Department of Mechanical Engineering

Course Outcomes (COs):

First Year Engineering	
Course code and Name: 102003 - Systems in Mechanical Engineering	
102003.1	Describe and compare the conversion of energy from renewable and non-renewable energy sources
102003.2	Explain basic laws of thermodynamics, heat transfer and their applications
102003.3	List down the types of road vehicles and their specifications
102003.4	Illustrate various basic parts and transmission system of a road vehicle
102003.5	Discuss several manufacturing processes and identify the suitable process
102003.6	Explain various types of mechanism and its application
Course code and Name: 102012: Engineering Graphics	
102012.1	Draw the fundamental engineering objects using basic rules and able to construct the simple geometries.
102012.2	Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.
102012.3	Construct the various engineering curves using the drawing instruments.
102012.4	Apply the concept of orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object.
102012.5	Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely

	using drawing equipment.
102012.6	Draw the development of lateral surfaces for cut section of geometrical solids

Second Year Engineering

Course code and Name: 202041 - Solid Mechanics

202041.1	DEFINE various types of stresses and strain developed on determinate and indeterminate members.
202041.2	DRAW Shear force and bending moment diagram for various types of transverse loading and support
202041.3	COMPUTE the slope & deflection, bending stresses and shear stresses on a beam.
202041.4	CALCULATE torsional shear stress in shaft and buckling on the column
202041.5	APPLY the concept of principal stresses and theories of failure to determine stresses on a 2-D element
202041.6	UTILIZE the concepts of SFD & BMD, torsion and principal stresses to solve combined loading application based problems.

Course code and Name: 202042 - Solid Modeling and Drafting

202042.1	UNDERSTAND basic concepts of CAD system, need and scope in Product Lifecycle Management
202042.2	UTILIZE knowledge of curves and surfacing features and methods to create complex solid geometry
202042.3	CONSTRUCT solid models, assemblies using various modeling techniques & PERFORM mass property analysis, including creating and using a coordinate system
202042.4	APPLY geometric transformations to simple 2D geometries

202042.5	USE CAD model data for various CAD based engineering applications viz. production drawings, 3D printing, FEA, CFD, MBD, CAE, CAM, etc
202042.6	USE PMI & MBD approach for communication

Course code and Name: 202043 - Engineering Thermodynamics

202043.1	DESCRIBE the basics of thermodynamics with heat and work interactions
202043.2	APPLY laws of thermodynamics to steady flow and non-flow processes.
202043.3	APPLY entropy, available and non-available energy for an Open and Closed System
202043.4	DETERMINE the properties of steam and their effect on performance of vapour power cycle.
202043.5	ANALYSE the fuel combustion process and products of combustion
202043.6	SELECT various instrumentations required for safe and efficient operation of steam generator

Course code and Name: 202044 - Engineering Materials and Metallurgy

202044.1	COMPARE crystal structures and ASSESS different lattice parameters.
202044.2	CORRELATE crystal structures and imperfections in crystals with mechanical behaviour of materials.
202044.3	DIFFERENTIATE and DETERMINE mechanical properties using destructive and non-destructive testing of materials.
202044.4	IDENTIFY & ESTIMATE different parameters of the system viz., phases, variables, component, grains, grain boundary, and degree of freedom. etc
202044.5	ANALYSE effect of alloying element & heat treatment on properties of ferrous & nonferrous alloy

202044.6	SELECT appropriate materials for various applications.

Course code and Name: 203156 - Electrical and Electronics Engineering

203156.1	APPLY programming concepts to UNDERSTAND role of Microprocessor and Microcontroller in embedded systems
203156.2	DEVELOP interfacing of different types of sensors and other hardware devices with Atmega328 based Arduino Board
203156.3	UNDERSTAND the operation of DC motor, its speed control methods and braking
203156.4	DISTINGUISH between types of three phase induction motor and its characteristic features
203156.5	EXPLAIN about emerging technology of Electric Vehicle (EV) and its modular subsystems
203156.6	CHOOSE energy storage devices and electrical drives for EVs

Course code and Name: 202045 - Geometric Dimensioning and Tolerancing Lab

202045.1	SELECT appropriate IS and ASME standards for drawing
202045.2	READ & ANALYSE variety of industrial drawings
202045.3	APPLY geometric and dimensional tolerance, surface finish symbols in drawing
202045.4	EVALUATE dimensional tolerance based on type of fit, etc.
202045.5	SELECT an appropriate manufacturing process using DFM, DFA, etc

Course code and Name: 207002 - Engineering Mathematics - III

202045.1	SOLVE higher order linear differential equations and its applications to model and analyze mass spring systems
202045.2	APPLY Integral transform techniques such as Laplace transform and Fourier transform to solve differential equations involved in vibration theory, heat transfer and related mechanical engineering applications
202045.3	APPLY Statistical methods like correlation, regression in analysing and interpreting experimental data applicable to reliability engineering and probability theory in testing and quality control.
202045.4	PERFORM Vector differentiation & integration, analyse the vector fields and APPLY to fluid flow problems.
202045.5	SOLVE Partial differential equations such as wave equation, one and two dimensional heat flow equations.
Course code and Name: 202047 - Kinematics of Machinery	
202047.1	APPLY kinematic analysis to simple mechanisms
202047.2	ANALYZE velocity and acceleration in mechanisms by vector and graphical method
202047.3	SYNTHESIZE a four bar mechanism with analytical and graphical methods
202047.4	APPLY fundamentals of gear theory as a prerequisite for gear design
202047.5	CONSTRUCT cam profile for given follower motion
Course code and Name: 202048 - Applied Thermodynamics	
202048.1	DETERMINE COP of refrigeration system and ANALYZE psychometric processes.
202048.2	DISCUSS basics of engine terminology, air standard, fuel air and actual cycles.

202048.3	IDENTIFY factors affecting the combustion performance of SI and CI engines.
202048.4	DETERMINE performance parameters of IC Engines and emission control.
202048.5	EXPLAIN working of various IC Engine systems and use of alternative fuels.
202048.6	CALCULATE performance of single and multi-stage reciprocating compressors and DISCUSS rotary positive displacement compressors

Course code and Name: 202049 - Fluid Mechanics

202049.1	DETERMINE various properties of fluid
202049.2	APPLY the laws of fluid statics and concepts of buoyancy
202049.3	IDENTIFY types of fluid flow and terms associated in fluid kinematics
202049.4	APPLY principles of fluid dynamics to laminar flow
202049.5	ESTIMATE friction and minor losses in internal flows and DETERMINE boundary layer formation over an external surface
202049.6	CONSTRUCT mathematical correlation considering dimensionless parameters, also ABLE to predict the performance of prototype using model laws

Course code and Name: 202050 - Manufacturing Processes

202050.1	SELECT appropriate moulding, core making and melting practice and estimate pouring time, solidification rate and DESIGN riser size and location for sand casting process
202050.2	UNDERSTAND mechanism of metal forming techniques and CALCULATE load required for flat rolling

202050.3	DEMONSTRATE press working operations and APPLY the basic principles to DESIGN dies and tools for forming and shearing operations
202050.4	CLASSIFY and EXPLAIN different welding processes and EVALUATE welding characteristics
202050.5	DIFFERENTIATE thermoplastics and thermosetting and EXPLAIN polymer processing techniques
202050.6	UNDERSTAND the principle of manufacturing of fibre-reinforce composites and metal matrix composites

Course code and Name: 202051 - Machine Shop

202051.1	PERFORM welding using TIG/ MIG/ Resistance/Gas welding technique
202051.2	MAKE Fibre-reinforced Composites by hand lay-up process or spray lay-up techniques
202051.3	PERFORM cylindrical/surface grinding operation and CALCULATE its machining time
202051.4	DETERMINE number of indexing movements required and acquire skills to PRODUCE a spur gear on a horizontal milling machine
202051.5	PREPARE industry visit report
202051.6	UNDERSTAND procedure of plastic processing

Course code and Name: 202052 - Project Based Learning - II

203152.1	IDENTIFY the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aims and objectives.
203152.2	ANALYZE the results and arrive at valid conclusions.
203152.3	PROPOSE a suitable solution based on the fundamentals of mechanical engineering by possibly integration

	of previously acquired knowledge.
203152.4	CONTRIBUTE to society through proposed solutions by strictly following professional ethics and safety measures.
203152.5	USE of technology in proposed work and demonstrate learning in oral and written form
203152.6	DEVELOP ability to work as an individual and as a team member.

Third Year Engineering

Course code and Name: 302041 - Numerical & Statistical Methods

302041.1	SOLVE system of equations using direct and iterative numerical methods.
302041.2	ESTIMATE solutions for differential equations using numerical techniques.
302041.3	DEVELOP solution for engineering applications with numerical integration.
302041.4	DESIGN and CREATE a model using a curve fitting and regression analysis.
302041.5	APPLY statistical Technique for quantitative data analysis.
302041.6	DEMONSTRATE the data, using the concepts of probability and linear algebra.

Course code and Name: 302042 - Heat Transfer

302042.1	ANALYZE & APPLY the modes of heat transfer equations for one dimensional thermal system.
302042.2	DESIGN a thermal system considering fins, thermal insulation and Transient heat conduction.

302042.3	EVALUATE the heat transfer rate in natural and forced convection and validate with experimentation results.
302042.4	INTERPRET heat transfer by radiation between objects with simple geometries, for black and grey surfaces.
302042.5	ABILITY to analyze the rate of mass transfer using Fick's Law of Diffusion and understands mass diffusion in different coordinate systems.
302042.6	DESIGN & ANALYSIS of heat transfer equipments and investigation of its performance.
Course code and Name: 302043- Design Of Machine Elements	
302043.1	DESIGN and ANALYZE the cotter and knuckle Joints, levers and components subjected to eccentric loading.
302043.2	DESIGN shafts, keys and couplings under static loading conditions.
302043.3	ANALYZE different stresses in power screws and apply its knowledge to design screw jack
302043.4	EVALUATE dimensions of machine components under fluctuate loading conditions.
302043.5	EVALUATE & INTERPRET the stress developed on the different type of welded and threaded joints.
302043.6	APPLY the design and development procedure for different types of springs.
Course code and Name: 302044 - Mechatronics	
302044.1	DEFINE key elements of mechatronics, principle of sensor and its characteristics
302044.2	UTILIZE concept of signal processing and MAKE use of interfacing systems such as ADC, DAC, Digital I/O.

302044.3	DETERMINE the transfer function by using block diagram reduction technique.
302044.4	EVALUATE Poles and Zero, frequency domain parameter for mathematical modeling for mechanical system.
302044.5	APPLY the concept of different controller modes to an industrial application.
302044.6	DEVELOP the ladder programming for industrial application.
Course code and Name: 302045B - Elective I- Machining Science & Technology	
302045.1B	DEFINE metal cutting principles and mechanics of metal cutting and tool life.
302045.2B	DESCRIBE features of gear and thread manufacturing processes.
302045.3B	SELECT appropriate grinding wheel and demonstrate the various surface finishing processes.
302045.4B	SELECT appropriate jigs/fixtures and to draw the process plan for a given component
302045.5B	SELECT & EVALUATE various parameters of process planning.
302045.6B	GENERATE CNC program for Turning / Milling processes and generate tool path using CAM software.
Course code and Name: 302046 - Digital Manufacturing Laboratory	
302046.1	DEVELOP a component using conventional machines, CNC machines and Additive Manufacturing Techniques
302046.2	ANALYZE cutting tool parameters for machining given job.
302046.3	DEMONSTRATE simulation of manufacturing process using Digital Manufacturing Tools.

302046.4	SELECT and DESIGN jigs and Fixtures for a given component.
302046.5	DEMONESTRATE different parameters for CNC retrofitting and reconditioning.

Course code and Name: 302047 - Skill Development

302047.1	APPLY& DEMONSTRATE procedure of assembly & disassembly of various machines.
302047.2	DESIGN & DEVELOP a working/model of machine parts or any new product
302047.3	EVALUATE fault with diagnosis on the machines, machine tools and home appliances
302047.4	IDENTIFY & DEMONSTRATE the various activities performed in an industry such as maintenance, design of components, material selection.

Course code and Name: 302049 -Artificial Intelligence & Machine Learning

302049.1	DEMONSTRATE fundamentals of artificial intelligence and machine learning.
302049.2	APPLY feature extraction and selection techniques.
302049.3	APPLY machine learning algorithms for classification and regression problems.
302049.4	DEVISE AND DEVELOP a machine learning model using various steps.
302049.5	EXPLAIN concepts of reinforced and deep learning.
302049.6	SIMULATE machine learning model in mechanical engineering problems.

Course code and Name: 302050 - Computer Aided Engineering

302050.1	DEFINE the use of CAE tools and DESCRIBE the significance of shape functions in finite element formulations.
302050.2	APPLY the various meshing techniques for better evaluation of approximate results.
302050.3	APPLY material properties and boundary condition to SOLVE 1-D and 2-D element stiffness matrices to obtain nodal or elemental solution.
302050.4	ANALYZE and APPLY various numerical methods for different types of analysis.
302050.5	EVALUATE and SOLVE non-linear and dynamic analysis problems by analyzing the results obtained from analytical and computational method.
302050.6	GENERATE the results in the form of contour plot by the USE of CAE tools.
Course code and Name: 302051 - Design of Transmission Systems	
302051.1	APPLY the principle of Spur & Helical gear design for industrial application and PREPARE a manufacturing drawing with the concepts of GD&T.
302051.2	EXPLAIN and DESIGN Bevel & Worm gear considering design parameters as per design standards
302051.3	SELECT&DESIGN Rolling and Sliding Contact Bearings from manufacturer's catalogue for a typical application considering suitable design parameters.
302051.4	DEFINE and DESIGN various types of Clutches, Brakes, used in automobile.
302051.5	APPLY various concept to DESIGN Machine Tool Gear box, for different applications
302051.6	ELABORATE various modes of operation, degree of hybridization and allied terms associated with hybrid electric vehicles.

Course code and Name: 302052 A - Elective II- Composite Materials

302052.1A	DEFINE & COMPARE composites with traditional materials.
302052.2A	IDENTIFY &ESTIMATE different parameters of the Polymer Matrix Composite
302052.3A	CATEGORISE and APPLY Metal Matrix Process from possessions landscape.
302052.4A	DETERMINE volume/weight fraction and strength of Composites.
302052.5A	SELECT appropriate testing and inspection method for composite materials.
302052.6A	SELECT composites materials for various applications.

Course code and Name: 302053 - Measurement Laboratory

302053.1	EVALUATE causes of errors in Vernier calipers, micrometers by performing experiments in standard metrological conditions, noting deviations at actual and by plotting cause and effect diagram, to reduce uncertainty in measurement.
302053.2	ANALYZE strain measurement parameters by taking modulus of elasticity in consideration to acknowledge its usage in failure detection and force variations.
302053.3	EXAMINE surface Textures, surface finish using equipment's like Talysurf and analyze surface finish requirements of metrological equipment's like gauges, jaws of vernier calipers, micrometers, magnifying glasses of height gauge and more, to optimize surface finish accuracy requirements and cost of measurement.
302053.4	MEASURE the dimensional accuracy using Comparator and limit gauges and appraise their usage in actual measurement or comparison with standards set to reduce measurement lead time.
302053.5	PERFORM Testing of Flow rate, speed and temperature measurements and their effect on performance in machines and mechanisms like hydraulic or pneumatic trainers, lathe machine etc. to increase repeatability

	and reproducibility.
302053.6	COMPILE the information of opportunities of entrepreneurships/business in various sectors of metrology like calibrations, testing, coordinate and laser metrology etc in an industry visit report.

Course code and Name: 302054 - Fluid Power & Control Laboratory

302054.1	DEFINE working principle of components used in hydraulic and pneumatic systems.
302054.2	IDENTIFY & EXPLAIN various applications of hydraulic and pneumatic systems.
302054.3	SELECT an appropriate component required for hydraulic and pneumatic systems using manufactures' catalogues.
302054.4	SIMULATE & ANALYSE various hydraulic and pneumatic systems for industrial/mobile applications.
302055.5	DESIGN a hydraulic and pneumatic system for the industrial applications.
302055.6	DESIGN & DEMONESTRATE various IoT, PLC based controlling system using hydraulics and pneumatics.

Course code and Name: 302055 - Internship/ Mini Project *

302055.1	DEMONSTRATE professional competence through industry internship.
302055.2	APPLY knowledge gained through internships to complete academic activities in a professional manner.
302055.3	CHOOSE appropriate technology and tools to solve given problem.
302055.4	DEMONSTRATE abilities of a responsible professional and use ethical practices in day to day life.
302055.5	DEVELOP network and social circle, and DEVELOPING relationships with industry people.

302055.6	ANALYZE various career opportunities and DECIDE career goals.

Final Year Engineering

Course code and Name: 402041 - Heating, Ventilation, Air Conditioning and Refrigeration

402041.1	ANALYSE different air-craft refrigeration systems and EXPLAIN the properties, applications and environmental issues of different refrigerants.
402041.2	ANALYSE multi pressure refrigeration system used for refrigeration applications.
402041.3	DISCUSS types of compressors, condensers, evaporators and expansion valves along with regulatory and safety controls and DESCRIBES Transcritical and ejector refrigeration systems.
402041.4	ESTIMATE cooling load for air conditioning systems used with concern of design conditions and indoor quality of air.
402041.5	DESIGN air distribution system along with consideration of ventilation and infiltration.
402041.6	EXPLAIN the working of types of desiccants, evaporative, thermal storage, radiant cooling, clean room and heat pump systems.

Course code and Name: 402042 - Dynamics of Machinery

402042.1	APPLY balancing technique for static and dynamic balancing of multi cylinder inline and radial engines.
402042.2	ANALYZE the gyroscopic couple or effect for stabilization of Ship, Airplane and Four wheeler vehicles.
402042.3	ESTIMATE natural frequency for single DOF un-damped & damped free vibratory systems.
402042.4	DETERMINE response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces.

402042.5	ESTIMATE natural frequencies, mode shapes for 2 DOF un-damped free longitudinal and torsional vibratory systems.
402042.6	DESCRIBE noise and vibration measuring instruments for industrial / real life applications along with suitable method for noise and vibration control.

Course code and Name: 402043 - Turbomachinery

402043.1	VALIDATE impulse moment principle using flat, inclined and curved surfaces and INVESTIGATE performance characteristics of hydraulic turbines.
402043.2	DETERMINE performance parameters of impulse and reaction steam turbine along with discussion of nozzles, governing mechanism & losses.
402043.3	MEASURE performance parameters of single & multistage centrifugal pumps along with discussion of cavitation and selection.
402043.4	EXPLAIN performance parameters of centrifugal compressor along with discussion of theoretical aspects of axial compressor.

Course code and Name: 402044D - Elective-IIIIndustrial Engineering

402044D.1	EVALUATE the productivity and IMPLEMENT various productivity improvement techniques.
402044D.2	APPLY work study techniques and UNDERSTANDS its importance for better productivity.
402044D.3	DEMONSTRATE the ability to SELECT plant location, appropriate layout and material handling equipment.
402044D.4	USE of Production planning and control tools for effective planning, scheduling and managing the shop floor control.
402044D.5	PLAN inventory requirements and EXERCISE effective control on manufacturing requirements.

402044D.6	APPLY Ergonomics and legislations for human comfort at work place and UNDERSTANDS the role of value engineering in improving productivity.
Course code and Name: 402045B - Elective-IV Operation Research	
402045D.1	EVALUATE various situations of Games theory and Decision techniques and APPLY them to solve them in real life for decision making.
402045D.2	SELECT appropriate model for queuing situations and sequencing situations and FIND the optimal solutions using models for different situations.
402045D.3	FORMULATE various management problems and SOLVE them using Linear programming using graphical method and simplex method.
402045D.4	FORMULATE variety of problems such as transportation, assignment, travelling salesman and SOLVE these problems using linear programming approach.
402045D.5	PLAN optimum project schedule for network models arising from a wide range of applications and for replacement situations find the optimal solutions using appropriate models for the situation.
402045D.6	APPLY concepts of simulation and Dynamic programming
Course code and Name: 402046 - Data Analytics Laboratory	
402046.1	UNDERSTAND the basics of data analytics using concepts of statistics and probability.
402046.2	APPLY various inferential statistical analysis techniques to describe data sets and withdraw useful conclusions from acquired data set.
402046.3	EXPLORE the data analytics techniques using various tools
402046.4	APPLY data science concept and methods to solve problems in real world context

402046.5	SELECT advanced techniques to conduct thorough and insightful analysis and interpret the results

Course code and Name: 402047 - Project (Stage I)

402047.1	Implement systems approach.
402047.2	To conceptualize a novel idea / technique into a product.
402047.3	To think in terms of a multi-disciplinary environment.
402047.4	To take on the challenges of teamwork, and document all aspects of design work.
402047.5	To understand the management techniques of implementing a project.

