

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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### MACHINE TOOL DESIGN

Subject Code

:

06ME841

IA Marks

:

25

No. of Lecture Hrs./ Week

:

04

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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Exam Hours

:

03

Total No. of Lecture Hrs.

:

52

Exam Marks

:

100

**PART - A**

## ELECTIVE-V (GROUP E)

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Wednesday, 04 November 2009 07:59 -

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### Unit - 1

**Principles of Machine Tool Design:** General requirements of machine tool design - design process machine tool layout general requirements of machine tool design – design process machine tool layout

**5 Hours**

### Unit - 2

**Machine Tool Drives and Mechanisms:** Working and auxiliary motion. Drives- Electric drives, Hydraulic transmission, Kinematic structure, Regulation of speed and feeds, stepped regulation, standardization of speed and feed, stepless regulation of speeds and feeds.

**7 Hours**

### Unit - 3

**Cutting force analysis and power requirement:** In Turning, Milling, Drilling, Shaping and Broaching operation with simple problems. General requirements of machine tools - Centre lathe, Milling machine.

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### **7 Hours**

#### **Unit - 4**

**Design of Machine Tool Structures:** Functions-Requirements-Design criteria Material used – static and dynamic stiffness – Profile and basic design procedure for machine tool structures. Design of beds, columns, housing, bases, tables, cross-rails, arms saddle, carriages.

### **7 Hours**

## **PART - B**

#### **Unit - 5**

**Design of Guide Ways and Power Screws:** Function and types of guide ways – Design and lubrication of slide ways - aerostatic slide ways - antifriction guide ways, combination guide ways - protecting devices, design of power screws.

### **6 Hours**

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### **Unit - 6**

**Design of Spindle and Spindle Bearings:** Functions-Requirements and materials for spindle compliance and machining accuracy. Design of spindles, antifriction bearing, Hydrodynamic and Hydrostatic bearing, Air lubricated bearing.

**6 Hours**

### **Unit - 7**

**Dynamics of Machine Tools:** Concept of dynamic cutting process, Physical causes of chatter and vibrations, Types of Chatter. Stability chart, chatter vibration in Lathe, Drilling machine, Grinding machine and Milling machine. Different methods for avoiding machine tool chatter and vibration.

**7 Hours**

### **Unit - 8**

## **ELECTIVE-V (GROUP E)**

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**Control Systems in Machine Tools:** Functions, requirements and classification. Control system for speed and feeds centralized control pre selective control, control system for forming and auxiliary motions –Mechanical control– Ergonomic consideration and compatibility – Automatic control system – Electric Hydraulic and pneumatic systems.

**7 Hours**

### **TEXT BOOKS:**

1. **Machine Tool Design**, N.K. Mehta Tata McGraw Hill 2001
2. **Principles of Machine Tools**, Sen and Bhattacharaya Oxford IBM Publishing 2000

### **REFERENCE BOOKS:**

1. **Machine Tool Design Volume – II and III**, N. Acharkan MIR Publications 2000
2. **Design of Machine Tools**, S. K. Basu and D. K. Pal 2000
3. **Principles of Machine Tool Design**, Koensberger 1993

**INDUSTRIAL ENGINEERING AND ERGONOMICS**

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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Subject Code

:

06ME842

IA Marks

:

25

No. of Lecture Hrs./ Week

:

04

Exam Hours

:

03

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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Total No. of Lecture Hrs.

:

52

Exam Marks

:

100

### PART - A

#### Unit - 1

**Productivity & work study:** Definition of productivity, factors affecting productivity, definition, objective & scope of work study, human factors in work study, work study & management, work study & supervisor, work study & worker.

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### 6 Hours

#### Unit - 2

**Method study:** Definition, objective & scope, charts to record movements in shop, process charts, flow process charts, Multiple activity charts, two handed process charts, SIMO chart, principles of motion economy.

### 8 Hours

#### Unit - 3

**Work Measurement:** Definition, objectives, techniques of work measurement, work sampling, need of confidence levels, sample size determination, random observation with simple problems

### 6 Hours

#### Unit - 4

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**Time study:** Definition, time study equipments, selection of jobs, steps in time study, breaking jobs into elements, recording information, rating, standard performance, scales of rating, factors affecting rate of working, allowances, standard time determination.

