

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI
(C.G.)**

Scheme of Teaching & Examination

M. E. in CAD

III Semester

| S. No. | Board of Study | Subject Code | Subject | Periods per Week | | | Scheme of Examination Theory /Practical | | | Total Marks | Credit L+(T+P)/2 |
|--------------------|----------------|--------------|----------------------------------|------------------|----------|-----------|--|-----------|------------|-------------|---------------------|
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Mech. Engg. | 558311(37) | Data Base Management System | 3 | 1 | - | 100 | 20 | 20 | 140 | 4 |
| 2 | Refer table 3 | | Elective-III | 3 | 1 | - | 100 | 20 | 20 | 140 | 4 |
| 3 | Mech. Engg. | 563321(37) | Preliminary work on Dissertation | - | - | 28 | 100 | - | 100 | 200 | 14 |
| 4 | Mech. Engg. | 563322(37) | Seminar based on dissertation | - | - | 3 | - | - | 20 | 20 | 2 |
| Total Marks | | | | 6 | 2 | 31 | 300 | 40 | 160 | 500 | 24 |

L-Lecture, T- Tutorial, P- Practical, ESE- End Semester Examination, CT- Class Test, TA- Teacher's Assessment

Note : Duration of all theory papers will be of Three Hours.

Table-3

| Elective-III | | | |
|---------------------|----------------|--------------|-----------------------------------|
| S. No. | Board of study | Subject code | Subject |
| 1 | Mech. Engg. | 558331 (37) | Computer Integrated Manufacturing |
| 2 | Mech. Engg. | 563332(37) | Tribology in Design |
| 3 | Mech. Engg. | 558323 (37) | Computational Fluid Dynamics |

Note (1) – 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a Particular academic session.

Note (2) – Choice of elective course once made for an examination cannot be changed in future Examinations.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M. E. III**

Subject: **Data Based Management System**

Total Theory Periods: **40**

Total Marks in End Semester Exam. : **100**

Minimum number of class test to be conducted: **02**

Branch: **Mechanical Engineering**

Code: 558311(37)

Total Tutorial Periods: **12**

UNIT 1

Introduction: Data, Information, Record, File, File Organization like: Sequential, Indexed Sequential Random. Traditional file processing approach. Database approach of data management, Advantage of database approach over file processing approach. Data Definition, Abstraction Models, Independence, Data Manipulation language, Data base manager and Administrator's System Signature.

UNIT 2

Entity Relation Model: Entity - Relationship, Attributes, Mapping constraints, Keys, E – R Diagrams and reduction to tables, Generalization and Aggregation, Extended E - R diagram.

UNIT 3

Relation Model: Structure, Relational algebra and calculus, Modification and views, SQL, QUEL, Integrity Constraints, Functional Dependencies.

UNIT 4

Relational Data Base Design: Pitfalls in RDB Design, Normalization using functional, Multivalued, Join dependencies, Domain key normal form, alternative approaches.

UNIT 5

SQL: Query languages, SQL as DDL, SQL as Query language, SQL as DML, Views in SQL.

TEXT BOOKS

1. H. K. Korth A. Silberschatz - Database System Concepts
2. C. J. Date – Introduction to Database System

REFERENCE BOOKS

1. J. D. Ullman – Principles of Database System
2. Bipin C. Desai -- Introduction to Database System, Galgotia Publication
3. Database Management system – R. Paneerselvan, PHI Publication
4. Fundamental of database system – R. Elmars, S. Navathe, Pearson Education

CHHATISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M. E. III**

Branch: **Mechanical Engineering**

Subject: **Computer Integrated Manufacturing**

Code: **558331 (37)**

Total Theory Periods: **40** Total Tutorial Periods: **12**

Total Marks in End Semester Exam. : **100**

Minimum number of class test to be conducted: **02**

UNIT 1

Introduction: Evolution of CIM, scope of CIM, segments of generic CIM, Automated Process Planning – Process planning, group technology, variant and generative process planning methods, AI in process planning, process planning software. CNC technology – Principles of numerical control, features of CNC systems, programming techniques, capabilities of a typical NC CAM software, integration of CNC machines in CIM environment, DNC – Flexible manufacturing systems- Architecture, work stations.

UNIT 2

Manufacturing Systems: MRP II software, production control software, forecasting, master production schedule, materials requirements planning, capacity requirements planning, shop floor control, shop floor data collection techniques, inventory management, purchase orders, bill of materials, standard product routing, job costing, marketing applications.

UNIT 3

Robotics, Automated Assembly and Inspection: Types of robots and their performance capabilities, programming of robots, hardware of robots, kinematics of robots, product design for robotized manufacturing, selecting assembly machines, feeding and transfer of parts, applications of robots in manufacture and assembly, sensors. Automated quality control types of CMM, non-contact inspection methods, in process and post process metrology, flexible inspection systems. Computer Aided Inspection and on line quality monitoring.

UNIT 4

Data Communications and Technology Management: Technology issues, configuration management, database systems, management of technology, networking concepts, Local area Network (LAN), SQL fundamentals, Manufacturing Automation protocols (MAP) and Technical and office protocols (TOP) fundamentals.– CIM models, economics of CIM, implementation of CIM.

UNIT 5

Collaborative Engineering: Introduction, Faster Design throughput, Web based design, Changing design approaches, extended enterprises, concurrent engineering , supply chain management (SCM), customerrelations management(CRM) Virtual Reality and Factory simulation, Agile and lean manufacturing, reverse engineering , Rapid prototyping.

