FOR KIND ATTENTION OF THE HODS OF THE UNIVERSITY DEPARTMENTS
ANNA UNIVERSITY, CHENNAI – 600 025.

It is hereby informed that the following REVISED CODE & TITLE shall be followed for the B.E. / B.Tech. (FULL – TIME) Degree Programmes of the University Departments, Anna University, Chennai – 25, under REGULATION 2012.

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Branch</th>
<th>Existing Code &amp; Title</th>
<th>Revised Code &amp; Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Electrical and Electronics Engg.</td>
<td>EI 8751 Bio Medical Instrumentation</td>
<td>EE8025 Medical Instrumentation</td>
</tr>
<tr>
<td>2.</td>
<td>Electronics and Instrumentation Engineering</td>
<td>EI 8751 Bio Medical Instrumentation</td>
<td>EI 8703 Bio Medical Instrumentation</td>
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<tr>
<td>3.</td>
<td>Industrial Engineering</td>
<td>ME 8077 Marketing Management</td>
<td>IE8019 Principles of Marketing Management</td>
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<td></td>
<td></td>
<td>ME 8751 Computer Integrated Manufacturing Systems</td>
<td>IE8018 Computer Integrated Manufacturing Systems</td>
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<td></td>
<td>MF 8074 Industrial Robotics</td>
<td>IE8020 Robotics Engineering</td>
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<tr>
<td>4.</td>
<td>Manufacturing Engg.</td>
<td>MF 8005 Production of Automotive Components</td>
<td>PR8652 Production of Automotive Components</td>
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<td>AU8651 Manufacturing of Automotive Components</td>
<td>AU8018 Manufacturing of Automotive Components</td>
</tr>
<tr>
<td>8.</td>
<td>Production Engineering</td>
<td>AU8651 Manufacturing of Automotive Components</td>
<td>PR8652 Production of Automotive Components</td>
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<tr>
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<td></td>
<td>PR8701 Computer Integrated Manufacturing</td>
<td>PR8701 Computer Integrated Production System</td>
</tr>
<tr>
<td>Faculty of Technology</td>
<td>CY8451 Physical Chemistry</td>
<td>CY8401 Physical Chemistry</td>
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<tr>
<td>10. Chemical Engg.</td>
<td>CY 8351 Instrumental Methods of Analysis</td>
<td>CY8303 Instrumental Methods of Analysis for Leather Technologists</td>
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</tr>
<tr>
<td>Leather Technology</td>
<td>CY 8451 Physical Chemistry</td>
<td>CY8402 Physical Chemistry for Leather Technology</td>
<td></td>
</tr>
</tbody>
</table>

Copy to:
1. The Chairman, Faculty of Mechanical Engineering, Anna University, Chennai 25.
2. The Chairperson, Faculty of Electrical Engineering. Anna University, Ch-25.
3. The Chairman, Faculty of Technology, A.C.Tech. Anna University, Chennai 25.
4. The HOD’s of Electrical / Electronics & Instrumentation Engg. MIT, / Production, MIT / Manufacturing / Automobile, MIT / Leather / Rubber & Plastics / Chemical / Mechanical / Industrial / Aeronautical, Anna University, Chennai.
5. ACOE, Anna University, Chennai 25.
6. DCOE, Anna University, Chennai 25.
7. The – DD/CAC University Department / The Stock File, CAC
FOR KIND ATTENTION OF THE HOD'S OF THE UNIVERSITY DEPARTMENTS

ANNA UNIVERSITY, CHENNAI – 600 025.

It is hereby informed that the following REVISED SYLLABUS shall be followed for the B.E. / B.Tech. (FULL – TIME) Degree Programmes of the University Departments, Anna University, Chennai – 25, under Regulation 2012.

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Branches</th>
<th>Revised Syllabus &amp; New Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>B.E. Manufacturing Engineering</td>
<td>1. ME 8073 Design for Manufacturing (Syllabus of Mechanical Engineering has to be followed)</td>
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<tr>
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<td></td>
<td>2. ME8074 Design of Jigs, Fixtures and Press Tools (Syllabus of Mechanical Engineering has to be followed)</td>
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<tr>
<td></td>
<td></td>
<td>3. PR8652 Production of Automotive Components (Syllabus of Production Engineering has to be followed)</td>
</tr>
<tr>
<td>2.</td>
<td>B.E. Industrial Engineering</td>
<td>MF8073 Flexible Manufacturing Systems (Syllabus of Manufacturing Engineering has to be followed)</td>
</tr>
</tbody>
</table>

The copies of the same are enclosed herewith for taking necessary action at your end.

Encl: as above

Copy to:
1. The Chairman, Faculty of Mechanical Engineering, Anna University, Chennai 25.
2. The HOD, Mechanical Engineering, CEG Campus, Anna University, Chennai 25.
3. The HOD, Manufacturing Engineering, CEG Campus, Anna University, Chennai 25.
4. The HOD, Industrial Engineering, CEG Campus, Anna University, Chennai 25.
5. The ACOE, Anna University, Chennai - 25
6. The DD – University Department
7. The Stock File, CAC.
OBJECTIVES:
- To understand the principles of design such that the manufacturing of the product is possible.
- To educate students on various design aspects to be considered for manufacturing the products using different processes.

UNIT I  MANUFACTURING METHODOLOGY AND PROCESESS  9
Methodologies and tools, design axioms, design for assembly and evaluation, minimum part assessment, Taguchi method, robustness assessment, manufacturing process rules, designer's tool kit, Computer Aided group Technology, failure mode effects analysis, Value Analysis, Design for minimum number of parts, development of modular design, minimizing part variations, design of parts to be multi-functional, multi-use, ease of fabrication, Poke Yoke principles.