**6 Hours**

**PART - B**

**Unit - 5**

**Introduction to industrial design:** elements of design structure for industrial design in engineering application in modern manufacturing systems.

Ergonomics and Industrial Design: Introduction, general approach to the man-machine relationship, workstation design-working position.

**8 Hours**

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### Unit - 6

**Visual Effects of Line and Form:** The mechanics of seeing-psychology of seeing general influences of line and form.

**6 Hours**

### Unit - 7

**Color Models:** RGB, CMY, HSV, Color and light, color and objects-color and the eye-color consistency-color terms reactions to color and color continuation-color on engineering equipments.

**6 Hours**

### Unit - 8

**Aesthetic concepts:** Concept of unity-concept of order with variety-concept of purpose style and environment –Aesthetic expressions. Style –components of style house style, observation style in capital goods, case study.

**6 Hours**

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### Text Books:

1. **Work study**, ILO, 3<sup>rd</sup> edition, 2006
2. **Human Factor Engineering**: Sanders & McCormick McGraw Hill Publications.

### Reference Books:

1. **Applied Ergonomics Hand Book**, Brain Shakel, Butterworth Scientific, London 1988
2. **Introduction to Ergonomics**, R. C. Bridger, McGraw Hill Publications.
3. **Industrial Design for Engineers**, Mayall W. H. London Hiffee Books Ltd., 1988
4. **Work Study & Ergonomics**, Suresh Dalela & Saurabh, standard publishers & distributors, 1999

## BIOMASS ENERGY SYSTEMS

Subject Code
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## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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:

**06ME843**

**IA Marks**

:

25

No. of Lecture Hrs./ Week

:

04

Exam Hours

:

03

Total No. of Lecture Hrs.

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:

52

Exam Marks

:

100

### PART - A

#### Unit - 1

**Introduction:** Biomass energy sources, energy content of various Bio – fuels, Energy plantation, origin of Biomass photo synthesis process, Biomass Characteristics, sustainability of Biomass.

**6 Hours**

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### **Unit - 2**

**Biomass conversion Methods:** Agrochemical, Thermochemical, Biochemical (flowchart) & Explanation.

**6 Hours**

### **Unit - 3**

**Physical & Agrochemical conversion:** Briquetting, Pelletization, Agrochemical, fuel Extraction, Thermo chemical Conversion: Direct combustion for heat, Domestic cooking & heating.

**7 Hours**

### **Unit - 4**

**Biomass Gasification:** Chemical reaction in gasification, Producer gas & the constituents, Types of gasifiers. Fixed bed gasifiers, Fluidized bed gasifiers. Liquefaction: Liquefaction through pyrolysis & Methanol synthesis, application of producer gas in I C Engines.

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### **7 Hours**

## **PART - B**

### **Unit - 5**

**Bio Methanization:** Anaerobic digestion, Basic principles, factors influencing Biogas yield, classification of Biogas digester, floating gasholder & fixed dome type.(Working Principle with diagram), Calculations for sizing the Biogas plant.

### **6 Hours**

### **Unit - 6**

**Biogas for power generation:** Ethanol as an automobile fuel, Ethanol production & its use in engines.

### **6 Hours**

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### Unit - 7

**Bio - Diesel:** Bio Diesel from edible & non-edible oils, Production of Bio diesel from Honge & Jatropha seeds, use of bio diesel in I C engines, Engine power using Bio diesel, Blending of Bio diesel, Performance analysis of diesel engines using bio diesel. Effect of use of bio diesel in I C engines.

**7 Hours**

### Unit - 8

**Bio Power Plants:** Bio Power generation routes, Basic Thermodynamic cycles in Bio power generation; Brayton cycle, Sterling cycle, Rankine cycle, Co-generation cycle. Biomass based steam power plant.

**7 Hours**

### TEXT BOOKS:

1. **Bio Gas Technology**, B.T. Nijaguna. New Age International- New Delhi.2001-02
2. **Energy Technology**, S. Rao & B. B. Parulekar – Khanna Publishers, Delhi-1999.
3. **Non Conventional Energy Sources**, G. D. Rai - Khanna Publishers. Delhi.