TEXT BOOKS

1. Manufacturing Engineering and Technology – Serope Kalpakjian, and Steven R. Smith, Pearson education.
2. Automation , Production systems and Computer Integrated Manufacturing System – Mikell P.Groover, PHI Publication.

REFERENCE BOOKS

1. Computer Integrated Manufacturing Hand Book – Eric Teicholz and Joel Orr, McGraw Hill Publication.
2. Computer Integrated Manufacturing – Paul G. Ranky, CIMware Publishers.
3. CAD / CAM / CIM – Radhakrishnan, New Age International Publication.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M. E. III**

Subject: **Tribology In Design**

Total Theory Periods: **40**

Total Marks in End Semester Exam. : **100**

Minimum number of class test to be conducted: **02**

Branch: **Mechanical Engineering**

Code: **563332(37)**

Total Tutorial Periods: **12**

UNIT 1

Surfaces, Friction and Wear: Topography of surfaces: Surfaces features, Experimental Determinations of surface structure, Chemical analysis of surface, surface effects in Tribology, Analysis of surface roughness, measurement of surface roughness. Friction: Mechanism of friction, measuring friction, equations and models of friction, Friction properties of metallic and non metallic materials, friction in extreme conditions. Wear: Types, mechanism, mapping, measurements, wear resistance materials, surface treatment, surface modifications and surface coatings. Computer Simulations of friction, lubrication and wear.

UNIT 2

Lubrication Theory: Lubricants, selection criteria, lubrication regime, Hydrodynamic, elasto and plasto hydrodynamic lubrication, basic equations, Reynold's equation, energy equation, boundary lubrication, boundary lubricating films and its properties. Hydrostatic lubrication, Gas lubrication

UNIT 3

Design of Fluid Film Bearings: Dynamic analysis of hydrodynamic bearing performance, trust and journal bearings– full, partial, fixed and pivoted – mass flow rate, friction, power loss, heat and temperature difference, dynamic loads, oil film thickness, stiffness of squeeze film and dynamic coefficient – hydrostatic bearing design.

UNIT 4

Industrial Components and Systems: Slider bearings – self acting finite bearings, failure modes, materials rolling element bearings – Types, contact mechanics, bearing internal load distribution, lubrication – Bearing geometry and kinematics, load ratings and life prediction, torque calculation, temperature analysis, endurance testing and failure analysis.

UNIT 5

Space and Automotive Tribology: Introduction – Mechanism, components, liquid and solid lubricants, accelerated testing and life testing of space mechanism. Principles of Aerospace eccentric bearing test mechanism. Engine Tribology –importance, lubrication regimes, engine bearings, wheel bearings, tire. Mechanics of load transfer – contact area and normal pressure distribution, brakes, effects of service on engine oil properties. Tribology in manufacturing – macro and micro tribology of MEMS materials. Technologies for machinery diagnosis and prognosis.

TEXT BOOKS

1. Cameron, A. "Basic Lubrication Theory", Ellis Herward Ltd., UK, 1981.
2. Hulling, J. (Editor) – "Principles of Tribology", MacMillan, 1984.
3. Williams, J.A. "Engineering Tribology", Oxford University Press, 1994.

REFERENCES

1. Neale, M.J. "Tribology Handbook", Butterworth Heinemann, 1995.
2. Bharat Bhushan, "Modern Tribology Handbook" Vol. – I & II.

CHHATISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **M. E. III**

Subject: **Computational Fluid Dynamics**

Total Theory Periods: **40**

Total Marks in End Semester Exam. : **100**

Minimum number of class test to be conducted: **02**

Branch: **Mechanical Engineering**

Code: **558323 (37)**

Total Tutorial Periods: **12**

UNIT 1

Typical partial differential equation in fluid dynamics. Types of second order equations, second order wave equations, system of first order equations, Finite difference and finite volume discretisation, Equation of Parabolic Type.

UNIT 2

Equation of hyperbolic type: Explicit schemes, Lax-Wendroff scheme and variants, Implicit schemes, Second order wave equation, Method of characteristics for second order hyperbolic equations, Equation of elliptic type: the laplace equation in two dimension, iterative methods for solution of linear algebraic systems, solution of the pentadiagonal system.

UNIT 3

The basic equations of fluid dynamics: Basic conservation principals, Unsteady Navier-Stokes equation it Integral form, Navier-Stokes equation it Differential form, Boundary conditions for Navier- Stokes equation. Reynolds averaged Navier-Stokes equations, Boundary layer, thin layer and associated approximations. Grid generation.

UNIT 4

Inviscid Incompressible Flow, Potential flow problem, panel Methods, panel methods for subsonic and supersonic flows, Inviscid compressible flow: Small perturbation flow, Numerical solution of the full potential equation.

UNIT 5

Boundary Layer flow: Physical consideration , the boundary layer equations, computations of laminar boundary layer, Turbulent boundary layers, Viscous Incompressible flow computation, stream function Vorticity approach, Viscous compressible flow, RANS, Turbulence Modelling, Basic computational methods for compressible flow.

TEXT BOOKS

1. Computational Fluid Dynamics -- T. J. Chung, Cambridge University Press
2. Text book of Fluid Dynamics – Frank Chorlton, CBS Publications.

REFERENCE BOOKS

1. Computational Methods for Fluid Dynamics – Gerziger and Peric, Springer Publication.
2. Numerical Methods in Fluid Flow & Heat Transfer – Dr. Suhas Patankar.
3. Introduction to Computational Fluid Dynamics -- P.Niyogi, S.K. Chakrabarty and M.K.Laha, Pearson education
4. Computational Fluid Dynamics -- J.A. Anderson, McGraw-Hill Publication