototyping Principles and Applications, RafiqNoorani, Wiely Pub.*

Web Resources:

www.casde.iitb.ac.in/store/events/2003/IAT-Pune.../DFMA.ppt
www.rose-hulman.edu/~stienstr/ME470/DFA.ppt
www.design4manufacturability.com/DFM_article.htm

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

L	T	P	C
3	1	0	3

13A03606 NONCONVENTIONAL SOURCES OF ENERGY
(CBCC- I)

Course Objective:
To create awareness to the student about basic concepts of non-conventional source of energy, to understand the process of collection, storage, conversion and applications of Solar Energy, Wind Energy, Bio Mass, OTEC. To learn about direct conversion methods.

UNIT – I
PRINCIPLES OF SOLAR RADIATION: Role and potential of new and renewable source, the solarenergy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrialand terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II
SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT-III
SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, Sensible, latent heat andstratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.
WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT-IV
BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gasyield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.
GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, potential inIndia.

UNIT-V
OCEAN ENERGY: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidaland wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations, and principles of DEC.
Thermo-electric generators, Seebeck, Peltier and Joule Thomson effects, Figure of merit, materials, applications,
MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator,
MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

Outcomes:

- *Understanding various Non-conventional sources of Energy.*
- *Able to learn how to use renewable energies instead of conventional fuels.*

TEXT BOOKS:

1. *Non-Conventional Energy Sources /G.D. Rai*
2. *Energy Resources Utilization and Technologies, Anjaneyulu Yerramilli, Francis Tuluri, BS Publications, 2012*

REFERENCES :

1. *Renewable Energy Sources/ Twidell & Weir*
2. *Non Conventional Energy Resources, B.H.Khan, McGrawHIll, 2015*
3. *Solar Power Engineering/B.S.Magal Frank Kreith & J.F.Kreith.*
4. *Principles of Solar Energy/ Frank Krieth & John F Kreider.*
5. *Non-Conventional Energy/ Ashok V Desai/ Wiley Eastern*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

L	T	P	C
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15A03607 TOTAL QUALITY MANAGEMENT
(CBCC-I)

Course Objective:

To understand the concept of quality, cost of quality, international quality standards.
To learn the principles of Total quality management, techniques for problem solving.
To learn about various tools of quality management used in various industrial applications.

UNIT – I

TQM – overview , concepts, elements – History-Quality management philosophies-Juran, Deming, Crosby , Feigenbaum, Ishikawa– Stages of Evolution– continuous improvement
– objectives – internal and external customers.
Quality standards – Need of standardization - Institutions – bodies of standardization, ISO 9000 series – ISO 14000 series – other contemporary standards – ISO certification process-Third party audit.

UNIT – II

Process management- Quality measurement systems (QMS) – developing and implementing QMS – nonconformance database- TQM tools & techniques- 7 QC tools-7 New QC tools.
Problem Solving techniques - Problem Solving process – corrective action – order of precedence

UNIT – III

System failure analysis approach – flow chart – fault tree analysis – failure mode assessment and assignment matrix – organizing failure mode analysis – pedigree analysis.
Quality circles – organization – focus team approach – statistical process control – process chart – Ishikawa diagram – preparing and using control charts.

UNIT IV

Quality Function Development (QFD) – elements of QFD – benchmarking-Types-Advantages & limitations of benchmarking – Taguchi Analysis – loss function - Taguchi design of experiments. Poka-yoke, Kaizen, Deming cycle.

UNIT – V

Value improvement elements – value improvement assault – supplier teaming. Business process reengineering & elements of Supply chain management.
Six sigma approach – application of six sigma approach to various industrial situations.

Outcomes:

- *Understanding the concepts of TQM.*
- *Able to use tools and techniques for problem solving.*
- *To formulate quality circles to find solutions to problems in industry.*
- *Analyze various quality problems and contribute towards continuous improvement in the system.*

TEXT BOOKS:

1. Total Quality Management, D.R.Kiran, BS Publications, 2016
2. Total Quality Management by Besterfield, Pearson.

REFERENCE BOOKS:

1. Quality management by Howard Giltow-TMH
2. Quality management by Evans.
3. Quality management by Bedi
4. Total Quality Management by Joseph & Susan Berg
5. Total Quality Management-Toward the Emerging Paradigm, Bounds, Yorks, Adams, Ranney, McGraHill, 1994

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

L	T	P	C
3	1	0	3

15A03608 MECHATRONICS
(CBCC- I)

Course Objective:

To make the students to learn about the Basic electronics, electrical and mechanical components used to control the machines and industries. Various types of sensors, signal conditioning systems and various pneumatic and hydraulic components used in control systems. Micro controllers, PLCS and PLC program and programmable motion control systems.

UNIT I

INTRODUCTION: Definition – Trends - Control Methods: Stand alone, PC Based (Real Time Operating Systems, Graphical User Interface, Simulation) - Applications: SPM, Robot, CNC, FMS, CIM.

Learning outcome &Suggested Student Activities:

This unit helps the students to understand the importance of mechatronicssubject and controlling the various machines, robots etc. Students may observe CNC machines in CAD/CAM lab to understand the mechatronics concepts.
Student may refer text book - Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering, Chapter- 1, by the authors - W .Bolton, publishers - Pearson Education Press, 3rd edition, 2005.Students may refer the following website www.nptel.iitm.ac.in/ECE/mechatronicswww.ustudy.in/mech/mechs en.wikipedia.org /wiki/mechatronics for better understanding of this topic.

UNIT II

SIGNAL CONDITIONING: Introduction – Hardware - Digital I/O , Analog input – ADC , resolution , speed channels Filtering Noise using passive components – Resistors, capacitors - Amplifying signals using OP amps –Software - Digital Signal Processing – Low pass , high pass , notch filtering.

Learning outcomes & Suggested Student Activities:

This unit helps the students to understand how to convert the analog signals into useful required form. These signal condition systems may be observed in electronics and communication engineering department labs.
Student may refer text book - Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering, Chapter – 3, by the authors - W Bolton, publishers- Pearson Education Press, 3rd edition, 2005.
Students may refer the following website www.nptel.iitm.ac.in/ECE/mechatronicswww.saylor.org/corses/me302___for better understanding of this topic.

UNIT III

PRECISION MECHANICAL SYSTEMS: Pneumatic Actuation Systems - Electro-pneumatic Actuation Systems - Hydraulic Actuation Systems - Electro-hydraulic Actuation Systems - Timing Belts – Ball Screw and Nut - Linear Motion Guides - Linear Bearings - Bearings- Motor / Drive Selection.

Learning outcome & Suggested Student Activities:

In this unit the students learn about the pneumatic and hydraulic systems and about some precisions mechanical component which are useful in the field of automation. This automation system can be observed in many processing industries and manufacturing industries to handle the materials and control the machines (or) process. Student may refer text book - Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering, Chapter-5, 6 & 7 by the authors - W .Bolton, publishers - Pearson Education Press, 3rd edition, 2005.Students may refer the following website www.pic-design.com, www.sdp-si.com, www.csio.res.in,

UNIT IV

ELECTRONIC INTERFACE SUBSYSTEMS: Motors Isolation schemes- opto coupling, buffer IC's - Protection schemes – circuit breakers, over current sensing, resettable fuses, Power Supply - Bipolar transistors/ mosfets.
ELECTROMECHANICAL DRIVES: Relays and Solenoids - Stepper Motors - DC brushed motors – DC brushless motors - DC servo motors - PWM's - Pulse Width Modulation – Variable Frequency Drives.

Learning outcome & Suggested Student Activities:

The objective of this unit is to make the student aware of electronic systems, electromechanical drives used in automation. Some of the systems may be observed electrical and electronics labs for better understanding. Student may refer text book - Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering, Chapter- 7 by the authors – W. Bolton, publishers- Pearson Education Press, 3rd edition, 2005.Students may refer the following website www.pic-design.com, www.sdp-si.com, www.csio.res.info better understanding of this topic.

UNIT V

MICROCONTROLLERS OVERVIEW: 8051 Microcontroller , micro processor structure - Digital Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors – Applications, Programming –Assembly.

PROGRAMMABLE LOGIC CONTROLLERS: Basic Structure - Programming: Ladder diagram -Timers, Internal Relays and Counters - Shift Registers - Master and Jump Controls - Data Handling -Analog input / output - PLC Selection, interface – R232 etc.,- Applications.

Learning outcome & Suggested Student Activities:

This unit helps the student to know about microcontrollers and to programming of programmable logic controls. Students may visit pharmaceutical industries, thermal power plants etc. To observe the PLC based control systems. to know about the interface between processing equipment and central system.

Student may refer text book - Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering, Chapter- 15, 14 & 19 by the authors - W .Bolton, publishers- Pearson Education Press, 3rd edition, 2005.Students may refer the following website www.authorstream.com, www.atmel.in, www.lifehacker.com

Text Books:

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering , W Bolton, Pearson Education Press, 3rd edition, 2005.

2. Mechatronics, M.D.Singh, J.G.Joshi, PHI.

Reference Books:

1.Mechatronics Principles, concepts and applications. Nitaigour premchand mahalik, MC Graw Hill Edu.

2. Mechatronics Source Book, Newton C Braga, Thomson Publications, Chennai.

3. Mechatronics, N. Shanmugam, Anuradha Agencies Publisers.

4. Mechatronics System Design, Devdas shetty,Richard,Thomson.

5. Mechatronics Er. R.K. Rajput. S. Chand Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

L	T	P	C
3	1	0	3

15A01608 INTELLECTUAL PROPERTY RIGHTS
(CBCC – I)

COURSE OBJECTIVE:

This course introduces the student to the basics of Intellectual Property Rights, Copy Right Laws Trade Marks and Issues related to Patents. The overall idea of the course is to help and encourage the student for startups and innovations.

UNIT – I

Introduction To Intellectual Property: Introduction, Types Of Intellectual Property, International Organizations, Agencies And Treaties, Importance Of Intellectual Property Rights.

UNIT – II

Trade Marks : Purpose And Function Of Trade Marks, Acquisition Of Trade Mark Rights, Protectable Matter, Selecting And Evaluating Trade Mark, Trade Mark Registration Processes.

UNIT – III

Law Of Copy Rights : Fundamental Of Copy Right Law, Originality Of Material, Rights Of Reproduction, Rights To Perform The Work Publicly, Copy Right Ownership Issues, Copy Right Registration, Notice Of Copy Right, International Copy Right Law.
Law Of Patents : Foundation Of Patent Law, Patent Searching Process, Ownership Rights And Transfer

UNIT – IV

Trade Secrets : Trade Secrete Law, Determination Of Trade Secrete Status, Liability For Misappropriations Of Trade Secrets, Protection For Submission, Trade Secrete Litigation.
Unfair Competition : Misappropriation Right Of Publicity, False Advertising.

UNIT – V

New Developments Of Intellectual Property: New Developments In Trade Mark Law ; Copy Right Law, Patent Law, Intellectual Property Audits.
International Overview On Intellectual Property, International – Trade Mark Law, Copy Right Law, International Patent Law, International Development In Trade Secrets Law.

TEXT BOOKS & REFERENCES:

1. Intellectual Property Rights, Deborah. E. Bouchoux, Cengage Learing.
2. Intellectual Property Rights– Unleashmy The Knowledge Economy, Prabuddha Ganguli, Tate Mc Graw Hill Publishing Company Ltd.,

Course Outcomes:

On completion of this course, the student will have an understanding of the following:

a) *Intellectual Property Rights and what they mean*
b) *Trade Marks and Patents and how to register them*
c) *Laws Protecting the Trade Marks and Patents*
d) *Copy Right and laws related to it.*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

L	T	P	C
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15A03609 HEAT TRANSFER LABORATORY

***NOTE**: Thermal Engineering data books are permitted in the examinations*

1. Thermal conductivity of insulating powder material through Concentric Sphere apparatus.
2. Thermal conductivity of insulating material through lagged pipe apparatus
3. Overall heat transfer co-efficient through Composite Slab Apparatus
4. Thermal Conductivity of metal (conductor).
5. Heat transfer in pin-fin
6. Experiment on Transient Heat Conduction
7. Heat transfer coefficient in forced convection.
8. Heat transfer coefficient in natural convection
9. Experiment on Parallel and counter flow heat exchanger.
10. Emissivity of a gray body through Emissivity apparatus.
11. Experiment on Stefan Boltzman Apparatus.
12. Heat transfer in drop and film wise condensation.
13. Experiment on Critical Heat flux apparatus.
14. Study of heat pipe and its demonstration.
15. Study of Two – Phase flow.