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### REFERENCE BOOKS:

1. **Greenhouse Technology for Controlled Environment**, G.N. Tiwari, Alpha Science International Ltd., Pangbourne.England.
2. **Renewable Energy Resources**, John.W.Twidell, Anthony. D. Weir, EC BG-2001.
3. **BioMass, Deglisc. X and P. Magne**, Millennium Enterprise, New Delhi.

## AUTOMOTIVE ENGINEERING

Subject Code

:

06ME844

IA Marks

:

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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25

No. of Lecture Hrs./ Week

:

04

Exam Hours

:

03

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52

Exam Marks

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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:

100

### PART - A

#### Unit - 1

**Engine Components and Cooling & Lubrication systems:** Spark Ignition (SI) & Compression Ignition (CI) engines, cylinder – arrangements and their relative merits, Liners, Piston, connecting rod, crankshaft, valves, valve actuating mechanisms, valve and port timing diagrams, Types of combustion chambers for S.I.Engine and C.I.Engines, Compression ratio, methods of a Swirl generation, choice of materials

for different engine components, engine positioning, cooling requirements, methods of cooling, thermostat valves, different lubrication arrangements.

**7 Hours**

## **ELECTIVE-V (GROUP E)**

Written by Administrator

Wednesday, 04 November 2009 07:59 -

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### **Unit - 2**

**Fuels, fuel supply systems for SI and CI engines:** Conventional fuels, alternative fuels, normal and abnormal combustion, cetane and octane numbers, Fuel mixture requirements for SI engines, types of carburetors, C.D.& C.C. carburetors, multi point and single point fuel injection systems, fuel transfer pumps, Fuel filters, fuel injection pumps and injectors.

**7 Hours**

### **Unit - 3**

**Superchargers and Turbochargers:** Naturally aspirated engines, Forced Induction, Types of superchargers, Turbocharger construction and operation, Intercooler, Turbocharger lag.

**6 Hours**

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### Unit - 4

**Ignition systems:** Battery Ignition systems, magneto Ignition system, Transistor assist contacts. Electronic Ignition, Automatic Ignition advance systems.

6 Hours

### PART - B

### Unit - 5

**Power Trains:** General arrangement of clutch, Principle of friction clutches, Torque transmitted, Constructional details, Fluid flywheel, Single plate, multi-plate and centrifugal clutches.

Gear box: Necessity for gear ratios in transmission, synchromesh gear boxes, 3, 4 and 5 speed gear boxes. Free wheeling mechanism, planetary gears systems, over drives, fluid coupling and torque converters, Epicyclic gear box, principle of automatic transmission, calculation of gear ratios, Numerical calculations for torque transmission by clutches.

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### 8 Hours

#### Unit - 6

**Drive to wheels:** Propeller shaft and universal joints, Hotchkiss and torque tube drives, differential, rear axle, different arrangements of fixing the wheels to rear axle, steering geometry, camber, king pin inclination, included angle, castor, toe in & toe out, condition for exact steering, steering gears, power steering, general arrangements of links and stub axle, over steer, under steer and neutral steer, numerical problems, types of chassis frames.

### 6 Hours

#### Unit - 7

**Suspension, springs and Brakes:** Requirements, Torsion bar suspension systems, leaf spring, coil spring, independent suspension for front wheel and rear wheel. Air suspension system.

Types of brakes, mechanical compressed air, vacuum and hydraulic braking systems, construction and working of master and wheel cylinder, brake shoe arrangements, Disk brakes,

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drum brakes, Antilock –Braking systems, purpose and operation of antilock-braking system, ABS Hydraulic Unit, Rear-wheel antilock & Numerical Problems

**6 Hours**

### **Unit - 8**

**Automotive emission control systems:** Automotive emission controls, Controlling crankcase emissions, Controlling evaporative emissions, Cleaning the exhaust gas, Controlling the air-fuel mixture, Controlling the combustion process, Exhaust gas recirculation, Treating the exhaust gas, Air-injection system, Air-aspirator system, Catalytic converter, Emission standards- Euro I, II, III and IV norms, Bharat Stage II, III norms.

**6 Hours**

**Text Books:**

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1. **Automotive mechanics**, William H Crouse & Donald L Anglin, 10<sup>th</sup> Edition Tata McGraw Hill Publishing Company Ltd., 2007
2. **Automotive Mechanics**, S. Srinivasan, Tata McGraw Hill 2003.

### Reference Books:

1. **Automotive mechanics: Principles and Practices**, Joseph Heitner, D Van Nostrand Company, Inc
2. **Fundamentals of Automobile Engineering**, K.K.Ramalingam, Scitech Publications (India) Pvt. Ltd.
3. **Automobile Engineering**, R. B. Gupta, Satya Prakashan, 4<sup>th</sup> edn. 1984.
4. **Automobile engineering**, Kirpal Singh. Vol I and II 2002.

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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### DATABASE MANAGEMENT SYSTEM

Subject Code

:

06ME845

IA Marks

:

25

No. of Lecture Hrs./ Week

:

04

Exam Hours

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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:

03

Total No. of Lecture Hrs.

:

52

Exam Marks

:

100

### PART - A

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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### Unit - 1

**Database and Database Users:** Introduction, characteristics of database approach, intended uses of a DBMS, advantages and implementation of database approach.

**6 Hours**

### Unit - 2

**Database Systems concepts and Architecture:** Data models, schemes and instances, DBMS architecture and data independence, database languages and interfaces, database system environment, classification of database management systems.

**6 Hours**

### Unit - 3

**Data Modeling:** High level conceptual data models for database design. Entity types, entity sets, attributes and keys, Relationships, relationship types, roles and structural constraints. Weak entity types, ER diagram and design issue.

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### 8 Hours

#### Unit - 4

**Record Storage and primary file organizations:** Secondary storage devices, buffering of the blocks, placing file records on the disk, operations on files, heap files and sorted files, hashing techniques.

### 6 Hours

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### **PART - B**

#### **Unit - 5**

**Relational data model and relational algebra:** Brief discussion on code rules, relational model concepts, constraints and schemas. Update operation on relations, basic and additional relational algebra operations, queries in relational algebra.

**7 Hours**

#### **Unit - 6**

**Structural Query Language (SQL):** Data definition etc., in SQL2. Basic and complex queries in SQL, Inset, Delete; Update statements, and views in SQKL, embedded SQL.

**7 Hours**

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### Unit - 7

**Database Design:** Design guidelines for relational schemas, functional dependencies, normalization 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup>; normal forms. Database design process, factors influencing physical database design guidelines, and guidelines for relational systems.

**7 Hours**

### Unit - 8

**System implementation:** System catalogue for RDBMSs, transaction processing, and system concepts, properties of transaction, brief discussion on concurrency control and recovery techniques, database security and authorization.

**5 Hours**

### Text Books:

1. **Fundamentals of Database Systems**, Ramez Elmasri and Shanmkanth B. Navathe, 3<sup>rd</sup> Edition, Addison Pearson.
2. **Database Management System**, Raghu Ramakrishnan, Tata Mc Graw Hill, 3<sup>rd</sup> Edn.

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2002.

### Reference Books:

1. **Database Management and Design**, Gray W.hansen and James V. Hansen, 2<sup>nd</sup> Edn. Printice Hall India Pvt. Ltd., 2002.

2. **Database Management Systems**, Designing and Building business applications by Gerald V. Post, 3<sup>rd</sup> Edition, Tata Mc Graw Hill Publishing company Ltd.,- 2005

3. **Project Mangment with PERT and CPM**, Moder Joseph J and Phillips cerel, R., VAN Noserand, Reinhold, 2<sup>nd</sup> Edn., 1976.

## ARTIFICIAL INTELLIGENCE

Subject Code

:

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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**06ME846**

**IA Marks**

:

25

No. of Lecture Hrs./ Week

:

04

Exam Hours

:

03

Total No. of Lecture Hrs.

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## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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52

Exam Marks

:

100

### PART - A

#### Unit - 1

**Artificial Intelligence:** Introduction, definition, underlying assumption, importance of AI, AI and related fields

**6 Hours**

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### Unit - 2

**Space Representation:** Defining a problem. Production systems and its characteristics, Search and Control strategies – Generate and Test, Hill Climbing, Best – first Search, Problem reduction, Constraint Satisfaction, Means – Ends Analysis.

**7 Hours**

### Unit - 3

**Knowledge Representation Issues:** Representations and Mappings, Types of knowledge – Procedural Vs Declarative, Logic programming. Forward Vs Backward reasoning, Matching

**7 Hours**

## ELECTIVE-V (GROUP E)

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Wednesday, 04 November 2009 07:59 -

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### Unit - 4

**Use of Predicate Logic:** Representing simple facts, Instance and Isa relationships, Syntax and Semantics for Propositional logic, FQPL and properties of Wffs, Conversion to Clausal form, Resolution, Natural deduction .

**6 Hours**

### PART - B

### Unit - 5

**Statistical and Probabilistic Reasoning:** Symbolic reasoning under uncertainty, Probability and Bayes' theorem, Certainty factors and Rule based systems, Bayesian Networks, Shafer Theory, Fuzzy Logic .

**7 Hours**

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### **Unit - 6**

**Expert Systems:** Structure and uses, Representing and using domain knowledge, Expert System Shells. Pattern recognition Learning classification patterns, recognizing and understanding speech. Introduction to knowledge Acquisition, Types of Learning

**7 Hours**

### **Unit - 7**

**Typical Expert Systems:** MYCIN, Variants of MYCIN, PROSPECTOR, DENDRAL, PUFF, ETC.

**6 Hours**

### **Unit - 8**

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**Introduction to Machine Learning:** Perceptrons, Checker Playing Examples, Learning Automata, Genetic Algorithms, Intelligent Editors .

**6 Hours**

### **Text Books:**

1. **Artificial Intelligence**, Elaine Rich & Kevin Knight, M/H 1983.
2. **Introduction to AI & ES**, Dan W. Patterson, Prentice Hall of India, 1999.

### **Reference Books:**

1. **Principles of Artificial Intelligence**, Springer Verlag, Berlin, 1981.
2. **Artificial Intelligence in business, Science & Industry**, Wendy B. Ranch
3. **A guide to expert systems**, Waterman, D.A., Addison – Wesley inc. 1986

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4. **Building expert systems**, Hayes, Roth, Waterman, D.A. Addison – Wesley, 1983

### DESIGN OF EXPERIMENTS

Subject Code

:

06ME847

IA Marks

:

25

No. of Lecture Hrs./ Week

:

04

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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Exam Hours

:

03

Total No. of Lecture Hrs.

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52

Exam Marks

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100

**PART - A**

## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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### Unit - 1

**Introduction:** Strategy of Experimentation, Typical applications of Experimental design, Basic Principles, Guidelines for Designing Experiments.

**5 Hours**

### Unit - 2

**Basic Statistical concepts:** Concepts of random variable, probability, density function cumulative distribution function. Sample and population, Measure of Central tendency; Mean median and mode, Measures of Variability, Concept of confidence level. Statistical Distributions: Normal, Log Normal & Weibull distributions. Hypothesis testing, Probability plots, choice of sample size. Illustration through Numerical examples.

**7 Hours**

### Unit - 3

**Experimental Design:** Classical Experiments: Factorial Experiments: Terminology: factors, levels, interactions, treatment combination, randomization, Two-level experimental designs for

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two factors and three factors. Three-level experimental designs for two factors and three factors, Factor effects, Factor interactions, Fractional factorial design, Saturated Designs, Central composite designs. Illustration through Numerical examples.

**7 Hours**

### **Unit - 4**

**Analysis and Interpretation methods:** Measures of variability, Ranking method, Column effect method & Plotting method, Analysis of variance (ANOVA) in Factorial Experiments: YATE's algorithm for ANOVA, Regression analysis, Mathematical models from experimental data. Illustration through Numerical examples.

**7 Hours**

## **PART - B**

### **Unit - 5**

**Quality by Experimental Design:** Quality, Western and Taguchi's quality philosophy,

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elements of cost, Noise factors causes of variation.

Quadr

atic loss function & variations of quadratic loss function. Robust Design: Steps in Robust Design: Parameter design and Tolerance Design. Reliability Improvement through experiments, Illustration through Numerical examples.

**6 Hours**

**Unit - 6**

**Experiment Design using Taguchi's Orthogonal Arrays:** Types of Orthogonal Arrays, selection of standard orthogonal arrays, Linear graphs and Interaction assignment, Dummy level Technique, Compound factor method, Modification of linear graphs. Illustration through Numerical examples.

**8 Hours**

**Unit - 7**

**Signal to Noise Ratio:** Evaluation of sensitivity to noise. Signal to Noise ratios for static problems: Smaller-the-better type, Nominal-the –better-type, Larger-the-better type. Signal to Noise ratios for Dynamic problems. Illustration through Numerical examples.

