DEFINITIVE MODULE RECORD

B.Sc. Hons

in

Mechanical Design and Manufacture

Mechanical Design and Manufacture with Business Studies

Marine and Composites Technology

Mechanical Design and Manufacture with Renewable Energy Studies

including

B.Sc. (Ordinary) and 'top-up' to Honours for HND entrants (Partner Colleges)

and

B.Sc. (Hons) final year direct entry

Department of Mechanical and Marine Engineering

Faculty of Technology

March 2002

Contents

Please refer to the ***Business Minor Pathway Information*** of the Plymouth Business School for the module records relevant to the Business Minor.

Stage 1
Modules

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MATH158**	CREDITS: 20	LEVEL: 1

MODULE TITLE: Mathematics

PRE-REQUISITE(S):

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
This module will introduce students to some fundamental mathematical techniques and will motivate students in using computer packages for engineering mathematics.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION 50% END MODULE TEST XX% PRACTICE XX%**
Give Subject Panel Group to which module should be linked .....
Minimum pass mark for accreditation

MODULE AIMS:
1. To develop an appreciation of the need for accurate analysis of engineering problems.
2. To improve confidence and competence in the use of numerical and mathematical techniques.
3. To motivate students in using computer packages for engineering mathematics.

LEARNING OUTCOMES: At the end of this module students **will be able to:**
1. Use basic mathematical techniques to solve engineering problems
2. Differentiate and interpret the derivative of a function and appreciate its engineering applications
3. Integrate a function using appropriate method of integration and appreciate its engineering applications
4. Use derive package to solve engineering problems

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation LO 1 - 3
IT LO 4

INDICATIVE SYLLABUS CONTENT:

1. **Basic Mathematical Techniques**
   Elementary ideas, indices and logs, quadratic equations and factorisation, algebraic manipulation
   Evaluation and rearrangement of formulae, trigonometry, evaluation and rearrangement of formulae
2. **Introduction to computer packages**
3. **Differentiation**
   Definition and interpretation of a derivative
   Sum rule, constant rule, product rule and quotient rule, function of a function rule
   Maximum and minimum values of a function
   Engineering applications of differentiation
4. **Integration**
   Sum rule, constant rule of integration
   Manipulation, substitution, integration by parts methods of integration
   Engineering applications:- Area, centroid, volume, second moment of area, moment of inertia

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION September 2002
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: Maths and Stats.**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: J M Davies | **Semester S1 + S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

Module Code: SOFT122	**Credits:10**	**Level :1**

Module Title : Computing and IT

Pre-Requisites :None

Co - Requisites :None

If Linked, Module linked to :None

Short Module Descriptor -
The impact of the computer and IT upon working practice in industry is changing the way that industry operates. In order to make full use of this facility students need to be aware of the capabilities and limitations of the computer and to be competent in its use.

Elements of Assessment
COURSEWORK 100 %

Module Aims :

- To develop an awareness of hardware and software available in practice.
- To develop an understanding of computer applications in solving engineering problems
- To develop an understanding of a computer programming language.
- To develop an awareness of IT drawing aids.

Skills Elements :

- Keyboard skills.
- Problem solving skills
- IT skills
- Drawing electronically

Objectives / Learning Outcomes :

The student should be able to:-

- specify the computer hardware requirements for a chosen task:
- use both hard drives and floppy drives and to manage files on both:
- use a spreadsheet as an engineering problem solver :
- exchange data between different software:
- write programs to solve engineering problems:
- retrieve data from the field/other sources:
- use industry standard software packages to solve problems:

Indicative Syllabus Content :

- **Introduction to computer systems**
  Mainframe and personal computers. Hardware and software distinction, system programs and applications programs.
- **Using a personal computer**
  Connection and configuration of the equipment. Operating systems, file structures. Communication using the PC and costs of usage.
- **General Industry Standard Software**
  Word processing. Spreadsheets. Introduction to Word processing & spreadsheets and using the capabilities of Excel for engineering calculation.
- **Industry Standard Software**
  Introduction to 2 dimensional drawing using AutoCad.
  Linking analysis and drafting software
- **Introduction to Programming**
  Introduction to programming languages and where these are used. Principles of good programming and data exchange between programs.

Please complete the information below

FACULTY: TECHNOLOGY	**DEPT:** School of Civil and Structural Engineering	**PARTNER INSTITUTION:**
MODULE LEADER: P.BIRD	**SUBJECT GP:** CIVIL ENGINEERING B	**SEMESTER:** S1

VALIDATION- DATE OF APPROVAL: DATE OF IMPLEMENTATION : September 2000
DATES(S) OF APPROVED CHANGES:

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MECH115**	**CREDITS: 10**	**LEVEL: 1**

MODULE TITLE: Engineering Science 1

PRE-REQUISITE(S): None

CO-REQUISITE(S): None

IF LINKED, MODULE LINKED TO: None

SHORT MODULE DESCRIPTOR

An introduction to solid mechanics including the nature of forces and moments, static equilibrium in 2-D, material strength properties and their relationship to the design of elements in tension, compression, shear, torsion, bending and pressure. Life cycle considerations.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION 50%
Give Subject Panel Group to which module should be linked : B5LEV1
Minimum pass mark for accreditation:

MODULE AIMS:
1. To impart a sound understanding of the effects of forces and moments on the design of machine or structural elements.
2. To impart the ability to analyse and design simple structural elements in respect of appropriate material, weight and strength from an engineering and ecological standpoint.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Identify forces and moments on an element and apply the criteria for static equilibrium in 2-D.
2. Identify common structural elements and determine the major stresses in them as a result of '1' above.
3. Appreciate the need for stress analysis of components from a structural integrity standpoint, but also from an ecological standpoint in terms of the penalties of excess weight, life cycle cost, and disposal.

SKILLS ELEMENTS:
Analysis and Evaluation. (LO1&2) (tp&a)
Synthesis, Creativity and Problem Solving. (LO3) (tp&a)
Self Appraisal and Reflection on Practice (LO3) (p)
Planning and Management of Learning (LO1,2&3) (p)
IT (LO2) (t&p))
t=taught, p=practiced, a=assessed

INDICATIVE SYLLABUS CONTENT:

1. Systems and modelling - mathematical, analogue, computational.
2. Forces and Moments - vector representation, components, and equilibrium.
3. The forces generated by the interaction of elements (smooth & rough surfaces, pins, rigid joints) – leading to the drawing of Free body diagrams.
4. Force analysis of pin-jointed structures.
5. Frictional effects
6. Elements in bending – section properties (I,Z), SF and BM diagrams, critical section, bending stresses, factors of safety.
7. Circular Elements in torsion – section properties (J), angle of twist, shear stresses.
8. Thin walled pressure vessels – cylinders, spheres.
9. Combined stresses – Mohr's circle
10. Weight, life cycle costs and disposal considerations.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2002
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr M A Bell**	**Semester * S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **DSGN131**	**CREDITS: 20**	**LEVEL: 1**

MODULE TITLE: **Design & CAD**

PRE-REQUISITE(S):

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
An introduction to the forms and role of engineering drawings and CAD in engineering design. Basic draughting procedures, basic 2-D CAD and 3-D parametric associative CAD.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION 0% END MODULE TEST % PRACTICE %**
Give Subject Panel Group to which module should be linked
.....B5LEV1.....
Minimum pass mark for accreditation .....

MODULE AIMS:

To introduce formal draughting as part of the design procedure.
To introduce orthographic projection with sections, dimensions and tolerances.
To introduce assembly drawing and standard engineering components.
To provide a grounding in 2-d CAD and 3-D parametric associative CAD.

LEARNING OUTCOMES: At the end of this module students SHOULD **be able to:**

Produce a fully detailed orthographic drawing of a simple component.
Produces an assembly drawing of approximately 8 components and/or standard parts.
Identify a range of standard engineering components or features.
Carry out the basic operations to produce detailed drawings using 2-D CAD
Carry out operations to produce 3-D models and assemblies with associative relationships using parametric CAD

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation; IT; Practical and Psycho Motor; Communication and Presentation.

INDICATIVE SYLLABUS CONTENT:

Introduction to design and the forms and role of engineering drawings and CAD
Orthographic projection with sections dimensions and tolerances.
Assembly drawing : standard mechanical engineering parts and features
Introduction to the role of CAD in engineering design.
2-D CAD operations
3-D parametric associative CAD operations.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2002
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr D Grieve**	**Semester * S1 and S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MFMT101**	**CREDITS: 20**	**LEVEL: 1**

MODULE TITLE: Manufacture and Materials 1

PRE-REQUISITE(S):

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
The module provides an introduction to manufacturing and materials for all BSc students. It includes primary and secondary forming processes, and introduces the concept of process-structure-property relationships in engineering materials.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION 50%
Give Subject Panel Group to which module should be linked: B5LEV1
Minimum pass mark for accreditation:

MODULE AIMS:
To develop students' understanding and knowledge of basic manufacturing and materials technology, enabling them to appreciate why an understanding of the relationships between processing, structure and properties is a key element in engineering.

LEARNING OUTCOMES: At the end of this module students **should be able to:**

1. Select a particular process for the manufacture of an engineering component.
2. Discuss the reasons for their choice, and list its advantages and disadvantages compared to its alternatives.
3. List generic types of material together with typical physical and mechanical properties.
4. Describe the effects of processing on structure and properties of engineering materials.
5. List and describe selected strengthening mechanisms, through the effect on structure and properties.
6. Carry out a tensile test and interpret the results.
7. Identify and describe features of a material's micro- or macrostructure.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation: LO 1, 2, 3, 5
Practical: LO 1, 6, 7
Communication LO 1 - 7

INDICATIVE SYLLABUS CONTENT:

- Types of manufacturing organisation and design of facilities.
- Primary forming processes (casting, rolling, forging, plastic moulding).
- Secondary forming techniques, including tool life and cutting forces).
- Basic metrology, including standards of length and limits and fits.
- Properties of materials. Interpretation of stress-strain curves.
- Qualitative description of major differences between generic classes of materials in terms of their microstructure. Influence of atomic bonding on properties. Cast structures and defects in metals. Types of polymers and additives. Polymer glass transition temperature and melting point.
- Property modification techniques; relationship between structure, processing, heat treatment and properties. Metals: plastic deformation; hot and cold working; microdefects and their influence. Polymers: drawing and moulding; directionality of properties; influence of strain rate. Alloying: use of phase equilibrium diagrams in heat treatment; types of alloy. Properties, structure and uses of the plain carbon steels and the major non-ferrous alloys.
- Materials testing. Strain rate effects on properties. The hardness test.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION 9/2002
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **T Paterson**	**Semester: S1 + S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **DSGN129**	CREDITS: **10**	LEVEL: **One (S1)**

MODULE TITLE: Design as a Generic Tool

PRE-REQUISITE(S): None

CO-REQUISITE(S): None

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):

This module lays the foundations for fostering a technologically-based, innovative and creative, holistic design identity. This is achieved through development of critical and analytical skills, coupled with experience in professional teamwork, and confidence in management of engineering/technological systems. The concept of *concurrent integrated design* is used to create a holistic view of the engineering design spectrum of activities.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION % END MODULE TEST % PRACTICE %**
Give Subject Panel Group to which module should be linked: B5LEV1
Minimum pass mark for accreditation

MODULE AIMS:

To introduce the philosophy of design and show the commonality between design approaches in different disciplines and activities. To encourage innovative and creative concept formation through project work and case studies. To foster seamless integration of personal skills with group-work interaction. To place engineering within a framework of ethical and sustainable decision-making. To build a portfolio of project work illustrating aspects of a holistic design process.

LEARNING OUTCOMES: At the end of this module students **should be able to:**

1. Confidently tackle a disparate range of engineering projects as part of a functional team.
2. Be more creative in developing design concepts.
3. Show increased flair in presentations, and in written report presentation.
4. Better integrate design into the total engineering/product process (concurrent design).
5. Demonstrate awareness of the cost/profit drivers in engineering and their influence on design.
6. Display increased insight into reasons for engineering 'failures', and the lessons that can be drawn from them in terms of human and technological shortcomings.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation LO 4, 5, 6. Synthesis, Creativity and Problem Solving LO 2, 4. Interactive and Group LO 1, 2, 3. IT LO 3. Planning and Management of Learning LO 1. Communication and Presentation LO 2, 3.

INDICATIVE SYLLABUS CONTENT: Module content will be divided into 5 main areas:

1. The multi-facetted nature of design – design perceptions from, for example, an architect, a product designer, engineers from other disciplines.
2. Formulating a design envelope – requirements, constraints, criteria, iterative brain-storming.
3. The interaction between design, materials, processing/manufacture and service requirements.
4. Fostering innovation – brainstorming, looking for elegance, lessons from failures, adding new twists to old ideas (Techoptimiser).
5. The human dimension to design – 'heart of darkness' syndrome, ethics in engineering, environmental impact and sustainability, ergonomics, behaviour of teams.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2002
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT:** DMME	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Prof. M N James**	**Semester * S1**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MEDM127**	**CREDITS: 10**	**LEVEL: 1**

MODULE TITLE: **Communication Skills**

PRE-REQUISITE(S): none

CO-REQUISITE(S): none

IF LINKED, MODULE LINKED TO: N/A

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
This module utilises skills taught in SOFT122 (Computing and IT) and DSGN129 (Design as a Generic Tool) with the aim of consolidating the skills in the production of reports, presentations, laboratory and examination skills.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION XX% END MODULE TEST XX% PRACTICE XX%**
Give Subject Panel Group to which module should be linked .....
Minimum pass mark for accreditation

MODULE AIMS:
1. To utilise, consolidate and extend communication skills already taught.
2. To ensure competency in verbal and written skills with a sound approach to experimental skills, problem solving skills and examination skills.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Produce a well structured, concise, technical report.
2. Prepare for, and competently deliver a verbal/visual presentation on a given topic.
3. Approach measurement and experimental skills with confidence.
4. Prepare for, and competently communicate skills and abilities through formal examination procedures.

ASSESSED SKILLS ELEMENTS:
Communication and Presentation (all LO's)
Planning and Management of Learning (LO4)
Synthesis, Creativity and Problem Solving (LO's 3&4)

INDICATIVE SYLLABUS CONTENT:

The material of this module will be delivered through a balanced programme of lectures and mini-projects covering the following topics:

Written skills including report writing, specifications, letters and CV's. (LO1)
Presentation skills including use of *Power Point*, OHP's, and video. (LO2)
Laboratory and measurement techniques, including an appreciation of errors, accuracy and calibration. (LO3)
Preparation and approach techniques in problem solving skills and communication skills in the context of formal written examinations. (LO4)

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2002
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY:	**DEPT:**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**
Technology	DMME		

MODULE LEADER:	**Semester**
Dr M A Bell	**S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MFRG110**	CREDITS: 20	LEVEL: 1

MODULE TITLE: Quality and Project Management

PRE-REQUISITE(S): N/A

CO-REQUISITE(S): N/A

IF LINKED, MODULE LINKED TO: N/A

SHORT MODULE DESCRIPTOR:
This module examines the use of quality management, project planning, process improvement, inventory control etc. in manufacturing systems and how such systems may be evolved with reference to the concept of the "World Class Industry" examining the philosophies and tools developed by major contributors from Europe, USA and the Far East.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% END MODULE TEST 50%
Give Subject Panel Group to which module should be linked DMM
Minimum pass mark for accreditation

MODULE AIMS:
To demonstrate some of the key elements of a successful (World Class) industry and how they might be designed and managed for optimum productivity.

LEARNING OUTCOMES: At the end of this module students **should be able to:**

1. Demonstrate the use of project planning techniques
2. Select appropriate quality management tools
3. Explain the key roles of inventory management in industry
4. Compare and contrast alternative approaches to Quality Management and to recognise the difficulties associated with creating a "Quality Culture".
5. Select the appropriate tools for the design of high quality, responsive industrial systems.
6. Understand the role of properly designed, formal quality management systems in national and global systems.

ASSESSED SKILLS ELEMENTS:
Knowledge and Understanding LO 1, LO 2, LO3, LO 4, LO 5, LO6; Synthesis, Creativity and Problem Solving LO3; Self Appraisal and Reflection on Practice LO 2, LO 4, LO 5, LO6; Communication and Presentation LO2, LO4

QAA Benchmark Statements from a range of disciplines apply to this subject and all three levels apply.

INDICATIVE SYLLABUS CONTENT:

1. The importance of quality, its costing and control by "traditional" and "modern" methods
2. The need for, and application of, formal project planning techniques
3. The potential for both product and process improvements and/or cost savings
4. Inventory management tools and philosophies
5. The use of formal, externally audited quality systems such as ISO 9000 and ISO 14001
6. The relevance of local and national cultures in industry
7. The "Quality Gurus" including Deming, Crosby and Juran
8. Industrial problem solving tools such as those of Ishikawa
9. Fiegenbaum's Total Quality Management
10. Taguchi's Design of Experiments
11. Shingo's Poke-Yoke and SMED
12. The management of change

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2002
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY:	**DEPT:**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**
Technology	DMME		

MODULE LEADER: **Mr Mike Miles**	**Semester S1 + S2**

Stage 2
Modules

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MATH254**	CREDITS: 10	LEVEL: 2

MODULE TITLE: **Computer Aided Engineering Mathematics**

PRE-REQUISITE(S): MATH158

CO-REQUISITE(S): NONE

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):

This module will introduce students to some further mathematical techniques and will motivate students in using the MATHCAD computer package for solving engineering mathematics problems.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION 0% END MODULE TEST 0% PRACTICE %**
Give Subject Panel Group to which module should be linked .....MS2.....
Minimum pass mark for accreditation

MODULE AIMS:

To develop an appreciation of the need for accurate analysis of engineering problems.
To improve confidence and competence in the use of mathematical techniques.
To motivate students in using the MATHCAD computer package for engineering mathematics.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Use further mathematical techniques to solve engineering problems.
2. Solve linear systems of equations.
3. Solve ordinary differential equations using appropriate methods of solution and appreciate its engineering applications.
4. Use the MATHCAD package to solve engineering mathematics problems.
5. Use the MATHCAD package to present solutions to engineering mathematics problems

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation LO 1 - 5
IT (Specifically the use of 'Mathcad') LO 4, 5.

INDICATIVE SYLLABUS CONTENT:

- **Matrices and Determinants**
  Definition and rules of determinants and matrices.
  Methods of solution of linear systems of equations.

- **Ordinary Differential Equations**
  Methods of solution of first order ordinary differential equations. Engineering applications.
  Methods of solution of linear second order ordinary differential equations. Engineering applications.

- **Computer package**
  Introduction to MATHCAD for solving basic mathematical problems.
  Use of MATHCAD in solving matrix algebra and ordinary differential equation problems.
  Use of MATHCAD in presentation of mathematical data in graphical form.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: TECHNOLOGY	**DEPT: MATHS & STATS**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr J.M. Davies**	**Semester S1**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MECH227**	CREDITS: 10	LEVEL: 2

MODULE TITLE: Computer Aided Engineering

PRE-REQUISITE(S):

CO-REQUISITE(S): N/A

IF LINKED, MODULE LINKED TO: N/A

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
To introduce students to finite element analysis (FEA) and to some of the capabilities of CAE software (such as Parametric Technology Corporation's Mechanica Structure and Motion).

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION XX% END MODULE TEST XX% PRACTICE XX%**
Give Subject Panel Group to which module should be linked B5BSHN.....
Minimum pass mark for accreditation

MODULE AIMS: This module aims to give students an understanding of and practice in:
1. Modelling and using FEA to analyse mechanics of solids problems.
2. Modelling a simple mechanism and using software to analyse it's motion.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Understand the basic theory behind FEA.
2. Set up and carry out a range FE analysis in mechanics of solids, including statics and dynamics problems and be able to report and critically appraise the results.
3. Set up and carry out a motion analysis of a simple mechanism

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation LO 1, LO2, LO3.
Synthesis, Creativity and Problem Solving; IT LO 2, LO3.
Self Appraisal Reflection and Professional LO 2, LO3.
Communication and Presentation LO 2, LO3

INDICATIVE SYLLABUS CONTENT:
1. The fundamentals of FEA: stiffness equations, assembly, boundary conditions, solution, appraisal of results.
2. A case study in mechanics of solids.
3. A case study in motion analysis.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr D J Grieve**	**Semester * S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: MECH228	CREDITS: 20	LEVEL: 2

MODULE TITLE: Engineering Science 2

PRE-REQUISITE(S): None

CO-REQUISITE(S): None

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR:
This module provides an extension of previously taught solid mechanics and an introduction to the principles of fluid mechanics and thermodynamics. The principles are taught in the context of applications relevant to the environment, design and manufacturing, and include stress analysis; solid dynamic analysis; the principles of fluid continuity, momentum and energy; fundamentals of thermodynamics; design, operational principles, uses and limitations of common energy consuming equipment such as pipe networks, pumps, fans, engines, and heating/cooling processes; principles of heat transfer; psychrometry.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION 50%
Give Subject Panel Group to which module should be linked : B5BSHN
Minimum pass mark for accreditation

MODULE AIMS:
1. To extend the understanding and use of the principles of engineering science as affecting the design and working environment and manufacturing capability of the service and manufacturing sector of industry.
2. To impart an ability to analyse and appreciate the characteristics of engineering systems involving dynamic loads.
3. To impart an ability to analyse and determine the requirements of the built environment or marine craft in terms of energy and human needs.
4. To impart a sound understanding of the fundamental thermodynamic and fluid mechanics principles of the conservation of mass, momentum and energy.
5. To impart a sound understanding of how the above principles determine the design and operation of common fluid dynamic and thermodynamic machinery, such as pipe networks, pumps, fans, engines, and heating/cooling processes.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Appreciate the use, potential and limitations of stress analysis techniques in the design, service life, cost, weight and serviceability of commonly encountered engineering components.
2. Appreciate and use dynamic analyses in the description of the behaviour of dynamic systems.
3. Identify the significance and relevance of fluid properties as they apply to the design and operation of common fluid dynamic and thermodynamic systems.
4. Use the basic principles of continuity, momentum and energy to analyse the performance of a range of thermo-fluid equipment.
5. Extend their knowledge of thermodynamics and heat transfer in the analysis and operation of thermal systems for buildings and building services, or marine craft.
6. Integrate their knowledge of fluid dynamics and thermodynamics within a broader understanding of mechanical engineering and environmental issues.

SKILLS ELEMENTS:
1. Analysis and Evaluation. (LO1-5) (tp&a)
2. Synthesis, Creativity and Problem Solving. (LO1-3) (tp&a)
3. Self Appraisal and Reflection on Practice (LO1,6) (p)
4. Planning and Management of Learning (LO1-6) (p)

t=taught, p=practiced, a=assessed

/cont.

INDICATIVE SYLLABUS CONTENT:

Strength of Materials

Two-dimensional stress and strain transformation. Stress/strain relationships for isotropic elastic materials. Experimental stress/strain analysis using strain gauge rosettes. Theories of elastic failure for ductile materials including the maximum shear stress theory and von Mises theory.

Further bending theory including bending and shear stresses due to transverse loading. Slope and deflection of beams including statically indeterminate beams using direct integration and Macaulay's method. Structural analysis by energy methods including Castigliano's theorems.

Instability as a mode of structural failure. Euler theory of strut buckling, limitations of the simple theory, practical approaches to design including the Rankine-Gordon theory.

Solid Dynamics

Dynamics: application of dynamic analyses and/or energy methods to oscillating systems to illustrate their characteristics. Free vibration of systems with and without damping, natural frequency and damping ratio, logarithmic decrement.

Behaviour of systems subjected to harmonic excitation by application of a sinusoidal force, sinusoidal motion of the base and by rotation of an unbalanced mass; effect of damping on frequency response and resonance. The use of isolation techniques to avoid transmission of dynamics forces - such as engine mounts, torque couplers.

Fluid Properties

Fluids and fluid properties: including compressible (gases) and incompressible (liquids) and perfect gas behaviour; the major fluid properties of specific heat capacity; viscosity; density; specific volume; pressure and temperature; property measurement; data sources - tables and charts. Processes - effect of temperature and pressure; change of phase; subcooled, saturated & superheated states.