Course code and Name: 402048 - Computer Integrated Manufacturing

402048.1	EXPLAIN CIM and factory automation.
402048.2	UNDERSTAND the integration of hardware and software elements for CIM
402048.3	APPLY CNC program for appropriate manufacturing techniques.
402048.4	ANALYZE processes planning, quality and MRP integrated with computers.
402048.5	INTERPRET flexible, cellular manufacturing and group technology.
402048.6	ANALYZE the effect of IOT, Industry-4.0 and cloud base manufacturing.

Course code and Name: 402049 - Energy Engineering

402049.1	EXPLAIN the power generation scenario, the layout components of thermal power plant and ANALYZE

	the improved Rankine cycle.
402049.2	ANALYZE the performance of steam condensers, cooling tower system; RECOGNIZE an environmental impact of energy systems and methods to control the same.
402049.3	EXPLAIN the layout, component details of diesel engine plant, hydel and nuclear energy systems.
402049.4	ANALYZE gas and improved power cycles.
402049.5	EXPLAIN the fundamentals of renewable energy systems.
402049.6	EXPLAIN basic principles of energy management, storage and economics of power generation.

Course code and Name: 402050D - Elective-V

Engineering Economics and Financial Management

402050D.1	UNDERSTAND the business environment, concepts of economics and demand-supply scenario.
402050D.2	APPLY the concepts of costing and pricing to evaluate the pricing of mechanical components.
402050D.3	UNDERSTAND accounting systems and analyze financial statements using ratio analysis
402050D.4	SELECT and PREPARE the appropriate type of budget and understand the controlling aspects of budget.
402050D.5	UNDERSTAND the international business and trade system functioning
402050D.6	DEMONSTRATE understanding of financing decisions of new ventures and performance

Course code and Name: 402051D - Elective-VI

Industrial Psychology and Organizational Behavior

402050D.1	DEMONSTRATE fundamental knowledge about need and scope of industrial - organizational psychology and behavior.
402050D.2	ANALYZE the job requirement, have understanding of fatigue, boredom and improve the job satisfaction.
402050D.3	UNDERSTAND the approaches to enhance the performance.
402050D.4	KNOWLEDGE of theories of organizational behavior, learning and social-system.
402050D.5	UNDERSTAND the mechanism of group behavior, various aspects of team, leadership and conflict management.
402050D.6	EVALUATE the organizational culture, manage the change and understands organizational development approaches.

Course code and Name: 402052 - Mechanical Systems Analysis Laboratory

402052.1	DEVELOP an understanding of the Systems Engineering Process and the range of factors that influence the product need, problem-specific information collection, Problem Definition, Task Specification, Solution Concept inception, Concept Development, System's Mathematical Modelling, Synthesis, Analysis, final solution Selection, Simulation, Detailed Design, Construction, Prototyping, Testing, fault-finding, Diagnosis, Performance Analysis, and Evaluation, Maintenance, Modification, Validation, Planning, Production, Evaluation and use of a system using manual calculation, computational tools to automate product development process, redesign from customer feedback and control of technological systems.
402052.2	ILLUSTRATE the concepts and USE the developed skill-set of use of computational tools (FEA, CFD, MBD, FSI, CAE) to automate the complete product development process.
402052.3	EVALUATE the knowledge of new developments and innovations in technological systems to carry forward to next stage of employment after passing your Undergraduate Degree Examination.
402052.4	APPRAISE how technologies have transformed people's lives and can be used to SOLVE challenges associated with climate change, efficient energy use, security, health, education and transport, which will be coming your ways in the coming future.

402052.5	PRIORITIZE the concept of quality and standards, including systems reliability, safety and fitness for the intended purpose.
402052.6	INVENT yourself to face the challenges of future technologies and their associated Problems.
Course code and Name: 402053 - Project – II	
402053.1	Implement systems approach.
402053.2	To conceptualize a novel idea / technique into a product.
402053.3	To think in terms of a multi-disciplinary environment.
402053.4	To take on the challenges of teamwork, and document all aspects of design work.
402053.5	To understand the management techniques of implementing a project.