Faculty of Engineering, Computing and Mathematics

Expression of Interest for a Masters Course under the Future Framework

***Name of proposed masters course*: Quantitative Methods**

Brief description and purpose (1-2 paragraphs)

This course will train students, from a variety of academic and industry backgrounds, in the discipline of quantitative methods, to enable them to work as professional statisticians, analysts, or researchers, employed in a variety of areas including research institutions, industry, and government agencies.

The emphasis throughout the course will be on identifying and applying appropriate statistical methodology to current real-world problems from a variety of disciplines. However, all necessary and relevant theory will be covered. The analysis and presentation of the results of real data sets will play a dominant role in the course, enabling students to develop essential oral and written communication skills.

Close links with industry partners and government departments will be utilised and the programme will seek accreditation from the Statistical Society of Australia Inc.

Anticipated entrance pathways or prerequisites

Students with the QM Major (or equivalent).

Indicative units (not final)

Year 1 semester 1, will include core units (indicated by (c) in the table below). Half of the second year will be dedicated to project work. Other non-core units would be mounted once every two years depending on demand. Note the units specified in this table are indicative of what we may run. There are many other options available that we are considering and communicating with various factions of the University on.

	Year 1	Year 2
Semester 1	Probability and inference (c)	Project
	GLM's (c)	Project
	Computational statistics (c)	Science communication / reading course
	Multilevel modelling	Multivariate statistics
Semester 2	Genetic Epidemiology	Spatial Statistics
	Non-parametric statistics	Bayesian statistics
	Biostatistics	Project
	Project	Project

Proposed project size (if applicable)

5 units (see above table). Note the masters project is a 5 unit project spread over the 2 years of the masters. The students will be expected to start this project by semester 2 year 1 and finish by the end of semester 2 year 2. The table above is not indicating that several small projects are done in each of these time slots - just that the time is allocated to overall project work rather than formal taught lectures.

Structure of the masters (eg. students take all units, choose from electives, choose one of a number of streams, etc)

Students take 11 taught units and complete a 5 unit project. It is envisaged that we will expand the masters course in future years to allow specialisation emphasising statistical methods and applications from other disciplines. However, this would be dependent on demand.

What content do you believe could be shared in common across a number of the Faculty's masters courses (eg. project management, data collection and analysis, research skills, etc)

Initially we would envisage sharing part of the communications course and one of the statistics units with the proposed Mathematics and Statistics masters course. Biostatistics is an established graduate unit in the UWA School of Population Health and will continue to be. Expansion of the masters course would involve an increased number of units shared with other disciplines (for example Engineering, Science, Agriculture, Social Science etc).

What content would be unique to this masters course?

The core units will be unique and initially the majority of the statistics units would be unique. Upon expansion of the masters course, it is envisaged that the proportion of unique units would decrease.

Is this masters course, or a variant, currently running?

No, but we currently run honours in applied statistics from which some of this material will be developed.

How soon do you believe the course could be mounted?

2014.

Rationale: Who is the target audience? What resources are required? Why do you believe it (a) is important to run this programme, (b) can be resourced by staff in the School(s), and (c) will be viable?

The target audience is threefold:

(1) Individuals looking to pursue a career as a professional statistician.

(2) Individuals already employed in such a role looking to expand and/or update their knowledge base.

(3) Individuals looking to pursue a research career in the wide range of disciplines that utilise statistical methods.

Resources required would be standard educational resources for applied quantitative focussed courses, including lecture facilities, computer labs, hardware and software, teaching staff. The majority of these are already available and used in the QM Major.

The importance of the program is emphasised by comments made by the Royal Statistical Society - "statistical literacy should be seen as a vital life skill". This is becoming more apparent as the worldwide data explosion increases the need for suitably qualified graduates in statistics. Graduates with these skills, will not only enable us to fill a shortage of quality statisticians needed in this country (and internationally), but also improve the research effort at UWA and beyond, and enhance our reputation globally.

With our partners, particularly within the medical disciplines, we believe that we currently have sufficient staff to mount this course. There *may* be a need to expand the teaching staff

in future should the course expand to encompass other discipline groups. Obviously this would be subject to financial viability.

We believe for the reasons outlined previously in this document the course will be viable. In particular:

1. The potential to attract a wide range of cross-disciplinary students
2. The shortage of high quality graduates with quantitative skills
3. The worldwide data explosion, increasingly requiring new and more complex statistical methodology, dramatically increasing the demand for such graduates

Contact person for the EOI

Name: Kevin Murray *Email*: kevin.murray@uwa.edu.au

Endorsement of Head of School(s)

Name(s): *Date(s)*: