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## FACULTY OF ENGINEERING, SCIENCE AND THE BUILT ENVIRONMENT

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Unit title:	Research Methods
Unit number:	DEG/M/119
Unit Level:	M
Unit value:	1.0
Unit co-ordinator:	Professor Tassos Karayiannis
Total study time:	150 hours
Unit pre-requisites:	None

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### Aims and learning outcomes

- To demonstrate the methodology and action required to propose, progress and communicate a desired solution to a technical problem.

### The Principle Objectives are:

- understand the methodology required to produce reasoned hypotheses;
- establish a structured programme of work;
- use traditional and electronic means to obtain source information;
- formulate and put into action a structured procedure of experimentation;
- assess the accuracy of data and derived parameters
- employ appropriate statistical tests to collected data;
- apply personal computers to generate and analyse appropriate numerical and written data;
- understand the limitations and advantages of team working;
- communicate research findings by report and seminar

### General Syllabus

Methodology of problem appraisal and analysis

Research and literature searches by manual and electronic means.

Basic statistics.

Experimental methods, error analysis.

Statistics applied to the evaluation of source data and experimental results using relevant electronic means where appropriate.

Questionnaire design.

Preparation and presentation of oral reports, effective public speaking and use of visual aids.

Development of web page for communication of basic ideas.

Preparation of written papers, reports, dissertations and theses including the use of appropriate computer software.

### Teaching Methods

A balance between formal lectures and student centred learning. Principles will be covered in formal lectures, while the student will be expected to address the depth of the subject areas through the assignments.

### Teaching Programme

Teaching will be by formal lectures supported by seminars, tutorials, case studies, self-learning materials and laboratory work. Principles will be covered in formal lectures, while the student will be expected to address the depth of the subject areas through the team assignment and associated studies. The assignments will thus have a central role in directing the student to applying the key concepts and themes within the unit including those of working within a team.

## **Indicative Sources**

### **Core**

- Badiru, A. B., Project management for Research: A guide for Engineering and Science, 1995.  
[www.osu-ours.okstate.edu/gradcoll](http://www.osu-ours.okstate.edu/gradcoll)
- On-line Microsoft Office Tutorials, <http://www.lrc-intraserv.sbu.ac.uk>
- Coleman, H.W. & Steele, W.G., Experimentation & Uncertainty Analysis for Engineers, Wiley, 1989
- Howard, K. & J.Sharp, The Management of a Student Research Project, Gower, 1988
- Lester, J., Writing Research Papers - A complete guide, Addison Wesley, 1998
- Mandel, S., Effective Presentation Skills, Kogan Press, 1993
- Peel, M., Successful Presentation in a Week, Hodder & Stoughton, 1997
- Ray, M.S., Engineering Experimentation, McGraw-Hill (UK), 1988
- Weixel, S., Microsoft Office 97 Suite Essentials, Que Education & Training, 1998

### **Background**

- Appropriate British & ISO standards
- Adamson, A., A Student's Guide for Assignments Projects & Research, Arthur Adamson Pubs., 1995
- Beer D & McMurray D, A Guide to Writing as an Engineer, Wiley, 1997
- Bell, J., Doing Your Research Work, OU Press, 1987
- Goodlad, S., Technically Speaking, Self published, 1980
- Jayaraman, S., Computer Aided Problem Solving for Scientists and Engineers, McGraw-Hill Inc, 1991
- Moore, P.G. & D.E.Edwards, Standard Statistical Calculations, 2nd Edition, 1965
- Preparation of Visual Aids for Lectures, BSI, PD6482, 1985

### **Optional**

- Randall, S., Effective Presentation Skills
- Eisenberg, A., Effective Technical Communication, McGraw Hill, 1993
- Additional guidance will be given in the sessions.

### **Assessment of the Unit**

The marking scheme will be as follows: 100% – Coursework assignments