Master of Technology - Industrial & Production Engineering

Syllabus - First Semester

ADVANCED SOLID MECHANICS

Course Code: IPE4101 **Credit Units: 04**

Course Contents:

Module-I: Three Dimensional Stress and Strain:Principal stresses and Principal strains, Mohr's circle representation of tri-axial stresses and strains.

Module-II: Unsymmetrical Bending: Shear centers for sections with one axis of symmetry. Shear center for any unsymmetrical section, stress and deflection of beams subjected to unsymmetrical bending.

Module-III: Bending of Plates: Basic definitions, Stress, Curvature and Moment relations, Basic Equation of plate deflection, Different boundary conditions, simply supported rectangular plates, axis symmetric loaded circular plates.

Module-IV: Contact Stresses:Due to Two Spherical Surfaces in Contact, Due to Two Parallel Cylindrical Rollers in Contact, Due to Two Curved Surfaces of Different Radii.

Module-V: Buckling of Columns: Beam columns with single concentrated load, number of concentrated loads, continuous lateral load, end couple, couples at both ends of the column, triangular loads and combined loads.

Module-VI: Beam on Elastic Foundations:General Theory, Infinite, Semi-infinite, and Finite beams, Classification of Beams, Beam supported by equally spaced elastic elements**.**

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books Recommended:

Textbooks:

- Advanced Strength and Applied Elasticity' by Augural &Fenster, Prentice Hall.
- Advanced Mechanics of Solids' by L., Srinath, TMH
- Intermediate Mechanics of Materials' by J. R. Barber, McGraw-Hill
- Introduction to Solid Mechanics' by Shames &Pitarresi, PHI
- Advanced Topics of Strength of Materials' by U.C. Jindal, Galgotia Publication
- Arthur P. Boresi, Richard J. Schmidt and Omar M. Sidebottom: ***Advanced Mechanics of Materials***, 5th Edition, John Wiley & Sons, Inc., 1993

- W.Michale Lai, David Rubin and ErchardKrempl: ***Introduction to Continuum Mechanics***, 3rd Edition, Pergamum Press, 1993

Other references:

- Beer, P.F.and Johnston, E.R.: ***Mechanics of materials***, 2nd Edition (Metric Edition), McGraw Hill Inc, 1992.
- R.C.Hibbeler: ***Mechanics of materials***, SI 2nd Edition, Prentice-Hall Inc, 2005
- Arthur P. Boresi, and Ken P. Chong: ***Elasticity in Engineering Mechanic***, 2th Edition, John Wiley & Sons, Inc., 2000
- J.R. Barber: ***Intermediate Mechanics of Materials***, McGraw Hill International Edition, Mechanical Engineering Series, 2001

APPLIED NUMERICAL METHODS

Course Code: IPE4102 **Credit Units: 03**

Course Contents:

Module-I: Approximations and Errors in Computations
Introduction, Numbers and their Accuracy, Errors and their Computation, Error in Series Approximation

Module-II: Numerical Solution of Ordinary Differential Equations
Introduction, Solution by Taylor's Picard's Method, Euler's Method, Runge-Kutta Methods, Predictor-Corrector Methods, the Cubic Spline Method, Simultaneous and Higher Order Equations, Boundary Value Problems: Finite-Difference Method, The Shooting Method, and The Cubic Spline Method.

Module-III: Numerical Solution of Partial Differential Equations
Introduction, Finite-Difference Approximations, Laplace's Equation: Jacobi's Method, Gauss-Seidel Method, SOR Method, ADI Method, Parabolic Equations, Iterative Methods, Hyperbolic Equations.

Module-IV: Numerical Differentiation and Integration
Introduction, Numerical Differentiation, Numerical Integration, Euler-Maclaurin Formula, Adaptive Quadrature Methods, Gaussian Integration, Singular Integrals, Furies' Integrals, Numerical Double Integration

Module-V: Least- square Curve Fitting and Function Approximation
Introduction, Least-square Curve Fiting, Spline Inaterpolation,Cubic Splines, Chebyshev Minimax Approximation, Chebyshev Polynomials.

Module-VI: Numerical Solution of Nonlinear Systems
Introduction, Picard Iteration, Newton's Method, Perturbed Iterative Scheme

Module-VII: System of Linear Algebraic Equations
Introduction, Methods for Large Linear Systems, Direct Methods, LU- Decomposition Methods, Iterative Methods, III-conditioned Systems.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books Recommended:

- Niyogi, Pradip, "Numerical Analysis and Algorithms", Tata McGraw –Hill
- Balagurusamy,E., "Numerical Methods", Tata McGraw –Hill
- Sastry, S.S., "Introduction Methods of Numerical Analysis", PHI
- Chapra, S.C. and Canal, R.P., "Numerical Methods for Engineers", Tata McGraw –Hill
- Gerald, F. Curtis, "Applied Numerical Analysis", Pearson Education

ADVANCED FLUID MECHANICS

Course Code: IPE4103 **Credit Units: 04**

Course Contents:

Module-I: Review of Kinematics: Lagrangian, Eulerian Representation, Veracity, Special Motions,Review of Governing Equations, Integral Equations for a system, Local Equations in Lagrangian Formulation, Local Equations in Eulerian Formulation, Integral Equations for a Control Volume.

Module-II: In viscid Fluids: Euler's Equation, Bernoulli's Equation, Crocco.s Equation, Vortices/Stream Function Formulation, Some Exact Solutions, Kelvin's Theorem, Helmholtz Theorem, D.Alembert.s Paradox, Fluid Mechanics Film Discussion

Module-III: Viscous flow: Review of Constitutive Equations, Linearly Viscous Compressible, and Linearly Viscous Incompressible. Exact solution, plane Poiseuille and Coquette flows; Hagen Ponselle flow through pipes.

Module-IV: Flows with large Reynolds number: Flows with very large Reynolds number, elements of two dimensional boundary layer theory; displacement thickness and momentum thickness, skin friction, Blassius solution for boundary layer on a flat plate without pressure gradient; the Karman-Polhausen integral method for obtaining approximate solutions. Drag on bodies; form drag and skin friction drag profile drag and its measurement. Taylor Vortices

Module-V: Approximations to Navies-Stokes Equations, Non-dimensionalization, Stokes Flow Uniform Flow Past a Sphere, Exact Solution, Uniform Flow Past A Circular Cylinder, Stokes Paradox, Extensions of Stokes theory, Thin Films,Lubrication Theory, Squeeze Films, Thin Films with Free Surfaces ,Hele-Shaw Flow, Boundary Layer Theory. Stability of Fluid Motions. Compressible Fluid Flow:Derivation of basic equations, Fanno flow, Rayleigh flow

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books:

- Fluid Mechanics and Its Applications Vijay Gupta & S.K. Gupta New Age International.
- Fluid Mechanics and Machinery DR Durgaiah New Age International.
- Engineering Fluid Mechanics J A Roberson and C T Crowe Jaico Publishing House.
- Fluid Mechanics: Problems and Solutions Joseph H Spark.
- Introduction to Fluid Mechanics A.F. James Prentice Hall of India.