UNIT II  GEOMETRIC ANALYSIS  9
Surface finish, review of relationship between attainable tolerance grades and different machining processes, part features-feature of size-control from-placement material condition – MMC – LMC

UNIT III  FORM DESIGN OF CASTINGS AND WELDMENTS  9
Redesign of castings based on parting line considerations, minimizing core requirements, redesigning cast members by welded structure, use of welding symbols.

UNIT IV  MECHANICAL ASSEMBLY  9
Selective assembly, deciding the number of groups, control of axial play, examples, Grouped datum systems, different types, geometric analysis and applications, design features to facilitate automated assembly, Assembly analysis worst case Arithmetic method, Monte Carlo method.

UNIT V  TRUE POSITION THEORY  9
Virtual size concept, floating and fixed fasteners, projected tolerance zone, assembly with gasket, zero true position tolerance, functional gauges, paper layout gauging, examples. Operation sequence for typical shaft type of components. Preparation of process drawings for different operations, tolerance worksheets and centrality analysis, examples.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCE BOOKS:
OBJECTIVES:
- To understand the functions and design principles of Jigs, fixtures and press tools
- To gain proficiency in the development of required views of the final design.

UNIT I  LOCATING AND CLAMPING PRINCIPLES  8
Objectives of tool design- Function and advantages of Jigs and fixtures -- Basic elements -- principles of location -- Locating methods and devices -- Redundant Location -- Principles of clamping -- Mechanical actuation -- pneumatic and hydraulic actuation Standard parts -- Drill bushes and Jig buttons -- Tolerances and materials used.

UNIT II  JIGS AND FIXTURES  10
Design and development of jigs and fixtures for given component- Types of Jigs -- Post, Turnover, Channel, latch, box, pot, angular post jigs -- Indexing jigs -- General principles of milling, Lathe, boring, broaching and grinding fixtures -- Assembly, Inspection and Welding fixtures -- Modular fixturing systems- Quick change fixtures.

UNIT III  PRESS WORKING TERMINOLOGIES AND ELEMENTS OF CUTTING DIES  10

UNIT IV  BENDING AND DRAWING DIES  10
Difference between bending and drawing -- Blank development for above operations -- Types of Bending dies -- Press capacity -- Spring back -- knockouts -- direct and indirect -- pressure pads -- Ejectors -- Variables affecting Metal flow in drawing operations -- draw die inserts -- draw beads- ironing -- Design and development of bending, forming, drawing, reverse re-drawing and combination dies -- Blank development for axisymmetric, rectangular and elliptic parts -- Single and double action dies.

UNIT V  OTHER FORMING TECHNIQUES  7
Bulging, Swaging, Embossing, coining, curling, hole flanging, shaving and sizing, assembly, fine blanking dies -- recent trends in tool design- computer Aids for sheet metal forming Analysis -- basic introduction -- tooling for numerically controlled machines- setup reduction for work holding -- Single minute exchange of dies -- Poka Yoke.

TOTAL: 45 PERIODS

Note: (Use of P S G Design Data Book is permitted in the University examination)

TEXT BOOK:

REFERENCES:
5. ASTME Fundamentals of Tool Design Prentice Hall of India.
OBJECTIVES:
- To impart knowledge in various manufacturing methods in developing automotive components.
- To study the principle of automobile engineering.

UNIT I ENGINE
Working principle of two strokes, four stroke and wankel engines – wet and dry liners – Piston and Piston rings – types – classification. Production of – Cylinder block, Cylinder head, liners, oil pan, piston and piston rings and testing.

UNIT II ENGINE PARTS
Working principle of crank shaft – Cam shaft – valve operating mechanisms – carburetors - spark plug Production of – Connecting rod – Crankshaft - push rod and rocker arm – valves – tappets – carburetors and spark plugs

UNIT III FUEL AND TRANSMISSION SYSTEM

UNIT IV CHASSIS AND SUSPENSION SYSTEM

UNIT V RECENT ADVANCES

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
2. Newton and steels, the motor vehicle, ELBS, 1990
OBJECTIVES:
- To understand the Modern manufacturing systems
- To understand the concepts and applications of flexible manufacturing systems

UNIT I  PLANNING, SCHEDULING AND CONTROL OF FLEXIBLE MANUFACTURING SYSTEMS
Introduction to FMS- development of manufacturing systems - benefits - major elements - types of flexibility - FMS application and flexibility - single product, single batch, n batch scheduling problem - knowledge based scheduling system.

UNIT II  COMPUTER CONTROL AND SOFTWARE FOR FLEXIBLE MANUFACTURING SYSTEMS
Introduction - composition of FMS- hierarchy of computer control - computer control of work center and assembly lines - FMS supervisory computer control - types of software specification and selection - trends.

UNIT III  FMS SIMULATION AND DATA BASE

UNIT IV  GROUP TECHNOLOGY AND JUSTIFICATION OF FMS
Introduction - matrix formulation - mathematical programming formulation - graph formulation - knowledge based system for group technology - economic justification of FMS- application of possibility distributions in FMS systems justification.

UNIT V  APPLICATIONS OF FMS AND FACTORY OF THE FUTURE
FMS application in machining, sheet metal fabrication, prismatic component production - aerospace application - FMS development towards factories of the future - artificial intelligence and expert systems in FMS - design philosophy and characteristics for future.

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCE BOOKS: