Integrated Engineering Studies1 Module Handbook

Introduction

The Integrated Engineering Studies 1 module is one of the most important modules in first year to develop the student's insight into the engineering profession, the roles of the engineer and the frameworks within which the modern engineer operates. This module also focusses on project work concerned with the development of an engineering solution to a realistic problem relevant to the domain of the student's programme of study. The module will involve the utilisation of the knowledge and skills developed throughout the student's current level of study in producing an appropriate solution. The emphasis of this module is on understanding the design process and appraising design. The balance of analysis, design and implementation will depend on the specific objectives of the problem topic but the problem is intended to provide design and analysis problems that help further develop the student's insight into the engineering profession. The group-based project and the work completed within this module by an individual student will require the student to work with other students following the same module. The groups are expected to follow a project plan under direct supervision from a resident module tutor and work in a self-motivated way within defined schedules and develop a confidence in their ability to work with others and creatively solving problems. This module will ground students in team building and team working skills and further develop the student awareness of and ability to identify professional issues relevant to the engineering discipline area and the societal context of engineering practice.

By the end you should have developed and understood the importance of the 'softer' transferable skills such as: team working, meeting deadlines, problem solving, time management, communication, presentation, independent learning, self-reliance, personal review and reflection. You will also gain an appreciation of the business context that Engineering projects may have to consider. The module also includes an introduction to engineering ethics, personal developing, employability; and sustainability.

Assessment

The module is assessed by a coursework:

Coursework3	10% - Team Building Assignment (presentation)
Coursework2	20% - Individual Reflective Reports (500 words)
Coursework1	70% - Group Project Report (3000 words 50%, and presentation 20%)
Total	100%

Must achieve 40% to pass

Learning Outcomes

On completion of this module student should be able to:

- Follow a project plan within a team to carry out the development of a practical and realistic problem relevant to the design and development of products or systems.
- Develop skills and prepare for a career in engineering.
- Use relevant technical and professional skills, techniques and practices in the development of a problem solution.

- Develop and demonstrate appropriate competence in, and an understanding of the roles and transferable skills required in the project's development.
- Demonstrate information gathering and enquiry skills appropriate to their programme level.
- Demonstrate the ability to report upon the project in a written and oral form.
- Understand key concepts of, and the motivations for, sustainable development.
- Develop an awareness of ethical, professional and sustainability issues and identify those which apply within the context of the project.
- Put their engineering education in context and understand and reflect on the skills and attributes that are being developed through academic study and work experience.

Syllabus

- Project Management Principles:
  - Project deliverables and milestones;
  - Scheduling of project tasks;
  - Project monitoring and review activities;
- Team working and team building
- Independent working and self-reliance;
- Personal reflection and review;
- Communication skills
- Design Principles for Technology based products and systems
- Invention, Innovation and Improvement: continuous improvement and innovation cycles
- Understanding the design challenge, the dimensions of product design; what constitutes "good design"?
- Process stages: need; investigation and problem formulation; design specification; concept generation and evaluation; concept development; detailed design; production sales; user feedback; product life cycles
- Understanding principles of design for sustainability:
  - Key concepts of sustainable development (limits to growth, ecological footprints, sustainable consumption);
  - Appreciation of the commercial, legislative and social motivation for practising sustainable development
- The role and scope of applicable legislation, codes of practice and industry standards
- Introduction to ethical considerations relevant to engineering and in the modern world and examples of ethical issues faced by the engineering profession
- Introduction to ethical practices: codes of conduct, obligations to the public, duty of care, trust
- Introduction to career planning skills

Teaching and learning strategy

The course material and overall project guidance approach will be introduced through e-learning presentations and seminars to present a consistent and logical progression of issues and concepts such as project management, design, market analysis, ethics and sustainability. The project will encourage students to innovate and enterprise through development of their own solutions to a real world problem drawing on a range of various ideas from different contexts and discipline areas. Guest lecturers from industry based sources will be invited where appropriate and practicable to bring the innovation, enterprise and real-world perspective to the students. Much of the student's independent learning and responses to programmed activities is expected to be spent in team based situations developing elements of the problem solution via collaborative learning. Class material will be expanded upon using GCU Learn to ensure student support, information sharing and personalised learning.