**6 Hours**

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### Unit - 8

**Parameter and Tolerance Design:** Parameter and tolerance design concepts, Taguchi's inner and outer arrays, parameter design strategy, tolerance design strategy. Illustration

through Numerical examples.

### 6 Hours

#### TEXT BOOKS:

1. **Design and Analysis of Experiments**, Douglas C. Montgomery, 5<sup>th</sup> Edition Wiley India Pvt. Ltd. 2007
2. **Quality Engineering using Robust Design**, Madhav S. Phadke, Prentice Hall PTR, Englewood Cliffs, New Jersey 07632, 1989.

#### REFERENCE BOOK:

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Written by Administrator

Wednesday, 04 November 2009 07:59 -

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1. **Quality by Experimental Design**, Thomas B. Barker, Marcel Dekker, Inc ASQC Quality Press.1985.
2. **Experiments Planning, analysis, and parameter Design optimization**, C.F. Jeff Wu Michael Hamada, John Wiley Editions. 2002.
3. **Reliability Improvement by Experiments**, W.L. Condra, Marcel Dekker, Inc ASQC Quality Press.1985.
4. **Taguchi Techniques for Quality Engineering**, Phillip J. Ross, 2<sup>nd</sup> Edn. McGraw Hill International Editions, 1996.

## DESIGN FOR MANUFACTURING AND ASSEMBLY

Subject Code

:

06ME848

IA Marks

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## ELECTIVE-V (GROUP E)

Written by Administrator  
Wednesday, 04 November 2009 07:59 -

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25

No. of Lecture Hrs./ Week

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04

Exam Hours

:

03

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52

Exam Marks

## ELECTIVE-V (GROUP E)

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100

### PART - A

#### Unit - 1

**Tolerances, Limits & Fits:** General Tolerances, Tolerance grades, Limits fundamental deviation, Fits, Tolerance Accumulation cumulative effect of tolerances in assembly. Relationship between attainable tolerance grades and different machining processes.

**6 Hours**

#### Unit - 2

**Geometric Tolerances:** Geometrical characteristics and symbols. Definition and Measurement of circularity, cylindricity, flatness and runout.

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True position tolerance.

**8 Hours**

**Unit - 3**

**Surface Roughness:** Terminology, Terms used for surface roughness, measurement of surface roughness. Surface roughness values obtained from various machining processes.

**6 Hours**

**Unit - 4**

**Statistical Quality Control:** Frequency distribution, standard deviation concept of skewness & Kurtosh variance, Process capability, Indices  $C_p$  and  $C_{pk}$  control charts.

**6 Hours**

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### **PART - B**

#### **Unit - 5**

**Component Design from casting considerations:** Pattern, Mould, Parting line, cored holes and machined holes, Design for reducing/eliminating sand cores.

**6 Hours**

#### **Unit - 6**

**Component Design from Machining consideration:** Design considerations for turning, drilling, tapping, milling and grinding operations, provisions for clamping, Reduction in machining area, simplification by separation and amalgamation, Use of productive machines.

**6 Hours**

#### **Unit - 7**

## **ELECTIVE-V (GROUP E)**

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**Design Considerations:** Major Design Phases. Design for Manufacturability consideration. Influence of Fabrication properties (Machinability, Castability, Weldability, Polymer processing).

**7 Hours**

### **Unit - 8**

**Selection of Materials in Design:** Properties of Materials used in design. Material selection process – cost per unit property, weighted properties and limits on properties methods.

**7 Hours**

### **Text Books:**

1. **Engineering Metrology**, R.K. Jain Khanna Publishers, 2000.
2. **Design for Manufacture**, Harry Peck, Pitman Publications, 1983.

### **Reference Books:**

## ELECTIVE-V (GROUP E)

Written by Administrator

Wednesday, 04 November 2009 07:59 -

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1. **ASM Handbook, vol.20.** Material selection & Design.
2. **Design for Manufacturability Handbook**, JamesH.G.Bralla, Editor, Mcgraw Hill 1998.
3. **Product Design for Manufacture and Assembly**, Geoffrey Boothroyd et al 'Merced Dekker Inc. New York.
4. **Engineering Deign: A Materials and processing approach**, George. E. Dieter, Mcgraw Hill, 1991.