COURSE OUTLINE

7020INT
Scientific Research Methods

Semester 1 - 2007

Academic Organisation:	School of Information and Communication Technology
Faculty:	Science, Environment, Engineering and Technology
Credit point value:	10
Student Contribution Band:	Band 2
Course level:	Postgraduate
Campus/Location/Learning Mode:	Gold Coast / On Campus / In Person
Convenor/s:	Dr John Thornton (Gold Coast)
Enrolment Restrictions:	Nil
This document was last updated:	7 February 2007

BRIEF COURSE DESCRIPTION

This course is aimed at introducing the student to scientific research. It is suitable for those aiming at finding ways for adpating or creating innovative objects or techniques. It targets a wide, interdisciplinary audience at postgraduate level. The course provides necessary skills for understanding and applying a variety of methods that characterise good, modern research. The course is strongly application oriented and learning-by-doing.

Prerequisites: Nil

SECTION A – TEACHING, LEARNING AND ASSESSMENT

COURSE AIMS

The purpose of this course is to introduce students to the fundamentals of scientific research and research practice, including setting up a research project, performing experiments, validating a model or design object, interpreting results and developing professional ways of reporting. It also acquaints students with a variety of possible research topics for continuing into further postgraduate studies.

This is an advanced course that requires maturity and skills from students. For students who wish to undertake postgraduate studies it provides a solid foundation for the methods that are typically applied in modern scientific research, preparing and motivating the students for possible postgraduate research.

Students will learn to demystify research, to differentiate between research and development, to set goals, plans and use methods that are recognised as good research practice.

LEARNING OUTCOMES

Upon successful completion of this course students will:

- Be able to distinguish between research and development.
- Be able to search the literature for a topic and formulate a research project.
- Understand the process of research and its validation.
- Be able to relate, critically evaluate, and report research findings.
- Be able to write a research proposal.
- Be able to think and investigate independently.

CONTENT, ORGANISATION AND TEACHING STRATEGIES

The course content focuses on the key areas that constitute the generally accepted process of research and its presentation.

There are three methods of teaching and learning used in the course:

1) By face to face contact in lectures to provide the focus, overall guidance and balance of the topics necessary.
2) By practical investigation and discovery to clearly understand the main characteristics of research methodology and how they are applied.
3) By personal experience and interaction with peers in developing a small research project

The minimum expected weekly effort for students is 10 hours, including lectures and conducting and reporting on their research. The course is taught during weeks 1 to 13 by interactive lecture/workshops. Attendance and participation to lectures/workshops is compulsory for practicing and consolidating techniques, and gaining immediate feedback.

Type	Hours per Lecture	Lectures
Lecture/workshop	2	1 – 13 (inclusive)
Investigation including self study (minimum requirement)	1	1 – 14 (inclusive)
Mini-thesis work (normal requirement)	7	2 – 13 (inclusive)
Total weekly effort	10	

It is strongly recommended that students' work should match the pace of lectures. Small exercises during the Lecture/Workshop provide an opportunity to obtain hands-on experience interacting with the lecturer

and peers to consolidate the material and receive feedback. The mini-thesis is based on self-directed work, and provides an opportunity to rehearse and get feedback on what is required on a larger scale in the Honours thesis.

Contact Summary

All assessment items are compulsory. Students must attend lectures, participate in the class exercises and common activities, and conduct the research for their mini-thesis on their own.

CONTENT SUMMARY

Strong emphasis is placed on understanding the essentials of modern research methodology and reporting as introduced in this course. The main topics in this course are:

• Introduction review from Socrates to Popper. The scientific method.
• Literature review. Criticality. Referencing and citing. Ethics.
• Structure of a thesis or scientific paper.
• Derivation and formulation of hypothesis. Experimentation setup, tools, & documentation.
• Data analysis. Model formulation. Representation of results. Validation.
• Interpretation of results, drawing conclusions. Critical review of results in context.
• Presentation skills.
• Thesis writing.