Fluid Dynamics

Continuity: basic principle of conservation of mass in steady flow situations. Velocity profiles, mean velocity, effect of density changes (gases). Basic equation of continuity for gases and liquids and its use in hydraulic and pneumatic systems.

Momentum: including basic principle of conservation of momentum and applications in jet thrust, fluid deflection, reaction turbine.

Thermodynamics and Heat Transfer

Energy: Identifies energy types - mechanical; thermal; internal; kinetic; potential & pressure/flow energy. Basic definition of Closed systems and the non-flow energy equation (NFEE) - noting that work and heat IN is positive. Application of the NFEE to simple situations of heating & cooling at constant volume and pressure, adiabatic, isothermal and polytropic expansion and compression processes. Open systems and the steady flow energy equation (SFEE). Application of the SFEE to simple situations of heating & cooling at constant pressure, evaporators, condensers, turbines and nozzles. Derivation of Bernoulli's equation from the SFEE and its application to simple flow situations such as pipe runs, venturi meters, pitot static tubes and nozzles. Dynamic and static pressure (height) relationship including fluid statics when v=0. Application to pumps and fans.

Principles of heat transfer and their application to the energy efficiency of buildings and marine craft. Psychrometry and its application to air conditioning systems.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003 DATE(S) OF APPROVED CHANGE: XX/XX/XX			
FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**
MODULE LEADER: **Dr P Dyson**		Semester S1+S2	

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **DSGN221**	**CREDITS: 20**	**LEVEL: 2**

MODULE TITLE: Engineering Design

PRE-REQUISITE(S): DSGN131, MECH115, MFMT101 or equivalents.

CO-REQUISITE(S): N/A

IF LINKED, MODULE LINKED TO: N/A

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
The module consists of a lecture course including design methodology, information gathering and interpretation and the design of a range of machine elements. Students work in small groups on design assignments containing a common theme, throughout the year.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION 0% END MODULE TEST 0% PRACTICE 0%**
Give Subject Panel Group to which module should be linked ....B5BSHN.....
Minimum pass mark for accreditation

MODULE AIMS:
To consolidate the Design content of the first year of the course and to give the students a thorough introduction to the solution of real design problems by the introduction of broader and group design assignments.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Analyse a range of machine elements.
2. Develop designs of complete systems incorporating appropriate elements and including information about materials and manufacturing methods.
3. Work in small groups.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation LO 1
Analysis and Evaluation; Synthesis Creativity and Problem Solving; Reflection and Professional; Communication and Presentation LO 2.

INDICATIVE SYLLABUS CONTENT:
Methodologies:
Structured approaches to the generation of design solutions, taking into account a variety of factors such as manufacturing and service environment, together with a logical evaluation of the merits of solutions so generated.

Information:
Types, sources and retrieval. British Standards. Standards for materials and components.

Systems Elements:
Mechanical power transmission devices; geared systems, clutches.
Mechanisms and actuators.
Characteristics of power sources.
Components Design

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION N/A**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr David J Grieve**	**Semester: S1 + S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MFMT201**	CREDITS: **20**	LEVEL: **2**

MODULE TITLE: **Manufacture and Materials 2**

PRE-REQUISITE(S): Manufacture and Materials 1 (MFMT101)

CO-REQUISITE(S): N/A

IF LINKED, MODULE LINKED TO: N/A

MODULE DESCRIPTOR:
This module extends the Stage 1 introduction to manufacture and materials technology to cover additional aspects of materials behaviour (such as property enhancement techniques, composite materials and an introduction to failure modes), and introduces non-traditional manufacturing processes and their application in industry.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION 50%
Give Subject Panel Group to which module should be linked: B5BSHN
Minimum pass mark for accreditation:

MODULE AIMS:
To extend the students' knowledge of properties, structure and property enhancement and manufacturing techniques. To impart an appreciation of the limitations of materials and an awareness of the cost and safety aspects of materials failure. To enable students to select suitable materials, forming and joining processes for given applications, in the context of other engineering and design disciplines.

LEARNING OUTCOMES: Students successfully completing this module should be able to:

1. Describe the major methods of controlling properties in engineering materials, including heat treatments, precipitation hardening and fibre reinforcing.
2. Explain the limitations of materials (fracture, fatigue, creep and corrosion failures), and discuss the cost and safety aspects and methods of enhancing materials' durability.
3. Describe various non-traditional manufacturing processes, and list their advantages and disadvantages when compared to traditional processes.
4. Select suitable materials, forming and joining processes for given applications.
5. Carry out a materials investigation, using appropriate laboratory techniques, and interpret the results

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation; Communication and Presentation: LO 1 – 5
Synthesis, Creativity and Problem Solving; Interactive and Group; Planning and Management; Practical: LO 3, 5.

INDICATIVE SYLLABUS CONTENT:
1. Strengthening and property control strategies: including heat treatment of steels. Precipitation hardening.
2. Polymer composite materials: fibre and matrix materials, basic design aspects; alternative manufacturing routes.
3. Failure of materials: including ductile and brittle fracture, strengthening of brittle materials. Introduction to stress concentrations and fracture mechanics. Introduction to fatigue failure – causes and mechanisms. Designing for enhanced fatigue life. Introduction to creep failure. Design and manufacture of creep resistant components such as turbine blades.
4. Corrosion: electrochemical series and galvanic series; types of corrosion cell; corrosion prevention.
5. Manufacturability and joining of materials, including a review of selected processes and the relation between process, structure and properties. Welding, heat affected zone and weld defects. Adhesives: types, selection and strength of adhesive joints.
6. Materials testing: destructive and non-destructive test methods.
7. Non-traditional machining techniques, such as EDM and ultrasonics.
8. Measurement and inspection, to include alignment, straightness and surface texture.
9. Sheet metal work (eg blanking and forming).
10. Abrasive machining, including grinding, honing and lapping.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT:** DMME	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr D Plane**	**Semester S1 + S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **PRRO202**	CREDITS: 10	LEVEL: 2

MODULE TITLE: **Mechatronics Project**

PRE-REQUISITE(S):

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):

Introduction to the design, build and test of practical robot systems.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION XX% END MODULE TEST XX% PRACTICE XX%**
Give Subject Panel Group to which module should be linked .....B5LEV1.....
Minimum pass mark for accreditation:

MODULE AIMS:
To design, build and test a robot to meet specified criteria.

LEARNING OUTCOMES: At the end of this module students **should be able to:**

1. Design a robot for a specified task
2. Construct and test the robot
3. Write appropriate technical reports and make oral presentations of the work accomplished.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation; Synthesis Creativity and Problem Solving; Interactive and Group; Communication and Presentation LO 1.
Analysis and Evaluation; Synthesis Creativity and Problem Solving; Interactive and Group; Practical and Psycho Motor; Communication and Presentation LO 2.
Analysis and Evaluation; Communication and Presentation LO 3.

INDICATIVE SYLLABUS CONTENT:
Project development - use of the systems kit to model and control situations.
Practical problems with real systems.
The choice of parts including motors, gears etc.
Introduction to the set robot problem including the elements of assessment
The robot build and test competition.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr R Sutton**	**Semester S1**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **CONT220**	**CREDITS: 10**	**LEVEL: 2**

MODULE TITLE: Instrumentation and Control

PRE-REQUISITE(S): MECHATRONICS PROJECT PRRO202

CO-REQUISITE(S): None

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
This module introduces mechanical and marine engineering students to basic instrumentation and sensor technology, and linear feedback control systems.

ELEMENTS OF ASSESSMENT
COURSEWORK 30% EXAMINATION 70%
Give Subject Panel Group to which module should be linked ... B5BSHN.....
Minimum pass mark for accreditation:

MODULE AIMS:
To provide an introduction to:
1. Instrumentation technology and the application of sensors
2. Linear feedback control systems

LEARNING OUTCOMES: At the end of this module students **should be able to:**

1. Understand the basic concepts of instrumentation technology and the use of sensors systems for measured data extraction.
2. Understand control system design fundamentals.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation; Synthesis Creativity; Communication and Presentation LO 1, LO 2.
IT; Interactive and Group; Practical and Psycho Motor LO 2.

INDICATIVE SYLLABUS CONTENT:

1. Instrumentation principles
2. Transducers using resistance, inductance, capacitive changes to measure force, displacement, strain, pressure, velocity, acceleration, flow, temperature and light intensity
3. Transformer, piezo electric, semiconductor and digital devices
4. Operational amplifiers
5. System dynamics and modelling
6. Transfer function and block diagram representation
7. Feedback systems
8. Transient behaviour of systems

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr R Sutton**	**Semester 2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MFRG216**	CREDITS: 20	LEVEL: 2

MODULE TITLE: Manufacturing Systems

PRE-REQUISITE(S): N/A

CO-REQUISITE(S): N/A

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR:
The module provides an introduction to the primary objectives, opportunities and constraints in manufacturing organisations and the people, departments, systems and tools that influence these factors. Alternative approaches to the design, management and control of successful manufacturing systems is investigated.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION 50%
Give Subject Panel Group to which module should be linked: B5BSHN
Minimum pass mark for accreditation:

MODULE AIMS:
To examine the essential elements of a successful manufacturing system and how it can be managed and controlled for optimum productivity and long term profitability.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Describe management's role in the design, development and control of manufacturing organisations.
2. Demonstrate the importance of all stakeholders and/or providers of resources to successful manufacturing organisations, with the emphasis on the internal and external customer.
3. Describe alternative approaches to the design and control of manufacturing systems and select the most appropriate.

ASSESSED SKILLS ELEMENTS:
Knowledge and Understanding LO 1, LO 2, LO3;
Analysis and Evaluation LO 2 and LO 3
Self Appraisal, Reflection and Professional LO 1, LO 2;
Communication and Presentation LO1, LO2

QAA Benchmark Statements from a range of disciplines apply to this subject and all three levels apply.

INDICATIVE SYLLABUS CONTENT:
1. The role and responsibility of manufacturing within both business and the community.
2. The diversity of manufacturing organisations and the need for well designed, balanced and flexible manufacturing systems including FMS and CIM
3. The individual's responsibility as both a team member and team builder within the organisation.
4. The importance of all stakeholders to the success of the organisation.
5. The need for and use of budgetary control in manufacturing and management.
6. The need for effective motivation and leadership.
7. Forecasting of demand, resource requirements etc. and the need for reliable scheduling and optimal use of resources.
8. The operational features of CAPM and ERP systems and how, if properly implemented, they be used to control manufacturing systems.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION 9/2002
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY:	**DEPT:**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**
Technology	DMME		

MODULE LEADER: **Mr Mike Miles**	**Semester S1 + S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: MARN217	**CREDITS: 20**	**LEVEL: 2**

MODULE TITLE: **Naval Architecture 1**

PRE-REQUISITE(S): MATH158, MECH115

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
This module will examine both the static and dynamic interaction between a vessel and the water in which it floats. It will cover the principles and practice of ship stability, the prediction of the resistance to motion for a vessel and the selection of suitable propulsor options.

ELEMENTS OF ASSESSMENT
COURSEWORK 30% EXAMINATION 70%
Give Subject Panel Group to which module should be linked: ANALYSIS
Minimum pass mark for accreditation:

MODULE AIMS:
To encourage and assist students to develop the knowledge and analytical skills necessary to carry out the following: assess the stability condition of vessels with particular regard to safety and comfort; assess the resistance characteristics of a vessel; select a suitable propulsor.

LEARNING OUTCOMES: At the end of this module students should be able to:
1. explain flotation principles and apply them to the determination of draft
2. explain and apply the principles of initial transverse stability
3. analyse transverse stability at large angles of heel, and in relation to the positioning of cargo and free surfaces
4. discuss the terms in which regulations covering ship stability are framed
5. explain and apply the principles of longitudinal stability
6. identify the elements of resistance to a vessel's motion through the water and discuss the factors which influence them.
7. calculate the key elements of vessel resistance.
8. analyse the main propulsor types to determine the key design and performance parameters.
9. discuss the factors to be considered when selecting a propulsor.
10. describe the use of a typical stability, performance prediction & matching software package.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation. (LO1-10) (tp&a)
Synthesis, Creativity and Problem Solving. (LO6-10) (tp&a)
Self Appraisal and Reflection on Practice (LO4) (tp&a)
IT (LO10) (t)
Planning and Management of Learning (LO1-10) (p&a)
Communication & Presentation (LO1-10) (p&a) t=taught, p=practiced, a=assessed

INDICATIVE SYLLABUS CONTENT:

Stability

Hydrostatics principles. Immersion and effect of density on draft. Hydrostatic curves. Load line regulations.
Theory of initial transverse stability. Centre of buoyancy, centre of gravity, metacentre. Wall sided formula.
Use of Simpson's rules to determine vessel's stability particulars.
Form coefficients and use of approximate relations to determine vessel stability.
Large angle stability. GZ curve. Cross stability curves. Stability regulations.
Determination and movement of C of G. List and loll.
Effect of free surfaces.
Longitudinal stability. Changes of draft and trim. Grounding and dry-docking.
Hydrodynamic Principles: Flow around aerofoils, cylinders and bluff bodies – lift and drag principles.
Ship Resistance: Components of hull drag. Friction and wave resistance estimation. Hull drag prediction.
Use of design formulae. Effect on ship resistance of operating in waves.
Propulsors: Propulsive devices – types and selection.
Propellers: Actuator disc theory. Performance coefficients and design charts. Theories of blade design. Cavitation.
Waterjets: Performance calculations and design charts. Installation and limitations.
Application
Use of computer design and analysis packages to assess stability and develop matched hull, engine and propulsor systems.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT:** DMME	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr P Dyson**	**Semester** S1+S2

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MATS231**	**CREDITS: 10**	**LEVEL: 2**

MODULE TITLE: Composite Materials and Structures for the Marine Environment

PRE-REQUISITE(S): MFMT101

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
The module provides an introduction to the performance of polymer composites in the marine environment, building on the overview of materials and manufacture presented in MATS 221.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION 0% END MODULE TEST 50% PRACTICE XX%**
Give Subject Panel Group to which module should be linked ....B5BSHN.....
Minimum pass mark for accreditation:

MODULE AIMS:
To enable students to develop an awareness of the demands placed on materials operating in the marine environment, and to appreciate how polymer composites can provide engineering solutions to these challenges. To introduce relevant professional codes of practice and standards.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Describe the typical range of operating conditions associated with the marine environment.
2. Summarise the mechanical and physical properties of common reinforcements and polymer matrices relevant to marine applications.
3. Describe the long-term effects of marine exposure on composite structures.
4. List the main codes of practice relevant to composites design and manufacture for the marine industry.
5. Identify and discuss health and safety issues relevant to polymer composites manufacture.
6. Describe a methodology for materials selection and methods of quality inspection for composite marine structures.
7. Discuss the need for coatings, and list common materials and their applications.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation LO 1 - 7.
Synthesis Creativity and Problem Solving LO 5, 6
Communication and Presentation LO 1 - 7

INDICATIVE SYLLABUS CONTENT:
1. Overview of materials and manufacturing methods.
2. The marine environment - requirements of materials and structures.
3. Classification societies: codes and standards.
4. Materials selection for the marine environment.
5. Long term properties of composites (fatigue, corrosion...).
6. Coatings for marine structures.
7. Case study of component design.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr J Summerscales**	**Semester * S2**

Stage 3
Modules

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **PRMD306**	CREDITS: 20	LEVEL: 3

MODULE TITLE: **Project**

PRE-REQUISITE(S):

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
The project module is an individual investigation of a specific problem in any of the engineering disciplines of the programme. It represents a significant body of work where the student is proactive in managing his/her own learning and other resources needed to find a solution to this task. The management of this task is subject to typical constraints of any engineering activity.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION XX% END MODULE TEST XX% PRACTICE XX%**
Give Subject Panel Group to which module should be linked .....B5BSHN.....
Minimum pass mark for accreditation:

MODULE AIMS:
To develop and begin to form a professional understanding of the inter-relationships between various engineering disciplines. To demonstrate ability to integrate engineering topics within the context of a specific project task. To broaden experience and develop a sense of responsibility and self-assurance.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Analyse a problem to be solved, or task to be performed and specify the framework within which the work will be carried out.
2. Plan a programme for solving the problem or performing the task and schedule the programme within the available time.
3. Perform the work required in the programme, which may require information searches, design and/or experimental work.
4. Evaluate critically the information or data acquired, discuss in context whether the project objectives were achieved, draw conclusions as to the main outcomes, and indicate and what further work may be required.
5. Communicate orally, and by means of a professional technical report, the project as a whole.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation; Synthesis Creativity and Problem Solving LO 1, LO 3.
Planning and Management of Learning LO 2.
Self Appraisal Reflection and Professional LO 4.
Communication and Presentation LO 5.

INDICATIVE SYLLABUS CONTENT:
There is no prescribed syllabus for the project. The programme of work is specific to each individual project and is the result of discussion between the student and the project supervisor.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Mr J W Barlow**	**Semester S1 and S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **STAT353**	**CREDITS:** 10	**LEVEL:** 3

MODULE TITLE: **Engineering Statistics**

PRE-REQUISITE(S):

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):

This module provides grounding in basic probability and statistics with an emphasis on applications in engineering.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION XX END MODULE TEST 50% PRACTICE XX%**
Give Subject Panel Group to which module should be linked .....
Minimum pass mark for accreditation:

MODULE AIMS:

(i) to provide an appreciation of the role of statistics in engineering design and manufacturing

(ii) to provide a basic grounding in probability and statistics and their applications in engineering

LEARNING OUTCOMES: At the end of this module students **should be able to:**

1. Apply basic probability to engineering problems and appreciate the role of probabilistic and statistical reasoning in engineering design, safety and reliability.

2. Understand the principles of inference from sample data and apply these to engineering data.

3. Apply regression analysis to engineering data and appreciate the scope of multiple regression for dealing with two or more explanatory variables.

ASSESSED SKILLS ELEMENTS:

Analysis and Evaluation, IT (Use of statistical software) (LO1,2&3)

Communication and Presentation.(Understanding of the statistical concepts of significance and confidence level.)(LO2&3)

INDICATIVE SYLLABUS CONTENT:

Review of basics: uncertainty and statistics; data types and displays, measures of location and variability; probability, conditional probability and independence.

Random variables and their distributions: discrete and continuous random variables, probability density functions, distribution functions, hazard and reliability functions.

Some specific distributions in detail: the binomial, Poisson, Normal, Exponential and Weibull distributions.

Estimation and Testing: An introductory treatment of inference for means, standard deviations and proportions. Simple linear regression and multiple linear regression models. Awareness of the role and scope of statistical modelling using computer packages.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: Mathematics and Statistics**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr D Wright** | **Semester * S1**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MATS340**	CREDITS: **10**	LEVEL: **3**

MODULE TITLE: **Advanced Materials**

PRE-REQUISITE(S):

CO-REQUISITE(S): N/A

IF LINKED, MODULE LINKED TO: N/A

MODULE DESCRIPTOR:
This module extends the introductions given in MATS121 and MATS221to cover a more in depth treatment of fracture and fatigue mechanics and to introduce new developments in advanced materials and composites.

ELEMENTS OF ASSESSMENT
COURSEWORK 30% EXAMINATION 70%
Give Subject Panel Group to which module should be linked .B5BSHN.....
Minimum pass mark for accreditation:

MODULE AIMS:

1. To extend the students knowledge of fracture and fatigue mechanics and to give an insight into methods of life prediction and enhancement.
2. To develop a deeper appreciation of the range of advanced materials and composites available to the engineer.
3. To impart an awareness of recent developments in manufacturing techniques for advanced materials and how these affect structure and properties.

LEARNING OUTCOMES: Students successfully completing this module **should be able to**:

1. Appreciate and critically assess the relevance of fracture mechanics to the structural integrity of materials.
2. Outline and discuss major developments in new materials technology.
3. Select and defend appropriate materials, forming and joining processes for given applications.
4. Carry out a number of investigative techniques, interpret, discuss, and evaluate the results.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation LO 1-3,
Synthesis Creativity and Problem Solving; Communication and Presentation LO 1 - LO 4
Interactive and Group; Practical and Psycho Motor LO 4

INDICATIVE SYLLABUS CONTENT:

1. Development of fracture and fatigue mechanics. Application to life prediction and enhancement. Toughening mechanisms.
2. Review of creep in metals and relevance to super plastic forming and alloys.
3. Advances in selected alloys, including stainless and alloy steels.
4. High temperature and conducting polymers, co-polymers and elastomers.
5. Advances in polymeric materials and natural and synthetic composites.
6. Diffusion principles, surface coatings, bearing and wear resistant materials and applications.
7. Powder metallurgy, diffusion bonding, CVD and PVD of metals, composites and ceramics.
8. Short fibre and particulate composites including MMC'S and CMC'S and their applications.
9. Rapid prototyping.
10. Smart materials.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT:** DMME	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr. David C Plane**	**Semester S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **PRDT303**	**CREDITS: 20**	**LEVEL: 3**

MODULE TITLE: **Integrating Group Design**

PRE-REQUISITE(S):

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
This will be a significant design study involving groups of (normally) 5 to 8 students working as a team to enable them to experience a typical "group dynamics" environment while undertaking a project of the type that many of them will be involved with after graduation. Projects may vary from feasibility studies based on largely economic and environmental considerations to broad based engineering design studies.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION 0% END MODULE TEST 0% PRACTICE 0%**
Give Subject Panel Group to which module should be linked ...B5BSHN.....
Minimum pass mark for accreditation:

MODULE AIMS:
1) To provide students with experience of working in groups as a project team tackling a significant assignment.
2) To provide students with experience of carrying out a complex task where many interdependencies have to be resolved in a limited time.
3) To require the students to investigate the critical analyse part of a group project

LEARNING OUTCOMES: At the end of this module students **should be able to:**

Work as effective members in a team on a complex project
Clearly and coherently present verbally and in writing the outcome of their work.
3) Demonstrate the ability to investigate, synthesise and critically evaluate one or more parts of a project.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation; Interactive and Group LO 1.
Communication and Presentation LO 1 and 2
Analysis and Evaluation; Synthesis Creativity and Problem Solving; Self Appraisal Reflection and Professional LO 3.

INDICATIVE SYLLABUS CONTENT:

1) Lecture on the engineering design procedure and effective team work
2) Team work and formal, observed meetings with supervisor
3) Lecture on presentations and group report
4) Formal group presentations
5) Submission of individual reports as part of the group submission
6) Submission of student logbook of all work

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr D Grieve**	**Semester * S1 and S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MFRG317**	**CREDITS: 20**	**LEVEL: 3**

MODULE TITLE: Manufacturing Processes

PRE-REQUISITE(S): MFMT201

CO-REQUISITE(S): None

IF LINKED, MODULE LINKED TO: N/A

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
The introduction of advanced manufacturing processes including computer aided manufacturing techniques.

ELEMENTS OF ASSESSMENT
COURSEWORK 30% EXAMINATION 70% END MODULE TEST N/A PRACTICE N/A
Give Subject Panel Group to which module should be linked B5BSHN
Minimum pass mark for accreditation:

MODULE AIMS:
To introduce the concept of design for manufacture and examine various advanced manufacturing processes.
Also to develop the students' understanding and knowledge of numerically controlled machine tools.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Design engineering components so that maximum productivity is achieved.
2. Compare and evaluate various advanced manufacturing processes.
3. Understand how a control system language is used to programme a machine tool.
4. Create part programmes for N.C. machine tools such as lathes and milling machines.
5. Generate post processed data using appropriate CAD/CAM techniques.
6. Critically assess the characteristics of a typical CIM system.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation; Interactive and Group; IT; Practical; Communication LO 1 and 2

INDICATIVE SYLLABUS CONTENT:
1. Design for manufacture.
2. Advanced manufacturing processes, technology and control.
3. Metrology.
4. Types of N.C. machine tool and control systems.
5. N.C. system languages and part programming.
6. CAD/CAM/CIM systems.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004

DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology.	**DEPT: DMME**	**PARTNER INSTITUTION N/A**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Mr T. Paterson.**	**S1 + S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: MECH 331	CREDITS: 20	LEVEL: 3

MODULE TITLE: Automotive Technology

PRE-REQUISITE(S):

CO-REQUISITE(S): N/A

IF LINKED, MODULE LINKED TO: N/A

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
This module considers how light weight high strength automotive structures and components are designed and produced by examining in detail the specialist materials, manufacturing methods and analysis techniques that are used.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION 0% END MODULE TEST 0% PRACTICE 0%**
Give Subject Panel Group to which module should be linked .B5BSHN.....
Minimum pass mark for accreditation:

MODULE AIMS: This module aims to give students a good understanding of how light weight high strength automotive structures and components are designed and produced by examining in detail the specialist materials, manufacturing methods and analysis techniques that are used.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Specify and defend appropriate materials, manufacturing processes for high strength structures and components.
2. Analysis and evaluate a range of light weight structures in respect of their fitness for purpose.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation LO 1 and LO 2.
Synthesis Creativity and Problem Solving LO 1 and LO 2
IT LO1 and LO 2
Communication and Presentation LO 1 and LO 2

INDICATIVE SYLLABUS CONTENT:
1. Metallic materials: Advanced casting processes, forging, powder processing. Designing with and applications.
2. Non metallic materials: Designing with, manufacturing processes and applications.
3. Fundamentals of sheet metal processing and joining.
4. Design and analysis of thin wall structures.
5. Fabrication of automobile structures.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT:** DMME	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: David J Grieve	**Semester S 1 + S 2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: TSOC 306	CREDITS: 20	LEVEL: 3

MODULE TITLE: Engineering and Design Tools and Failure Prevention

PRE-REQUISITE(S): DSGN 221 A and B or equivalents.

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
This module introduces students to a range of techniques and procedures that are increasingly used to ensure that manufactured products and systems perform well, safely and meet customer requirements.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION XX% END MODULE TEST XX% PRACTICE XX%**
Give Subject Panel Group to which module should be linked Minimum pass mark for accreditation:

MODULE AIMS:
To introduce students to a range of techniques and procedures that are used to ensure manufactured products and systems perform well, safely and meet customer requirements.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Carry out and justify a sensitivity and optimisation study on a simple design.
2. Carry out and defend a risk assessment on a plant.
3. Define and assess the reliability of a system.
4. Critically assess the manufacturability of a design.
5. Devise, assess and justify possible methods of extending the life of a product or system.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation LO 1 - 5.
Self Appraisal, Reflection and Professional LO 2.
IT LO 1.
Communication and Presentation LO 1 - 5.

INDICATIVE SYLLABUS CONTENT:
Hazards and risk
Optimisation, Taguchi.
Design for manufacturability, remanufacture and recycling.
Reliability, maintainability, Weibull statistics - BS 5760 Reliability of Systems and Components.
Tribology - wear / wear out of components and systems.
Fatigue and Fracture.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY:	DEPT: DMME	PARTNER INSTITUTION	(for IHS only) NAME OF SITE
Technology			

MODULE LEADER: D J Grieve	Semester: S1 and S2

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **TSOC305**	**CREDITS: 10**	**LEVEL: 3**

MODULE TITLE: The Technological Life Cycle

PRE-REQUISITE(S):

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
This module introduces students to the range of factors that influence the economic lives, ways of extending the lives, of products and systems.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION XX% END MODULE TEST XX% PRACTICE XX%**
Give Subject Panel Group to which module should be linked...B5BSHN.....
Minimum pass mark for accreditation:

MODULE AIMS:
To introduces students to the range of factors that influence the economic lives of products and systems, and to ways of extending the lives of products and systems.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Assess the likely economic life of a product or system.
2. Devise and critically assess possible methods of extending the life of a product or system.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation, Synthesis Creativity and Problem Solving, Communication and Presentation LO 1, 2.

INDICATIVE SYLLABUS CONTENT:
Marketing and advertising.
Finance, Break even point.
Life extension methods, remanufacture and design for recycling.
Tribology - wear / wear out of components and systems.
Case Studies in engineering and software.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr D J Grieve**	**Semester * S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MARN333**	**CREDITS: 20**	**LEVEL: 3**

MODULE TITLE: Naval Architecture 2

PRE-REQUISITE(S): MATH158, MECH115, MECH228, MARN217

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
This module places engineering principles in the context of a vessel and its systems. The structural design concepts which are particularly applicable to marine craft are developed and applied. Vessels' fitness for purpose and the design drivers used to realise a vessel are considered and operations aspects of various vessel types are studied.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION 50%
Give Subject Panel Group to which module should be linked: ANALYSIS
Minimum pass mark for accreditation:

MODULE AIMS:
To develop an understanding of the factors which influence the design of a marine vessel from both the engineering and the operational aspects.

LEARNING OUTCOMES: At the end of this module students **should be able to:**
1. Explain and discuss the principles associated with the analysis of the structural strength of the hull of a marine vessel.
2. Carry out and justify a preliminary structural analysis.
3. Analyse mission requirements and formulate a vessel suitable to carry out a given mission
4. Critically appraise the general arrangement drawings of a variety of vessel types, and develop outline arrangement drawings for a vessel to fulfil a given purpose.
5. Assess the implications of various operational and regulatory aspects on the design of a vessel.
6. Use proprietary software to determine the performance and behaviour of a vessel with an awareness of its assumptions and limitations.

ASSESSED SKILLS ELEMENTS:
1. Analysis and Evaluation. (LO1-6) (tp&a)
2. Synthesis, Creativity and Problem Solving. (LO3-5) (tp&a)
3. Interactive and Group. (LO3-5) (p&a)
4. Self Appraisal and Reflection on Practice (LO5) (tp&a)
5. IT (LO6) (tp&a)
6. Planning and Management of Learning (LO1-6) (p&a)
7. Communication & Presentation (LO3-5) (p&a)

t=taught, p=practiced, a=assessed

INDICATIVE SYLLABUS CONTENT:

Structural Design and Analysis
Combined axial and lateral loading on beam-columns. Origin and calculation of loads on marine structures. Bending, shear and torsion of ship hull girders.
Bending of stiffened plates and panels. In plane and combined loading of stiffened plates and panels.

Vessel Design
Regulatory considerations in vessel design
Influence of mission and costs on design.
Evolution and trends in modern vessel design.
General arrangement drawings of various vessel types.
Evaluation of risk and selection of design factors and margins.
Cargo access and containment systems.
Presentation of information for operational use on stability, stress and cargo measurement

Case Study
Vessel design.

Software
Use of CFD and/or hull calculation software.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT:** DMME	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr J Chudley**	**Semester:** S1+S2

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MARN334**	**CREDITS: 20**	**LEVEL: 3**

MODULE TITLE: Marine Engineering

PRE-REQUISITE(S): MARN217, MECH 115, MECH 228 or equivalents

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
This module provides an introduction to power plant systems for marine transport purposes. To develop an understanding as to the requirements of the marine industry and the environment, and to enable an appreciation of different types of marine plant and auxiliary systems.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION 50%
Give Subject Panel Group to which module should be linked :- B5BSHN
Minimum pass mark for accreditation :

MODULE AIMS:

To provide an understanding of modern marine plant. To provide the knowledge and understanding for the control of transport efficiency, safety and environmental factors in marine transport.

LEARNING OUTCOMES: At the end of this module students **should be able to:**

1. Argue the advantages and disadvantages of different types of engine plant for a particular application and demonstrate an appreciation of the principal components of marine power plant and their interdependencies.
2. Calculate the power developed in different types of engines and account for losses. Draw up a heat balance for different types of engine plant
3. Appraise the main constructional and operational features of the main types of marine auxiliary plants, pumps of different types, steering gear, CPP, marine heat exchangers, stabilisers, boilers, etc.
4. Demonstrate an in-depth understanding of the problems related to the combustion of poor quality fuel.
5. Know the regulations concerning marine pollution prevention and apply them to engine exhaust emissions, describing how such pollutants may be minimised through engine plant adjustment and modification.
6. Work effectively in a group to undertake a case study in the area of design for the control of marine transport, efficiency, safety and environmental factors.