Feedback on coursework is provided within 3 working weeks of submission. In this course, online discussion board is used to improve the students learning process by engaging in discussions with their peers.

Indicative Reading

- Berkun, S., (2005) The Art of Project Management, O'Reilly.
- Bruce, A. & Langdon, K (2000) Project Management (Essential Managers), Dorling Kindersley Publishers Ltd.
- Nokes, S., et. al, (2003) The Definitive Guide to Project Management: The Fast Track to Getting the Job Done on Time and on Budget, Financial Times Prentice Hall.
- Portney, S., (2010) Project Management for Dummies, Hungry Minds Inc.
- West, M., (2004) Effective Teamworking, BPS Blackwell.
- Fleddermann, C., (2008) Engineering Ethics, Prentice Hall.
- Cross, N., (1994), Engineering Design Methods, Wiley.
- Fiell, C., (2006) Industrial Design A-Z, Taschen Publishing.
- Walker, S., (2006) Sustainable by Design: Explorations in Theory and Practice, Gutenberg Press.
- Moran, M., (2005) Career Builders Toolkit, Cisco Press.
- Prospects Web Site: www.prospects.ac.uk <http://www.prospects.ac.uk/>
- Moon, J., (2009) Making Groups Work (Student Edition), Higher Education Academy Subject Centre for Education. Online link http://escalate.ac.uk/downloads/5413.pdf
- West, M., (2012) Effective Team work: Practical lessons from Organizational Research, Wiley Blackwell, 3rd Edition.
- Burns, P., (2008) Corporate Entrepreneurship: Building an Entrepreneurial Organization, Palgrave MacMillan.
- Cottrell, S., (2010) Study Skills for Success: Personal Development & Employability. Palgrave MacMillan.
- Hind, D.W.G & Moss, S., (2010), Employability Skills, Business Education Publishers.
- Mullins, L.J. (2011) Management and Organisational Behaviour, 9th edition, Prentice Hall
- Noon, M., Blyton, P & Morrell, K., (2013) The Realties of Work, Palgrave MacMillan
- Graham, N. & Portney, G., (2010) Project Management for Dummies, Wiley.
- Barker, S., (2010) Brilliant Project Management, Pearson
- Hasson, G., (2011) Brilliant Communication Skills, Pearson
- Hasson, G., (2010) Brilliant Time Management, Pearson

Transferable skills

- Critical thinking and problem solving.
- Communication skills, written, oral and listening.
- Effective Information retrieval and research skills.
- Computer literacy.
- Self-confidence, self-discipline & self-reliance (independent working).
- Awareness of strengths and weaknesses.
- Appreciating and desiring the need for continuing professional development.
- Reliability, integrity, honesty and ethical awareness.

- Ability to prioritise tasks and time management (organising and planning work).
- Interpersonal skills, team working and leadership.
- Presentation skills.
- Commercial awareness

Programme of Delivery

A draft delivery plan outlining the topics covered is shown below. The program is draft until it is delivered. There are always minor changes to the length/content of e-learning lectures.

Week	Learning Unit	Student Activity	Formal Marked Submissions
Week 1	Introduction/Team building assignment	Form a group, Introduce yourself, Exchange contact details, Generate ideas for team building assignment	
Week 2	Team working	Activity 1.1. Activity1.2. Activity 1.3	
Week 3	Writing / Speaking to the right Audience		Team building assignment
Week 4	Business case	food manufacturing company business case	
Week 5	Introduction to marketing	Marketing tutorial/automotive	
Week 6	Project management		
Week 7	Time management	How good is your Time Management?	
Week 8	Personal development planning	PDP Workshop	
Week 9	Standards	Mobile phone screen	
Week 10	Engineering ethics	Ethics Tutorial	
Week 11	Sustainability		
Week 12	Final group oral presentation		Final group report Individual report Peer review form