ASSESSMENT

Summary of Assessment

Assessment is by critical analysis of two technical papers, the mini-thesis, seminar presentation, and participation in the class exercises and activities

Item	Assessment Task	Length	Weighting	Total Marks	Relevant Learning Outcomes	Due Day and Time
1.	Analysis of paper 1	3 hours effort	10%	100	Writing and critical analysis	Tuesday 9:00 AM Week 5
2.	Analysis of paper 2	3 hours effort	10%	100	Writing and critical analysis	Tuesday 9:00 AM Week 10
3.	Mini-thesis	80 hours effort	60%	600	Conducting research	Tuesday 9:00 AM week 12
4.	Seminar presentation	20 minutes	10%	100	Presentation skills	Weeks 12 and 13
5.	Workshops and participation	24 hrs effort	10%	100	All course contents	Weeks 1 -13

Assessment Details

Analysis of technical papers: The analysis evaluates students' abilities to read a technical paper with an open mind, demonstrating critical thinking, and identifying a paper's components. The assessment is based on the quality and depth of the student's reflection and synthesis.

Mini-thesis: The mini-thesis constitutes a complete piece of research of a magnitude that it fits into one semester, on a topic of the student's choice. Assessment is on all components, including document

structure, writing style and clarity and the quality of the research and the presentation of results (rather than on the quantity). The contents of the research for the mini-thesis may be in the same field as the student's Honours thesis, but by no means contributing to it.

Seminar presentation: Assesses the student's ability to prepare high quality presentation material, and orally present the research and results of the mini-thesis in a professional and timely manner to an audience and to reply to queries in a professional way.

Lecture/workshop participation: Small exercises interspersed in the lecture help to settle and ground understanding of specific techniques through practice. Open discussions aid in the student's ability to develop critical thinking. Assessment is based on the student's readiness for participation and the extent of participation in group work, as well as on the quality of their contribution.

Return of Assessment Items

Assessment items will be returned within the fastest reasonable time (usually within one or two weeks). Electronic submission (e.g. CDs) will not be returned, they remain as a backup and evidence of what was delivered.

Workshop material will not be returned

Notification of Availability of Feedback on Assessment

Lecture/Workshops are the default opportunity for feedback in general.

GRADUATE SKILLS

Graduate Skills	Taught	Practised	Assessed
Effective communication (written)	☒	☒	☒
Effective communication (oral)	☐	☒	☒
Effective communication (interpersonal)	☐	☒	☐
Information literacy	☐	☐	☐
Problem solving	☒	☒	☒
Critical evaluation	☒	☒	☒
Work autonomously	☒	☒	☒
Work in teams	☒	☒	☒
Creativity and innovation	☐	☐	☐
Ethical behaviour in social / professional / work environments	☒	☒	☐
Responsible, effective citizenship	☐	☐	☐

TEACHING TEAM

Course Convenor

Convenor Details	Gold Coast
Campus Convenor for this course	Dr John Thornton
Email	j.thornton@griffith.edu.au
Office Location	G09_1.52
Phone	5552 8730
Fax	5552 8066
Consultation times	See noticeboard outside convener's office

Additional teaching team members

None.

COURSE COMMUNICATIONS

The default time for communication with the lecturer (or course convener) is in the workshops or consultation times. Students may also contact the lecturer and/or course convener via email or phone.

Students must notify the lecturer or course convener immediately if there is a problem of whatever kind to sit for an exam, assignment demo, or in delivering the assignment by the due date. Evidence will be requested.

TEXTS AND SUPPORTING MATERIALS

There are no prescribed textbooks for this course. Recommended readings are:

Title: "How to write a thesis" Author: Roweena Murray Publisher: Open University Press Edition: 2004 ISBN: 0-335-20718-9	Title: "The Research Student's Guide to Success" Author: Pat Cryer Publisher: Open University Press Edition: 2nd Edition ISBN: 0-335-20686

Further reference and support material will be provided during the course.

SECTION B – ADDITIONAL COURSE INFORMATION

To be eligible to pass the course, students are required to complete ALL forms of assessment and must demonstrate a reasonable degree of competence in the required course objectives as examined in each form of assessment.

Students must obtain at least 50% in the mini-thesis and seminar.

Non-submission of a piece of assessment will incur a fail grade for the course.

Students may work together in investigating material for their assignments but final submission must reflect the work and original contribution of each individual student.

Any dishonest assignments will be dealt with under the Griffith University policies for plagiarism (see GU website). Dishonest assignment includes:

Deliberate copying or attempting to copy the work of other students;

Use of or attempting to use information prohibited from use in that form of assessment;

Submitting the work or another as your own; or

Plagiarism (i.e. taking and using as your own the thoughts and writings of another with the intent to claim the work as your own).

Full and detailed acknowledgment (e.g. notation, and/or bibliography) must be provided if contributions are drawn from the literature or websites in preparation or reports and assignments.

All documentation (not source code) for assessment must be word-processed.

Students must be able to produce a copy of all work submitted (code and documents) on CD. All CDs are retained.

Assignment submissions must contain only files relating to that assignment. Submissions containing irrelevant files and / or viruses will NOT be assessed. CDs must be named as advised by the course convener. Files must have accurate date and time labels attached to them.

Assignments MUST be submitted by the due date and time, strictly following the procedure on the assignment instructions. Extensions may be granted in exceptional circumstances by “Application for Extension” and MUST be made BEFORE the due date. Before an extension will be granted, a review of the work completed to date MUST be undertaken with the course convener.

An assessment item submitted after the due date, without an approved extension, will be penalised. The standard penalty is the reduction of the mark allocated to the assessment item by 10% of the maximum mark applicable for the assessment item, for each day or part day that the item is late. Weekends count as one day in determining the penalty. Assessment items submitted more than five days after the due date are awarded zero marks.

Assignments submitted without the assignment marking sheet indicating clearly student names, student number and tutor identification will not be assessed.

Students are expected to spend time outside supervised workshop periods developing skills and knowledge.

Assignments received by fax or email will NOT be accepted.

Enrolment in this course is undertaken on the basis that prior assumed knowledge has been gained by the attainment of a grade of “P” (Pass) or above in the subject(s) stated as pre-requisite. Failure to adhere to this recommendation may result in your having difficulty with the course and not being able to successfully complete it. Any additional support or special assistance cannot be expected or required if you have not completed the recommended ‘prior assumed knowledge’ course/s.

Failure to submit an assessment work will only be excused by a comprehensive medical certificate covering the majority of the period over which the work was due. Otherwise an extension may be granted only at the convener or Head of School's discretion.

Any submission of an assessment work that is supplied electronically which contains a virus detectable by the School’s Virus Scanning facilities may be deemed to be a non-submission. This includes all types of viruses including word processing macros.

SECTION C – KEY UNIVERSITY INFORMATION

ACADEMIC MISCONDUCT

Students must conduct their studies at the University honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is academic misconduct, for which the University may penalise a student. Specifically it is academic misconduct for a student to:

present copied, falsified or improperly obtained data as if it were the result of laboratory work, field trips or other investigatory work;

include in the student's individual work material that is the result of significant assistance from another person if that assistance was unacceptable according to the instructions or guidelines for that work;

assist another student in the presentation of that student's individual work in a way that is unacceptable according to the instructions or guidelines for that work;

cheat; (Cheating is dishonest conduct in assessment);

plagiarise (Plagiarism is knowingly presenting the work or property of another person as if it were one's own.)

Visit the University's *Policy on Academic Misconduct* for further details.

KEY STUDENT-RELATED POLICIES

All University policy documents are accessible to students via the University's Policy Library website at: www.griffith.edu.au/policylibrary. Links to key policy documents are included below for easy reference:

Student Charter
Student Administration Policy
Assessment Policy
Academic Calendar
Health and Safety Policy
Academic Standing, Progression and Exclusion Policy
Policy on Student Grievances and Appeals
Examinations Timetabling Policy and Procedures
Guideline on Student E-Mail

UNIVERSITY SUPPORT RESOURCES

The University provides many facilities and support services to assist students in their studies. Links to information about University support resources available to students are included below for easy reference:

Learning Centres - the University provides access to common use computing facilities for educational purposes. For details visit www.griffith.edu.au/cuse

Learning@Griffith - there is a dedicated website for this course via the Learning@Griffith student portal.

Student Services facilitate student access to and success at their academic studies. Student Services includes: Careers and Employment Service; Chaplaincy; Counselling Service; Health Service; Student Equity Services (incorporating the Disabilities Service); and the Welfare Office.

Learning Services within the Division of Information Services provides learning support in three skill areas: computing skills; library skills; and academic skills. The study skills resources on the website include self-help tasks focusing on critical thinking, exam skills, note taking, preparing presentations, referencing, writing, proof reading, and time management.