ADVANCED MANUFACTURING SCIENCE

Course Code: IPE4104 **Credit Units: 03**

Course Contents:

Module-I: Introduction: Limitations of Conventional machining processes Need of advanced machining processes and its classification.

Module-II: Mechanical Type Metal Removal Processes: Ultrasonic machining; Elements of the process; Tool design and economic considerations; Applications and limitations, Abrasive jet and Abrasive water jet machining principles; Mechanics of metal removal; Design of nozzles; applications, Abrasive finishing process, Magnetic abrasive finishing process

Module-III: Thermal Type Advance Machining Processes: Classification, General principles and applications of Electro discharge, Plasma arc, Ion beam, Laser beam, Electron beam machining, Mechanics of metal removal in EDM, selection of EDM pulse generator dielectric, machining accuracy, surface finish and surface damage in EDM, Generation and control of electron beam for machining applications, advantages and limitations

Module-IV: Chemical and Electro-chemical Type Metal Removal Processes: Principle, working advantages, disadvantages and applications of Electrochemical, Chemical machining, Economy aspects of ECM, Electro-chemical demurring and honing

Module-V: Hybrid Unconventional Machining Processes: Introduction to ECDM, ECAM, And Abrasive EDM etc.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books:

- Advance Machining Processes V.K. Jain New Age
- Modern Machining Processes P.C. Pandey New Age
- Manufacturing Processes Degarmo -
- Manufacturing Processes Kalpakjian Tata McGraw-Hill International

COMPUTER INTEGRATED MANUFACTURING

Course Code: IPE4105 **Credit Units: 03**

Course Contents:

Module-I: Introduction: Introduction to Automation, Need and future of NC Systems and CAM, Advantages and Disadvantages, Open and Closed loop systems, Historical developments and future trends. Future of NC Machines, Difference between ordinary and NC Machine tools, Methods for improving accuracy and productivity.

Module-II: Control of NC Systems: Types of CNC Machine Tools systems devices, e.g. encoders and interpolators, Features of CNC Systems, Direct Numerical Control (DNC), Standard Controllers and General Programming features available in CNC Systems, Computer Process monitoring and Control. Adaptive control systems.

Module-III: NC Part Programming: Manual Programming for simple parts, e.g., turning, milling, drilling, etc., Computer aided NC Programming in APT language, use of canned cycles, Generation of NC Programmer through CAD/CAM systems, Design and implementation of post processors.

Module-IV: Computer Aided Process Planning: Introduction, Manual process planning vs. Computer aided process planning, Basics of variant and generative process planning methods, Examples of automated process planning systems.

Module-V: Computer Integrated Manufacturing: Introduction, features and applications of CIM, key elements, advantages and disadvantages of CIM.

Module-VI: Artificial Intelligence in Manufacturing: Introduction, Elements of Expert Systems, Introduction to Neural Networks, Expert Systems application in manufacturing, Case studies.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books:

- Computer Control of Manufacturing Systems Korean -
- CAD/CAM Grooves Prentice Hall
- NC Machine Tools S J Martin -
- CAD/CAM P N Rao Tata McGraw Hill
- CAD/CAM P Radhakrishnan, S Subramanian, V Raju
- Computer Aided Manufacturing Chang, Wysk& Wang Prentice Hall of India

ADVANCED FLUID MECHANICS LAB

Course Code: IPE4106 **Credit Units: 01**

- Determination of Chezy's and Manning's constants
- Determination of co-efficient of discharge for venturiflume/standing wave
- Determination of pipe friction factor.
- Determination of minor losses.
- Study of hydraulic jump
- Impact of Jet
- Trial on turbine.
- Trial on centrifugal pump.
- Trial on reciprocating pump

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ADVANCED MANUFACTURING SCIENCE LAB

Course Code: IPE4107 **Credit Units: 01**

- To study the working of EDM.
- To determine the effects of process variables of EDM on surface finish of parts.
- To determine the effects of process variables on dimensional accuracy of parts in EDM process.
- To measure the cutting forces in turning operation on lathe machine tool.
- To measure the cutting forces in drilling operation on radial drilling machine tool.
- To measure the cutting forces in grinding operation on surface grinding machine tool.
- To study the working of Ultrasonic Drilling process.
- To study the working of Advanced Manufacturing System.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER INTEGRATED MANUFACTURING LAB

Course Code: IPE4108 **Credit Units: 01**

Course Contents:

Features and selection of CNC turning and milling centers, Practice in part programming and Operation of CNC turning machines, subroutine techniques and use of cycles. Practice in part Programming and operating a machining center, tool Joining and selection of sequences of Operations, tool setting on machine, practice in APT based NC programming. Practice in Robot Programming and its languages, Robotic simulation using software, Robot path control, Preparation of various reports and route sheets, Simulation of manufacturing system using CAM Software, controller operating system commands

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Syllabus - Second Semester

OPTIMIZATION TECHNIQUES

Course Code: IPE4201 **Credit Units: 04**

Course Contents:

Module-I: Introduction: Need of Optimization and Historical Development, Engineering Applications, Classification and Formulation of Optimization Problem

Module-II: Classical Optimization Techniques: Single-Variable and Multi-Variable Optimization, With and Without Constraints, Kuhn-Tucker Conditions,

Module-III: Non-Linear Programming: Introduction, One-Dimensional Optimization Methods, Unconstrained and Constrained Optimization Techniques; Elimination Methods, Exhaustive Search, Interval Halving, Fibonacci, Golden Section Methods; Random Search Methods, Hooke and Jeeves Method, Powell's Method; Indirect Search Methods: Steepest Descent, Fletcher-Reeves, Newton's Method, DFP, BFGS Method; Internal and External Penalty Approach.

Module-IV: Other Optimization Techniques: Introduction and Basic Concepts of Geometric Programming, Dynamic Programming, Integer Programming, Stochastic Programming, Their Applications

Module-V: Advance Topics in Optimization: Multi-Objective Programming, Introduction to Genetic Algorithms, Simulated Annealing and ANN Based Optimization.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books Recommended:

- Engineering Optimization Theory and Practice by S.S. Rao, New Age International.
- Optimization for Engineering Design by Kalyanmoy Deb, PHI.
- Optimization Techniques by J.S. Arora, John Wiley

DESIGN OF EXPERIMENTS

Course Code: IPE4202 **Credit Units: 03**

Course Contents:

Module-I: Introduction and Experimental Methods: Introduction to Instruments and Their Representation; Static and Dynamic Performance Characteristics of Instruments; Transducer and Intermediate Elements; Advances in Instrumentation and Measurements. Experimental methods for measurements: motion, force, torque & power, pressure, temperature, stress and strain (including principal values), acoustics, signal and systems analysis; Sensors theory and applications;

Module-II: Measurement Methods and Applications: Basic statistical concepts; Normal distribution and related analysis, Gaussian distribution, Poisson distribution; Errors and error propagation in results - addition, subtraction, multiplication, division, powers, roots, general error propagation; Graphical representation; Curve fitting of experimental data – linear least-square curve fitting best straight line, equations of second degree and higher; goodness of fit, Consistent and inconsistent experiments, Chi-square test.

Module-III: Advanced Experiments and Applications: Control Systems and Engineering Applications; Application of Digital Computers in Experimental Data Analysis; Measurements of fluctuating quantities, Auto-correlations of random signal; Analysis and Measurements of space and auto correlations, Optical method and analysis for stresses in loaded members; Hot-wire/film method and analysis for turbulence quantities; Laser Doppler anemometer and application.

Module-IV: Fundamentals of Design of Experiments: Experiments Design Concepts: Introduction, Applications of experimental design, basic design principles, Basic statistical Methods, Variance, practical interpretation, Blocking factors, Factorial experiments, Two level factorial design, Regression modeling, Robust design, Random effects models.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books:

- Experimental Measurements, Precision, Error and Truth – N.C. Barford (Imperial College of Sic & Tech), Addison-Wesley Publication Company, London.
- Engineering Fundamentals in Measurements, Probability, Statistics and Dimensions – K.C. Crandall and R.W. Sea bloom (University of Washington); McGraw Hill.
- Instrumentation, Measurements and Analysis - B.C. Nakra& K.K. Chaudhry (IIT Delhi); Tata McGraw Hill.
- Experimental Methods for Engineers – J P Holman (Southern Methodist University, USA) Tata McGraw Hill
- Statics for Experimenters: Design, Innovation, and Discovery – George E.P. Box, J. Stuart Hunter and William G. Hunter; Wiley Interscience – John Wiley & Sons, New Jersey, USA.
- Experimental design and Analysis – Howard J. Seltman; 2013, *http://www.stat.cmu.edu/hseltman/ 309/Book/Book.pdf*
- Design and Analysis of Experiments – Douglas C. Montgomery; Wiley International Student Edition (8), 2014.

ADVANCED COMPUTER AIDED MANUFACTURING

Course Code: IPE4211 **Credit Units: 04**

Course Objectives:

The general objectives of the course are to enable the students to

- Understand the basic fundamentals of computer aided design and manufacturing.
- To understand the different geometric modeling techniques like solid modeling, surface modeling, feature based modeling etc. and to visualize how the components look like before its manufacturing or fabrication.
- To learn the part programming, importance of group technology, computer aided process planning, computer aided quality control.
- To learn the overall configuration and elements of computer integrated manufacturing systems.

Course Contents:

Module-I: Automation: Types of automation, Programmed Automation, History of Numerical Control,Components of NC: Punched Tape, MCU, Processing Unit, Axis Designation, NC Motion Control:PTP, Straight cut, Contouring NC Coding System: EIA & ISO format, Application NumericalControl, Advantages, & Disadvantages, Adoptive Control System.

Module-II: Computer Numerical Control: Block Diagram of CNC operations, Positioning System: Open loopand Closed loop System, Precision in NC Positioning: Control resolution, Accuracy, Repeatability.

Module-III: Part Programming: Procedures Associated with part programming, Cutting process parameterselection, Process planning issues and path planning, Part programming formats, G & M Codes, Interpolations, Canned Cycles and Subprograms, Tool Compensations etc.

Module-IV: CNC Hardware Basics: Machines Structure, Guidways: Requirements, types and design features, Actuation systems: Ball Screws, Introduction of Servo and Stepper Motors, Feedback devices: Encoder, Optical grating, Resolvers, Inductosyn

Module-V: Modern CNC Systems: Indexable carbide tools, Modular Tooling & Tool Presetting, MachiningCenters, Automatic tool changers

Module-VI: Computer Aided Part Programming: APT Programming, Part Program Generation through ProE/DelCAM, Post Processors Computations for part programming: Segmentations of free form curves, Consideration for INTOL and OUTTOL, Part programming for Bezier and B-spline Curves, Generating part program from CAD drawings.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books:

- Groover M.P., Automation, Production Systems, and Computer-Integrated Manufacturing", Pearsoned Education.
- S K SINHA,"CNC Programming", Galgotia Pubs.

Reference Books:

- Chang, Wysk and Wang, Computer Aided Manufacturing, Prentice Hall International. 3rd Edition
- Kochan D., CAM: Developments in Computer Integrated Manufacturing System, Springer Verlag.
- Chang, T.C., An Introduction to Automated Process Planning Systems, Prentice Hall International.
- Rao P N.,"CAD/CAM Principles and Practice", Tata McGraw-Hill
- Kundra, Rao and Tiwari, Numerical Control and CAM
- Robert Quesada, T. Jeyapoovan, "Computer Numerical Control : Machining Center and Turning Centers", Tata McGraw-Hill

MECHATRONICS

Course Code: IPE4204 **Credit Units: 04**

Course Contents:

Module-I: Introduction: Definitions, trends, control systems, microprocessor / micro controller based controllers, PC based controllers, applications: SPM, robot, CNC machine, FMS, CIM.

Module-II: Sensor Technology: Sensor and transducers, terminology, displacement, position, proximity – encoders, velocity – tachogenerators, force - strain gauges, pressure, temperature – thermocouples, RTDs, thermistors, light sensors – photoelectric sensors, IR sensors, sensor selection.

Module-III: Signal Conditioning: Introduction, the operational amplifier, protection, filtering, Wheatstone bridge, digital signals, multiplexers, data acquisition, digital signal processing, pulse – modulation.

Module-IV: Precision Mechanical Actuation: Pneumatic actuation systems, electro-pneumatic actuation systems, hydraulic actuation systems, electro-hydraulic actuation systems, mechanical systems, types of motion, kinematics, inverse kinematics, timing belts, ball screw and nut, linear motion guides, linear bearings, harmonic transmission, bearings, motor / drive selection.

Module-V: Electronic Devices and Circuits: Semiconductor devices, diodes and LEDS, zener diodes and voltage regulator, inductive kick, bandwidth, frequency %& response of a measurement system, bipolar transistor circuits, amplifiers.

Module-VI: Electromechanical Drives: Relays and solenoids, stepper motors, DC brushed and brushless motors, DC servo motors, AC / DC motors for non-servo motion drives, braking methods, pulse width modulated, Bipolar driver, Mosfet drives, SCR drives, variable frequency drives.

Module-VII: Digital Electronics: Digital logic, number systems, logic gates, Boolean algebra, Karnaugh maps, sequential logic.

Module-VIII: Microprocessors:
Control, microcomputer structure, microcontrollers, digital interfacing, analog interacting, DAC,ADC applications.

Module-IX: Input / Output Systems:
Interfacing, input / output ports, interface requirements, peripheral interface adapters, serial communication interface, direct memory access.

Module-X: Control System:
System transfer function, Laplace transformation and its applications, continuous and discrete processes, proportional control, integral control, differential control, PID control, digital controllers, control system performance, controller tuning, adaptive control, frequency response, PLC, PMC, introduction to fuzzy logic and neural networks.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books Recommended:

- Understanding Electro-Mechanical Engineering – An Introduction to Mechatronics by Kamm, Prentice-Hall of India.

WELDING & AIDED MANUFACTURING

Course Code: IPE4205 **Credit Units: 04**

Course Contents:

Module-I: Welding Metallurgy: Welding as compared with other fabrication processes, Classification of welding processes; Heat affected zone and its characteristics; Effects of alloying elements on weld ability, Weld ability of steels, stainless steel, cast iron, and aluminum and titanium alloys, Weld testing standards, Hydrogen embrittlement, Lamellar tearing, residual stresses and its measurement, heat transfer and solidification, Analysis of stresses in welded structures, Pre and post welding heat treatments, Metallurgical aspects of joining, Conditions of soldering, Brazing and welding of materials.

Module-II: Weld Design & Quality Control: Principles of sound weld design, Welding joint design, Welding defects; Testing of weldament, Material joining characteristics, Welding positions, Allowable strength of welds under steady loads, Weld throat thickness; Weld quality, Discontinuities in welds, their causes and remedies and quality conflicts.

Module-III: Modern Trends in Welding: Friction welding, Explosive welding, Diffusion bonding, High frequency induction welding, Ultrasonic welding, Electron beam welding, Plasma arc welding, Laser welding.

Module-IV: Mechanization in Welding: Mechanization of flat/circular joints, Thin/thick sheets (resistance/arc weld), Mechanization of I beams (arc weld), Longitudinal circumferential SA welding (roller blocks, column booms, flux supports), Circular/spherical welding joints (rotating tables petitioners), Manufacture of welding longitudinal welded pipes by induction, TIG, Plasma and SA welding of spiral welded pipes.

Module-V: Robotics in Welding: Robot design and applications in welding, Programming of welding robots, tolerances forassemblies for robot welding, New generation of welding robots, Self alignment by current arc variation, Robots for car body welding, Microelectronic welding and soldering, Efficiency of robotics in welding.

Module-VI: Soldering: Techniques of soldering, solders, phase diagram, composition, applications
Brazing: Wetting and spreading characteristics, surface tension and contact angle concepts, brazing fillers, role of flux and characteristics, atmospheres for brazing, adhesive bonding,
Cladding, Surfacing and Cutting

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books:

- Advanced Welding Processes Nikodaco&Shansky MIR Publications
- Welding Technology and Design VM Radha Krishnan New Age International
- Source Book of Innovative welding Processes M.M. SchwarizAmerical Society of Metals (Ohio)
- Advanced Welding Systems, Vol. I, II, III J. CornuJaico Publishers
- Manufacturing Technology (Foundry, Forming and Welding)P.N. Rao Tata McGraw

- Materials and Applications - Metal JoiningSchwartz M McGraw-Hill, 1979 Manual
- Modern Arc Welding Technology NadkarniS.V.Oxford IBH Publishers, 1996
- Laser Welding - A Practical Guide Christopher Davis Jaico Publishing House, 1994
- Welding Engineering and Technology, Parmer R SKhanna Publishers, 1997
- Friction Stir Welding and Processing, Mishra. R.S and Mahoney. M.W ASM, 2007

ADVANCED COMPUTER AIDED MANUFACTURING LAB

Course Code: IPE4212 **Credit Units: 01**

Course Contents:

1. Practice programming on manual part programming
2. To write the CNC programme for the given operation.
3. To perform step-turning operation using CAM software on CNC lathe.
4. To perform plain turning operation using CAM software on CNC lathe.
5. To perform the side milling, face milling operation using CAM software on CNC milling machine.
6. Simulation of manufacturing system using CAM Software
7. Practice in APT based NC programming.
8. To perform the drilling operation using CAM software on CNC milling machine

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

DESIGN OF EXPERIMENTS LAB

Course Code: IPE4207 **Credit Units: 01**

Experiments related with the subjects theory.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

OPTIMIZATION TECHNIQUES LAB

Course Code: IPE4208 **Credit Units: 01**

Experiments related with the subjects theory.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

RESEARCH METHODOLOGY AND TECHNICAL REPORT WRITING

Course Code: IPE4210 **CreditUnits:02**

Course Objectives:
The course will enhance scientific , technical and research writing skills and impart knowledge about various stages of research process, statistical analysis, statistical tests and their applications in statistical decision making.

Course Contents:

Module I: Introduction to research: Definition, motivation, need, objectives, significance and characteristics of research; types of research; steps in research process; planning a research proposal; literature review, web searching.

Module II: Population and sample, parameter and statistic, sampling and data collection, sampling design: steps, types, sample size, sampling methods, large and small samples, primary and secondary data, data processing and analysis. Sample surveys and questionnaire designing, scaling techniques.

Module III: Dependent and independent variables, univariate, bivariate and multivariate analysis, means-arithmetic, geometric and harmonic; measure of dispersion of data, standard deviation, variance, coefficient of variation and degree of freedom. Hypothesis testing: null hypothesis and alternate hypothesis, errors in hypothesis testing, significance and confidence levels, parametric tests and non-parametric tests, one-tailed and two-tailed tests, analysis of variance. Regression analysis and curve fitting, method of least-squares, explained and unexplained variations, coefficient of correlation, coefficient of determination**.**

Module IV: Technical/scientific/research report writing: structure and components of scientific reports, formats of dissertations, research report, report writing skills, report preparation, referencing , bibliography and footnotes. Making presentation-use of visual aids and PPTs. Publication of research papers, citations,. Intellectual property rights and copy rights, plagiarism, patents and patent laws, commercialization and ethical issues.