ASSESSED SKILLS ELEMENTS:

Knowledge and understanding (LO1-6); Analysis and Evaluation (LO1-4); Synthesis, Creativity and Problem Solving (LO1, LO6); Interactive and Group (LO6); Professional (LO6); Planning and Management of Learning (LO1, LO6), Communication and Presentation (LO1-6); IT (LO1-2, LO6)

INDICATIVE SYLLABUS CONTENT:

Marine Power Plant

Type of power plants and transmission. Basic prime movers. Criteria of performance. Hear balance of engine systems and auxiliary requirements. Electrical propulsion plant. Combined power plant systems. Design considerations and constraints of different types of marine plant and power transmission systems.

Auxiliary Systems

Pumps. Steering gear. Controllable pitch propellers (CPP), Stabilisers/thrusters. Marine fuel oil systems. Fuel quality and testing. Marine heat exchangers. Gearing for turbines and diesel engines. Marine boilers, Marine Refrigeration/HVAC.

Environmental Factors in Marine Transport

Exhaust emissions and control. Fire and safety, smoke control and escape procedures. Noise and vibration :- reduction measures. Statutory regulations and classification society rules. Hazardous cargoes. Sewage treatment and waste incineration.

Case Study

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2003
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY:	**DEPT:**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr Y M Dai**	**Semester S1 + S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MATS333**	CREDITS: 20	LEVEL: 3

MODULE TITLE: **Composites Design and Manufacture**

PRE-REQUISITE(S): MATS231

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
The module provides an integrated, practical exploration of the design and manufacture of polymer composite structures.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION 0% END MODULE TEST 0% PRACTICE N/A%**
Give Subject Panel Group to which module should be linked B5BSHN.....
Minimum pass mark for accreditation:
Coursework – practical design, manufacture and test exercises.

MODULE AIMS:
To enable students to gain experience of practical tools and techniques for predicting the performance of composite structures, and to appreciate the limitations of these techniques in the light of manufacturing constraints

LEARNING OUTCOMES: At the end of this module students **should be able to:**

1. Evaluate the advantages and disadvantages of common manufacturing routes of polymer composites, and select an appropriate technique for a given component.
2. Use a 'rule of mixtures' approach to calculate the in-plane properties of composite laminae.
3. Demonstrate familiarity with and the use of commercial laminate design software.
4. Design a laminate to meet specified flexural and/or tensile performance criteria.
5. Explain and evaluate how the quality of the manufacturing process influences the achievable properties of composite structures.
6. Manufacture a laminate and/or simple composite structure, demonstrating appropriate process control.
7. Specify, carry out and interpret an appropriate test procedure to validate the design/manufacture.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation LO 3, 4, 5, 7, 8;
Synthesis, Creativity and Problem Solving LO 4, 5, 7, 8;
Interactive and Group LO 7, 8;
Self Appraisal, Reflection and Professional LO 6;
IT LO 4, 5;
Planning and Management of Learning LO 7, 8;
Practical/laboratory LO 4, 5, 7, 8;
Communication and Presentation LO 1, 2, 6, 8.

INDICATIVE SYLLABUS CONTENT:
1. Calculation of ply stiffness and strength.
2. Application of composite properties to classical mechanics.
3. Laminate design and analysis.
4. Design principles for composite structures.
5. Composites manufacturing processes.
6. Industry visit to composites manufacturer.
7. Design/manufacture/test interactions.
8. Property measurement and quality assurance.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr S Grove** | **Semester S1 and S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **MATS341**	CREDITS: 20	LEVEL: 3

MODULE TITLE: Resource Management

PRE-REQUISITE(S):

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):
The module provides students with an overview of the resource problems and challenges facing modern society. Part A concentrates on the relevant technologies which have the potential to contribute to a more rational use of resources, while part B considers global, political and developmental issues.

ELEMENTS OF ASSESSMENT
COURSEWORK 100% EXAMINATION 0% END MODULE TEST XX% PRACTICE XX%**
Give Subject Panel Group to which module should be linked ..B5BSHN.....
Minimum pass mark for accreditation:

MODULE AIMS: To enable students to appreciate the potential conflicts between technological and social developments - exploring the tensions posed by societal desire for technological progress versus societal demands for resource management.

LEARNING OUTCOMES: At the end of this module students **should be able to:**

1. Discuss the current distribution and usage of resources on a global scale.
2. Critically compare the consumption of resources in different societies as a function of post industrialisation.
3. Discuss and rationalise the drivers for resource management.
4. Critically analyse the resource usage associated with common industrial products/processes.
5. Validly analyse and understand the significance of technological alternatives to current practice.
6. Develop a rational personal philosophy of the advantages and failings of globalisation.

ASSESSED SKILLS ELEMENTS:
Analysis and Evaluation, Communication and Presentation LO 1 - 6;
Synthesis Creativity and Problem Solving, Self Appraisal Reflection and Professional LO 6;

INDICATIVE SYLLABUS CONTENT:
Overview: History of industrialisation and post industrial society.
Resources, flow and transformation of material and energy.
Part A - Use of resources in a technological society and developments to make more efficient use of technology.
Drivers for a material society - energy and products, needs versus desires.
Transport alternatives - teleworking, local supply, mass transport, community organisation.
Waste management and reduction - Refuse versus re-cycling.
Part B - Global Drivers that effect the development and use of technology.
Globalisation and distributed working. The market, global trade - theory vs practice. Population dynamics. Lobbies. Government role versus personal responsibility.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: Technology	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: To be allocated	**Semester S1 and S2**

UNIVERSITY OF PLYMOUTH MODULE RECORD

MODULE CODE: **THER341**	**CREDITS:** 20	**LEVEL:** 3

MODULE TITLE: **Renewable Energy**

PRE-REQUISITE(S):

CO-REQUISITE(S):

IF LINKED, MODULE LINKED TO:

SHORT MODULE DESCRIPTOR (For module catalogue. **MAXIMUM four lines 9pt print**):

The module provides an overview of the challenges presented to modern technology by a combination of finite resources and their environmental impact, and a detailed study of current renewable energy technologies and their practical contribution.

ELEMENTS OF ASSESSMENT
COURSEWORK 50% EXAMINATION 50%
Give Subject Panel Group to which module should be linked: B5BSHN.
Minimum pass mark for accreditation:

MODULE AIMS:

To make students aware of the challenges and constraints associated with finite resources and their environmental impact. To introduce alternative renewable energy technologies and their economic potential. To provide students with sufficient background information for them to develop and demonstrate a critical appreciation of the potentials and constraints of renewable energy technologies.

LEARNING OUTCOMES: Students who successfully complete this module should be able to:

1. Perform calculations relating to energy and power and understand their significance.
2. Describe differences in fuel use in different countries of the world, and the use of energy by sector.
3. Critically assess the potential application and contribution of renewable sources to electricity, transport and heating.
4. Evaluate the magnitude and distribution of the energy resource for each of the principal renewable technologies, and calculate the power output from simple energy devices.
5. Appreciate the technical barriers associated with each alternative technology.
6. Propose and cost an appropriate energy technology scheme for a given application.
7. Define and discuss the technological, political and social aspects affecting renewable energy integration.

ASSESSED SKILLS ELEMENTS:
Analysis and evaluation (learning outcomes 2, 3, 4, 6); Synthesis and creativity (LO 6); IT (LO 1, 4, 6)

INDICATIVE SYLLABUS CONTENT:

- Finite resources and concepts of sustainability
- Climate change – evidence and implications
- Current global fuel usage - energy in modern society
- Overview of renewable energy technologies and their potential contribution
- Cost and resource estimation
- Generation or conservation?
- The technology of renewable energy systems: solar; biomass; hydroelectricity; tidal; wind; wave; geothermal
- Integration of renewable and conventional sources.
- Pricing structures and political factors in renewable energy implementation.
- Spreadsheet exercises; case study/investigation.

VALIDATION: DATE OF APPROVAL: 6/2/02 DATE OF IMPLEMENTATION Sept. 2004
DATE(S) OF APPROVED CHANGE: XX/XX/XX

FACULTY: TECH	**DEPT: DMME**	**PARTNER INSTITUTION**	(for IHS only) **NAME OF SITE**

MODULE LEADER: **Dr Stephen Grove**	**Semester S1 + S2**