***Note:** Any 10 of the above 15 experiments are to be conducted.*

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

L	T	P	C
0	0	4	2

15A03610 COMPUTER AIDED ENGINEERING LAB (CAE LAB)

I. Introduction to Analysis Software Package

II. Structural analysis: (Any Six exercises)

1. Analysis of a rectangular plate with a hole.
2. Analysis of a truss member under loading.
3. Analysis of a bracket plate with axial loading
4. Analysis of a bracket plate with eccentric loading
5. Static Analysis of Prismatic bar
6. Static Analysis of a Corner Bracket
7. Static Analysis of beam
8. Analysis of Thermally Loaded support Structure
9. Analysis of Hinged support member
10. Analysis of Tapered plate under transverse load

III. Thermal analysis:(Any two exercises)

1. Analysis of a square plate considering conduction.
2. Analysis of a square plate considering conduction and convection.
3. Analysis of a compound bodies considering conduction and convection.

IV. Computational Fluid Dynamics (Any four exercises)

1. Determine the flow of incompressible gas through an S-bend for laminar flow.
2. Determine the flow of incompressible gas through an S-bend for turbulent flow.
3. Determine that of incompressible water flowing over a cylinder.
4. Determine air flow over a simple geometry (aerofoil) in a wind tunnel (2-D).
5. Determine heat transfer from the heated fin within a rectangular enclose containing air.
6. Determine how to solve a natural convection problem (in an infinitely long concentric cylinders).
7. Determine liquid enters through two inlets with different temperatures (multiphase flow) and leaves one outlet.

Software can be used: ANSYS, ALG Nastran, Star-CCM+, Fluent, FIRE. CFX.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Tech III-II Sem. (ME)

L	T	P	C
0	0	2	0

15A52602 ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS (AELCS) LAB (Audit Course)

1. INTRODUCTION

With increased globalization and rapidly changing industry expectations, employers are looking for the wide cluster of skills to cater to the changing demand. The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information and to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Taking part in social and professional communication.

2. OBJECTIVES:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

3. SYLLABUS:

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

UNIT-I: COMMUNICATION SKILLS

1. Reading Comprehension
2. Listening comprehension
3. Vocabulary Development
4. Common Errors

UNIT-II: WRITING SKILLS

1. Report writing
2. Resume Preparation
3. E-mail Writing

UNIT-III: PRESENTATION SKILLS

1. Oral presentation
2. Power point presentation
3. Poster presentation

UNIT-IV: GETTING READY FOR JOB

1. Debates
2. Group discussions
3. Job Interviews

UNIT-V: INTERPERSONAL SKILLS

1. Time Management
2. Problem Solving & Decision Making
3. Etiquettes

4. LEARNING OUTCOMES:

- Accomplishment of sound vocabulary and its proper use contextually
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities

5. MINIMUM REQUIREMENT:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infra-structural facilities to accommodate at least 60 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system

- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

6. SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and G

1. **Walden Infotech: Advanced English Communication Skills Lab**
2. **K-VAN SOLUTIONS-Advanced English Language Communication Skills lab**
3. **DELTA's key to the Next Generation TOEFL Test: Advanced Skills Practice.**
4. **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
5. **Train2success.com**

7. BOOKS RECOMMENDED:

1. **Objective English for Competitive Exams**, Hari Mohana Prasad, 4th edition, Tata Mc Graw Hill.
2. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, O U Press 3rd Edn. 2015.
3. **Essay Writing for Exams, Audrone Raskauskiene, Irena Ragaisience & Ramute Zemaitience,OUP, 2016**
4. **Soft Skills for Everyone,** Butterfield Jeff, Cengage Publications, 2011.
5. **Management Shapers Series** by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. **Campus to Corporate,** Gangadhar Joshi, Sage Publications, 2015
7. **Communicative English,**E Suresh Kumar & P.Sreehari, Orient Blackswan, 2009.
8. **English for Success in Competitive Exams,** Philip Sunil Solomon OUP, 2015