Examination Scheme:

Attendance	Assignment/Library consultation / Thesis writing	Class test	Final Exam	Total
5	15	10	70	100

Text Books:

- Blake, G. and Bly, R.W. 1993, The Elements of Technical Writing. MacMillan, New York
- Booth, V. 1981. Writing a Scientific Paper and Speaking at Scientific Meetings. The Biochemical Society, London
- Chawla,D and Sondhi, N. 2016, Research Methodology- Concepts and Cases. Vikas Publishing House Pvt Ltd. New Delhi
- Kothari, C.R.2008. Research Methodology- Methods and Techniques, 2nd.ed. New Age International Publishers, New Delhi.

Reference Books:

- Geode, Millian J.& Paul K. Hatl, Methods in Research, McGraw Hills, New Delhi.
- Montomery, Douglas C.(2007), 5th Ed. Design and Analysis of Experiments, Wiley India.
- Panneerselvam, R.2009. Research Methodology, PHI Learning Pvt.Ltd., New Delhi-110001
- Ranjit Kumar 2009. Research Methodology- A step –by- step Guide for beginners; 2nd ed. Dorling Kindersley (India) Pvt. Ltd. Patpargang, Delhi- 110092

Syllabus - Third Semester

TOTAL QUALITY MANAGEMENT & QUALITY ASSURANCE

Course Code: IPE4301 **Credit Units: 03**

Course Contents:

Module-I: The Foundations of Total Quality Management: Components of quality, The total quality management approach, Innovation, design and improvement, Product quality characteristics and service quality characteristics, Quality parameters and specific dimensions of quality

Module-II: Key Aspects of the Quality System: Planning for quality**,** Flowcharting, Detailed flow process charts and flow diagrams**,** planning for just-in-time (JIT) management**,** System design and contents**,** System documentation, implementation and assessment

Module-III: TQM Tools and the Improvement Cycle: Measurement of quality, Costs of quality, Tools and techniques for quality improvement, Statistical process control, Quality improvement techniques in service industries, Specific techniques for design, reliability, maintenance and process improvement

Module-IV: The Quality Organization Within an Organization: People and the organizational structure**,** Responsibilities and performance management**,** The relationship between the quality organization and top management**,** Culture change through teamwork for quality improvement**,** Implementing teamwork for quality improvement: the DRIVE model

Module-V: Internal Quality Audits: Scope of requirements and audit procedures**,** the audit programme and planning of quality audits**,** Verifying compliance with planned arrangements, determining the effectiveness of the system**,** reporting the results of quality audits**,** Follow-up audits

Module-VI: Quality and Business Process Re-engineering: Beyond tools to total quality management**,** Stages in the development of quality and related activities: inspection, quality assurance**,** company-wide quality control**,** total quality management, Quality circles

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books

- Total Quality Management – the route to improving performance**, OAKLAND, J.S.,** Butterworth/Heinemann (1993)
- ISO 9000 Quality Systems Handbook 2nd Edition, HOYLE**, D., Butterworth**/Heinemann1997

METROLOGY AND COMPUTER AIDED INSPECTION

Course Code: IPE4302 **Credit Units: 04**

Course Contents:

Module-I: Metrological concepts – Concept of accuracy, Need for high precision measurement associated withhigh precision measurements. Accuracy of numerical control system, Inaccuracy due to thermal aspects, Detailed surface roughness concept, Dimensioning & Dimensional chains, Surface and form metrologyflatness,roughness, waviness cylindricity, etc., Methods of improving accuracy & surface finish, Influence of forced vibration on accuracy, Dimensional wear of cutting tools and its influences on accuracy.

Module-II: Standards for length measurement standards and their calibration - Light interference - Method ofCoincidence - Measurement errors. Various tolerances and their specifications, gauging assembly,Comparators.

Module-III: Angular measurements - principles and instrument measurements

Module-IV: Computer Aided Metrology - Principles and interfacing, soft metrology - Application of lasers inPrecision measurements- laser interface, laser scanners, Coordinate measurement machine (CMM),Type of CMM & applications, none contact CMM, Electro optical sensors for dimension, contact no sensors or surface finish measurements. Image processing and its Metrology. Acoustical measurements, Digital techniques in mechanical measurements, Assessing and presenting experimental DATA

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

PRODUCTION PLANNING & CONTROL

Course Code: IPE4304 **Credit Units: 03**

Course Contents:

Module-I: General: Functions of production planning and control, preplanning planning, control, plant layout, simplification and standardization, time and motion study.

Module-II: Product Development and Design: Effect of competition on design, Long-range Planning, Company policy, product analysis, marketing aspects, the product characteristics, functional aspect, operational aspect, durability and dependability, Aesthetic aspect; Economic analysis, Profit and competitiveness, The three S's:- Standardization, Simplification and Specialization. Break Even Analysis.

Module-III: Inventory Control: Definition, classification, objectives of inventory control, functions, economic order quantity various inventory models. Numericals on inventory control. Inventory carrying costs, factors affecting inventory costs. V.E.D. analysis, S-D-E analysis, F-S-N analysis H-M-L analysis and ABC analysis. Safety stocks, their objectives safety stocks and service levels.

Module-IV: Evaluation of Material and Processes: Introduction, value analysis, consideration of new techniques and materials, value analysis tests, material utilization of a product or assembly. Numerical problems on material utilization of a product. Value engineering job plan and various phases of job plan in systematic value engineering approach.

Module-V: Routing, Loading and Scheduling: Introduction, Scheduling Procedure, Master Schedule, its objectives, Order scheduling, Loading by scheduled period, Dispatching, Job card, Job order. Commercial Loading & Scheduling Devices.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books Recommended:

- Production Planning and control: Samuel Eilon
- Production Planning and Control: K.C. Aggarwal & K.C. Jain
- Industrial Engg. & Operation Management by S.K. Sharma & Savita Sharma.
- Production Planning and Control: King J.R.
- Production Planning and Control: Sharma, Hari Rraghu Rama.
- Production Planning and Control: Narasimhan Seetha-rama L.

NON-CONVENTIONAL MACHINING

Course Code: IPE4305 **Credit Units: 03**

Course Contents:

Module-I: Introduction: Need for advanced machining processes; An Overview of Modern machining processes

Module-II: Mechanical processes: Abrasive Jet Machining; Ultrasonic Machining; Abrasive Flow Finishing; Magnetic Abrasive Finishing; Abrasive Water Jet Machining

Module-III: Thermoelectric advanced machining processes: EDM; EleGtric Discharge Diamond Grinding; Wire EDM; Laser beam Machining; Plasma Arc Machining; Electron Beam Machining

Module-IV: Electrochemical and Chemical Processes: ECM; ECG; Electro stream Drilling; Electrochemical Deburring; Chemical Machining

Examination Scheme:

Components	**A**	**CT**	**S/V/Q**	**HA**	**EE**
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books Recommended:

- Advanced Machining Processes by V.K. Jain. Allied Publishers Pvt Ltd
- Model:n Machining Processes by P.C. Pandey and H.S. Shan. Tata McGraw- Hill

QUALITY & RELIABILITY MANAGEMENT

Course Code: IPE4306 **Credit Units: 03**

Course Contents:

Module-I: Introduction: Concept of quality, Need, Factor influencing quality, Types of quality, Quality control, Cost of quality control, Quality assurance, Benefits, Modern concept, Inspection and quality control, Quality characteristics, Quality circles.

Module-II: Statistical Concepts and Control Charts: Review of fundamental statistical concept, Frequency distribution, Central tendency, measures of dispersion, Probability distributions, statistical quality control, Theory of control charts, Control charts for variables and attributes ($\bar{x}$, R, P, np and C chart), their advantages and disadvantages, Applications.

Module-III: Acceptance Sampling: Introduction, Advantages and Disadvantages, Operating Characteristics curve, Producer's and consumer's risk, Quality indices for acceptance sampling plans, Types of sampling Plans-single double sequential sampling plan, Sampling plan for variables, continuous sampling plans, Skip lot sampling plans, Chain sampling plan.

Module-IV: Total Quality Management: Introduction, Concept of Total quality, Quality function, Deployment tools for continuous quality improvement, The ISO 9000 family of standards, Six sigma and other extensions of TQM.

Module-V: Reliability: Introduction, Factor effecting Reliability, Failure and its types, Failure curve, Majors of reliability, MTBF, MTTF, Relationship b/w reliability failure rate and MTBF and its characteristics, System reliability (components in series and parallel) System reliability with stand by components, Redundancy, Operating characteristics curve, Reliability and life testing plans, Types of test, Maintainability, Availability.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Books Recommended:

- Statistical Quality control by C. Gupta.
- Modern Methods for Quality Control and Improvement by Harrism M. Wadsworth.
- Statistical Quality control by E.L. Grant.
- Reliability Mathematics by B.L.AmsTadter.
- Fundamental of Quality Control and Improvement by AmitavaMitra.

METROLOGY AND COMPUTER AIDED INSPECTION LAB

Course Code: IPE4307 **Credit Units: 01**

Experiments related with the subjects theory.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

SUMMER INTERNSHIP EVALUATION

Course Code: IPE4335 **Credit Units: 06**

Guidelines:
There are certain phases of every Intern's professional development that cannot be effectively taught in the academic environment. These facets can only be learned through direct, on-the-job experience working with successful professionals and experts in the field. The internship program can best be described as an attempt to institutionalize efforts to bridge the gap between the professional world and the academic institutions. Entire effort in internship is in terms of extending the program of education and evaluation beyond the classroom of a university or institution. The educational process in the internship course seeks out and focuses attention on many latent attributes, which do not surface in the normal classroom situations. These attributes are intellectual ability, professional judgment and decision-making ability, inter-disciplinary approach, skills for data handling, ability in written and oral presentation, sense of responsibility etc.

In order to achieve these objectives:

- **Each student will be allotted a supervisor** for proper guidance.
- **Student will first submit synopsis in the format given by coordinator/supervisor.**
- Student will maintain a file (**Internship File/Project Report**). **Further, coordinator will provide NTCC project guidelines and sample to help in preparation of file.** The Internship File aims to encourage students to keep a personal record of their learning and achievement throughout the Programme. It can be used as the basis for lifelong learning and for job applications. Items can be drawn from activities completed in the course modules and from the workplace to demonstrate learning and personal development. The File will assess the student's analytical skills and ability to present supportive evidence, whilst demonstrating understanding of their organization, its needs and their own personal contribution to the organization.

The **layout guidelines** for the Project Report

1. File should be in the following specification

- A4 size paper
- **Font**

For normal text Font Type and Size must be- Times New Roman, 12 pt. The minimum font size of materials within a table or a figure can be 10 point.

- **Margins**

A margin of 3.75 cm (1½ inch) is to be given on the binding edge while on the other sides it is to be 2.5 cm (1 inch). The text of the report, including headings, figures, tables, and notes, but excluding page numbers, must be accommodated within the page area.

- **Line Spacing**

The line spacing in the main text must be between one-and-a-half (1.5). Single line spacing should be given for figure captions, table titles, figure legends, and footnotes. Equations, tables, figures, and quotations should be set off from the main text with adequate space (not less than the normal line spacing adopted for the main text). Two consecutive paragraphs should be separated by a spacing which must be larger than the line spacing adopted for the text.

- **Tables and Figures**

Each sketch, drawing, graph and photograph should have a figure number and title below the figure etc. Numbering should be sequential, chapter wise. For instance, if there are 24 figures chapter 3 spread over all of its sections the figure numbers run from Figure 3.1 through Figure 3.24. In figures experimental data should typically be represented by centered symbols, and theoretical data by continuous curves.
Each table should have a table number and caption above the table. Numbering should be sequential, chapter wise, as in the case of Figure numbers. For instance, if there are 18 tables in chapter 3 the table numbers run from Figure 3.1 through Figure 3.18.

Make sure that figures and tables are complete in other respects such as legends, references (if any) and coordinate labels with units. Each figure and table must be explicitly referred to in the text and located where its first reference occurs, preferably after the reference.

- **Drawings**

All engineering drawings must conform to relevant Standards and should include a title block. If drawings are large they should be included at the back of the report in a separate pocket. In case drawings are made using CAD packages, a CD ROM should be included which contains all the files and details of the packages used.

- **Equations**

The numbering of equations should be sequential, chapter wise. Numbered equations must be explicitly referred to in the text.

2. Report Size: The maximum number of pages of the Report should be preferably between 50-80 pages.

3. Report Layout: The report should contain the following components
Front Page
Table of Content
Acknowledgement
Student Certificate
Company Profile (optional)
Introduction
Main Body
References / Bibliography

The File will include ***five sections*** in the order described below. The content and comprehensiveness of the main body and appendices of the report should include the following:

1. **The Title Page**--Title - An Internship Experience Report For (Your Name), name of internship organization, name of the Supervisor/Guide and his/her designation, date started and completed, and number of credits for which the report is submitted.
2. **Declaration by the Students-**This is page number (i), the beginning of the small case Roman numeral page numbers. The student has to give a declaration to the effect that the data used for the work, the work depicted in the report, and the written material contained in the report are not copied from others and that due permission has been taken from, and due credit has been given to, the sources whenever they are used.
3. Certificate-This is page number (ii). The certificate will be signed by the Faculty Supervisor(s) before the viva-voce after verifying the format and by the Head of the Department after review with the Supervisor(s).

4. Acknowledgements-This is page number (iii). Keep this brief and avoid using informal language. This page must be signed by the candidate.
5. Abstract and **Keywords-**This is page number (iv). The abstract (preferably one page) should contain the context/relevance of the problem at hand, a description of what was done and a gist of the significant observations/results.
The keywords (maximum 6) are a hint that what is contained in the report.
7. Contents-This is page number (v). The table of Contents should be titled just *Contents* (not Table of Contents). Try to fit it into one or two pages.
8. **Introduction**--short, but should include how and why you obtained the internship experience position and the relationship it has to your professional and career goals.
9. **Main Body**--should include but not be limited to daily tasks performed. Major projects contributed to, dates, hours on task, observations and feelings, meetings attended and their purposes, listing of tools and materials and their suppliers, and photographs if possible of projects, buildings and co-workers.
10. **References / Bibliography** --This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

ASSESSMENT OF THE INTERNSHIP FILE

Continuous Internal Assessment	**Final Assessment**
40 Marks	60 Marks

Continuous Internal Assessment consists of topic relevance, progress report and synopsis marks. Final Assessment includes viva, presentation and report marks.

Examination Scheme:

Components	**V**	**S**	**R**	**PR**	**FP**
Weightage (%)	20	20	20	20	20

V – Viva, S – Synopsis, FP – Final Presentation, R – Report, PR-Progress Report

PROJECT-DISSERTATION-I

Course Code: IPE4337 **CreditUnits: 05**

GUIDELINES FOR DISSERTATION

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation.

Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

A short account of the activities that were undertaken as part of the project;

A statement about the extent to which the project has achieved its stated goals.

A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;

Any activities planned but not yet completed as part of the DISSERTION, or as a future initiative directly resulting from the project;

Any problems that have arisen that may be useful to document for future reference.

- Report Layout

The report should contain the following components:

- **Title or Cover Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

- **Acknowledgements** (optional)

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- **Abstract**

A good"Abstract" should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project

- **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

- **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

- **Materials and Methods**

This section should aim at experimental designs, materials used. Methodology should be mentioned in details including modifications if any.

- **Results and Discussion**

Present results, discuss and compare these with those from other workers, etc. In writing these section, emphasis should be given on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.

Note that in writing the various secions, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary never write in "point" form.

- **Conclusion**

A conclusion should be the final section in which the outcome of the work is mentioned briefly.

- **Future prospects**

- **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

- **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples

For research article

Voravuthikunchai SP, Lortheeranuwat A, Ninrprom T, Popaya W, Pongpaichit S, Supawita T. (2002) Antibacterial activity of Thai medicinal plants against enterohaemorrhagic*Escherichia coli* O157: H7. *ClinMicrobiol Infect*, **8** (suppl 1): 116–117.

For book

Kowalski,M.(1976) Transduction of effectiveness in *Rhizobium meliloti*. SYMBIOTIC NITROGEN FIXATION PLANTS (editor P.S. Nutman IBP), **7**: 63-67

ASSESSMENT OF THE DISSERTATION FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution.
Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project.
Project execution is concerned with assessing how much work has been put in.
The File should fulfill the following ***assessment objectives:***

Range of Research Methods used to obtain information

Execution of Research

Data Analysis
Analyse Quantitative/ Qualitative information
Control Quality

Draw Conclusions

Examination Scheme:

Dissertation	50
Viva Voce	50
Total	**100**

ata, leading to production of a structured report.

Selecting the Dissertation Topic
It is usual to give you some discretion in the choice of topic for the dissertation and the approach to be adopted. You will need to ensure that your dissertation is related to your field of specialization.

Deciding this is often the most difficult part of the dissertation process, and perhaps, you have been thinking of a topic for some time.

It is important to distinguish here between 'dissertation topic' and 'dissertation title'. The topic is the specific area that you wish to investigate. The title may not be decided until the dissertation has been written so as to reflect its content properly.

Few restrictions are placed on the choice of the topic. Normally we would expect it to be:
- relevant to business, defined broadly;
- related to one or more of the subjects or areas of study within the core program and specialisation stream;
- clearly focused so as to facilitate an in-depth approach, subject to the availability of adequate sources of information and to your own knowledge;
- of value and interest to you and your personal and professional development.

Planning the Dissertation
This will entail following:
- Selecting a topic for investigation.
- Establishing the precise focus of your study by deciding on the aims and objectives of the dissertation, or formulating questions to be investigated. Consider very carefully what is worth investigating and its feasibility.
- Drawing up initial dissertation outlines considering the aims and objectives of the dissertation. Workout various stages of dissertation
- Devising a timetable to ensure that all stages of dissertation are completed in time. The timetable should include writing of the dissertation and regular meetings with your dissertation guide.

The Dissertation plan or outline
It is recommended that you should have a dissertation plan to guide you right from the outset. Essentially, the dissertation plan is an outline of what you intend to do, chapter wise and therefore should reflect the aims and objectives of your dissertation.

There are several reasons for having a dissertation plan

- It provides a focus to your thoughts.
- It provides your faculty-guide with an opportunity, at an early stage of your work, to make constructive comments and help guide the direction of your research.
- The writing of a plan is the first formal stage of the writing process, and therefore helps build up your confidence.
- In many ways, the plan encourages you to come to terms with the reading, thinking and writing in a systematic and integrated way, with plenty of time left for changes.
- Finally, the dissertation plan generally provides a revision point in the development of your dissertation report in order to allow appropriate changes in the scope and even direction of your work as it progresses.

Keeping records

This includes the following:

- Making a note of everything you read; including those discarded.
- Ensuring that when recording sources, author's name and initials, date of publication, title, place of publication and publisher are included. (You may consider starting a card index or database from the outset). Making an accurate note of all quotations at the time you read them.
- Make clear what is a direct a direct quotation and what is your paraphrase.

Dissertation format

All students must follow the following rules in submitting their dissertation.

- Front page should provide title, author, Name of degree/diploma and the date of submission.
- Second page should be the table of contents giving page references for each chapter and section.
- The next page should be the table of appendices, graphs and tables giving titles and page references.
- Next to follow should be a synopsis or abstract of the dissertation (approximately 500 words)
- Next is the 'acknowledgements'.
- Chapter I should be a general introduction, giving the background to the dissertation, the objectives of the dissertation, the rationale for the dissertation, the plan, methodological issues and problems. The limitations of the dissertation should also be hinted in this chapter.
- Other chapters will constitute the body of the dissertation. The number of chapters and their sequence will usually vary depending on, among others, on a critical review of the previous relevant work relating to your major findings, a discussion of their implications, and conclusions, possibly with a suggestion of the direction of future research on the area.
- After this concluding chapter, you should give a list of all the references you have used. These should be cross - references with your text. For articles from journals, the following details are required e.g.

  Draper P and Pandyal K. 1991, The Investment Trust Discount Revisited, Journal of Business Finance and Accounting, Vol18, No6, Nov, pp 791-832.

  For books, the following details are required:
  Levi, M. 1996, International Financial Management, Prentice Hall, New York, 3rd Ed, 1996

- Finally, you should give any appendices. These should only include relevant statistical data or material that cannot be fitted into the above categories.

The Layout Guidelines for the Dissertation

- A4 size Paper
  - Font: Arial (10 points) or Times New Roman (12 points)
  - Line spacing: 1.5

- Top and bottom margins: 1 inch/ 2.5 cm; left and right margins: 1.25 inches/ 3 cm

Guidelines for the assessment of the Dissertation
While evaluating the dissertation, faculty guide will consider the following aspects:

1. Has the student made a clear statement of the objective or objective(s).
2. If there is more than one objective, do these constitute parts of a whole?
3. Has the student developed an appropriate analytical framework for addressing the problem at hand.
4. Is this based on up-to-date developments in the topic area?
5. Has the student collected information / data suitable to the frameworks?
6. Are the techniques employed by the student to analyse the data / information appropriate and relevant?
7. Has the student succeeded in drawing conclusion form the analysis?
8. Do the conclusions relate well to the objectives of the project?
9. Has the student been regular in his work?
10. Layout of the written report.

Assessment Scheme:

Continuous Evaluation:		40%
(Based on Abstract, Regularity, Adherence to initial plan, Records etc.)		
Final Evaluation: Based on,		60%
Contents & Layout of the Report,	20	
Conceptual Framework,	05	
Objectives & Methodology and	05	
Implications & Conclusions	10	
Viva & Presentation	20	

Syllabus - Fourth Semester

PROJECT-DISSERTATION-II

Course Code: IPE4437 **Credit Units: 15**

GUIDELINES FOR DISSERTATION

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- **Conclusion**

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- **Future prospects**

- **Appendices**

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- **References / Bibliography**

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ASSESSMENT OF THE DISSERTATION FILE

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Analyse Quantitative/ Qualitative information
Control Quality

Draw Conclusions

Examination Scheme:

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Viva Voce	50
Total	**100**

ata, leading to production of a structured report.

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Deciding this is often the most difficult part of the dissertation process, and perhaps, you have been thinking of a topic for some time.

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Few restrictions are placed on the choice of the topic. Normally we would expect it to be:
- relevant to business, defined broadly;
- related to one or more of the subjects or areas of study within the core program and specialisation stream;
- clearly focused so as to facilitate an in-depth approach, subject to the availability of adequate sources of information and to your own knowledge;
- of value and interest to you and your personal and professional development.

Planning the Dissertation
This will entail following:
- Selecting a topic for investigation.
- Establishing the precise focus of your study by deciding on the aims and objectives of the dissertation, or formulating questions to be investigated. Consider very carefully what is worth investigating and its feasibility.
- Drawing up initial dissertation outlines considering the aims and objectives of the dissertation. Workout various stages of dissertation
- Devising a timetable to ensure that all stages of dissertation are completed in time. The timetable should include writing of the dissertation and regular meetings with your dissertation guide.

The Dissertation plan or outline

It is recommended that you should have a dissertation plan to guide you right from the outset. Essentially, the dissertation plan is an outline of what you intend to do, chapter wise and therefore should reflect the aims and objectives of your dissertation.

There are several reasons for having a dissertation plan

- It provides a focus to your thoughts.
- It provides your faculty-guide with an opportunity, at an early stage of your work, to make constructive comments and help guide the direction of your research.
- The writing of a plan is the first formal stage of the writing process, and therefore helps build up your confidence.
- In many ways, the plan encourages you to come to terms with the reading, thinking and writing in a systematic and integrated way, with plenty of time left for changes.
- Finally, the dissertation plan generally provides a revision point in the development of your dissertation report in order to allow appropriate changes in the scope and even direction of your work as it progresses.

Keeping records

This includes the following:

- Making a note of everything you read; including those discarded.
- Ensuring that when recording sources, author's name and initials, date of publication, title, place of publication and publisher are included. (You may consider starting a card index or database from the outset). Making an accurate note of all quotations at the time you read them.
- Make clear what is a direct a direct quotation and what is your paraphrase.

Dissertation format

All students must follow the following rules in submitting their dissertation.

- Front page should provide title, author, Name of degree/diploma and the date of submission.
- Second page should be the table of contents giving page references for each chapter and section.
- The next page should be the table of appendices, graphs and tables giving titles and page references.
- Next to follow should be a synopsis or abstract of the dissertation (approximately 500 words)
- Next is the 'acknowledgements'.
- Chapter I should be a general introduction, giving the background to the dissertation, the objectives of the dissertation, the rationale for the dissertation, the plan, methodological issues and problems. The limitations of the dissertation should also be hinted in this chapter.
- Other chapters will constitute the body of the dissertation. The number of chapters and their sequence will usually vary depending on, among others, on a critical review of the previous relevant work relating to your major findings, a discussion of their implications, and conclusions, possibly with a suggestion of the direction of future research on the area.
- After this concluding chapter, you should give a list of all the references you have used. These should be cross - references with your text. For articles from journals, the following details are required e.g.

  Draper P and Pandyal K. 1991, The Investment Trust Discount Revisited, Journal of Business Finance and Accounting, Vol18, No6, Nov, pp 791-832.

  For books, the following details are required:
  Levi, M. 1996, International Financial Management, Prentice Hall, New York, 3rd Ed, 1996

- Finally, you should give any appendices. These should only include relevant statistical data or material that cannot be fitted into the above categories.

The Layout Guidelines for the Dissertation

- A4 size Paper
  - Font: Arial (10 points) or Times New Roman (12 points)
  - Line spacing: 1.5
  - Top and bottom margins: 1 inch/ 2.5 cm; left and right margins: 1.25 inches/ 3 cm

Guidelines for the assessment of the Dissertation

While evaluating the dissertation, faculty guide will consider the following aspects:

Has the student made a clear statement of the objective or objective(s).
If there is more than one objective, do these constitute parts of a whole?
Has the student developed an appropriate analytical framework for addressing the problem at hand.
Is this based on up-to-date developments in the topic area?
Has the student collected information / data suitable to the frameworks?
Are the techniques employed by the student to analyse the data / information appropriate and relevant?
Has the student succeeded in drawing conclusion form the analysis?
Do the conclusions relate well to the objectives of the project?
Has the student been regular in his work?
Layout of the written report.

Assessment Scheme:

Continuous Evaluation:		40%
(Based on Abstract, Regularity, Adherence to initial plan, Records etc.)		
Final Evaluation: Based on,		60%
Contents & Layout of the Report,	20	
Conceptual Framework,	05	
Objectives & Methodology and	05	
Implications & Conclusions	10	
Viva & Presentation	20	