Course Specification for

MAT 499

Research Project

Bachelor of Science in Applied Mathematics

Department of Mathematics & Statistics

College of Science

Al Imam Mohammad Ibn Saud Islamic University

Institution: **Al-Imam Mohammad Ibn Saud Islamic University** *Date of Report* **March 03, 2014 – Jumada I 2, 1435** **Reviewed on February 2016 – Jumada I, 1437**
College/Department: **College of Science / Department of Mathematics and Statistics**

A. Course Identification and General Information

1. *Course title and code:* **Research Project – MAT 499**
2. *Credit hours* **2**
3. *Program(s) in which the course is offered.* *(If general elective available in many programs indicate this rather than list programs)* **Bachelor of Science in Applied Mathematics**
4. *Name of faculty member responsible for the course* **Dr. Abdelouahed EL KHALIL**
5. *Level/year at which this course is offered:* **Level 8 / Year 4**
6. *Pre-requisites for this course (if any):* **Research project course starts in the last semester of the program study (4th year – 8thsemester).**
7. *Co-requisites for this course (if any):* **None**
8. *Location if not on main campus* **Main campus for the male section and King Abdullah city for the female section**
9. *Mode of Instruction* *(mark all that apply)* *a. Traditional classroom* ☐ *What percentage* ☐ *b. Blended (traditional and online)* ☐ *What percentage?* ☐ *c. e-learning* ☐ *What percentage?* ☐ *d. Correspondence* ☐ *What percentage?* ☐ *f. Other* ☐ *What percentage?* ☐ *Comments:* **The student works on a problem in an area of advanced mathematics at bachelor level with the guidance of the supervisor**

B. Objectives

1. *What is the main purpose for this course?*

- **This course enables distinguished students to carry out a sustained, guided, independent study of a topic in mathematics.**
- **This course is a faculty directed project that could be considered advanced in nature.**
- **To develop an appropriate mathematical literacy as well as competency in documentation, analyses and presentation of results.**
- **To develop experience of report-writing, oral presentation and visual presentation.**

2. *Briefly describe any plans for developing and improving the course that are being implemented.* *(e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)*

- **The use of computers in the teaching process especially in materials that require it.**
- **Creation an internal server for the material especially for which that requires it.**
- **There is a Teaching/Learning Quality Assurance process for minor/major changes in the course based essentially on course reports and students evaluations feedback.**

C. Course Description

Course Description:

This course allows students to undertake a research project on a topic of interest. It gives the students an opportunity to perform a subject within the field of mathematics under supervision according to an individual study plan and independence thinking. Also, document and summarize results by writing a research report and present the results of the project.

Course Regulations:

I. Registration requirements

1. The research project consists of a report to be prepared only by students who have successfully completed at least 106 credit hours of the bachelor's program. The student is further expected to graduate in the semester of the project preparation or at most in the next summer semester.

2. A student cannot register for a research project in the summer semester.

II. General procedure

1. The Department committee in charge of research projects first calls for project submissions at the end of the semester preceding projects preparation. Then faculty members submit proposals according to the specific form available (model 1).

2. The model of the proposed research project (model 1) indicates whether the project is intended for one student or two students.

3. The subject of the proposed research project should be of a scientific

nature appropriate to the scientific background of the student. It should require some scientific background covering at least level 5 of BSc syllabus.

4. The main objective of a project is to strengthen the scientific background of the student, to develop his/her practical skills, but not to obtain new scientific results.

5. The Department committee evaluates project proposals and then publishes the list of accepted projects.

6. Each student enrolled in a research project is asked to choose one project from the list.

7. The committee reviews the selected projects and assigns to each student one project. In case when two or more students choose the same subject, priority will be given to the student with best grading.

8. Teachers and students are then informed about project assignments at most three weeks after semester start.

III. Project Supervision

1. Each teacher can supervise at most 2 students.

2. The supervisor must meet with his/her student at least two hours per week.

3. If the student lacks diligence on his project, the supervisor should submit a detailed report to the Department committee.

IV. Project report

1. In the eighth week of the semester, the supervisor must complete a first report on the carried out work, marking it with a score out of 20.

2. Two weeks before the final exams start, the supervisor writes down a final report marking it with a score out of 30 (written evaluation). Furthermore, the supervisor checks the plagiarism level of the project. A maximum of 40% is tolerated. Elsewhere, the student must make modifications in his project to fulfill this condition.

V. Project defense

1. Before the end of the final exams, the Department committee sets up a timetable for oral defense for all projects in the department.

2. The Department committee selects defense panels and sends out copies of projects to defense committee at least two days before the defense date.

3. Every member of the committee should make a written evaluation of the project.

4. Once the project defense finished, the jury debates and scores the project a mark out of 50. The supervisor reports his overall mark to the chairman of the project committee.

1. *Topics to be Covered*

List of Topics	*No. of Weeks*	*Contact Hours*
The student undertakes supervised independent study and review of research documentation in active field of Mathematics with the guidance of the research supervisor.	**15**	-

2. *Course components (total contact hours and credits per semester):*

	Lecture	*Tutorial*	*Laboratory*	*Practical*	*Other:*	*Total*
Contact Hours						
Credit						**2**

3. *Additional private study/learning hours expected for students per week.*

6 hours minimum

4. *Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy*

	NQF Learning Domains And Course Learning Outcomes	*Course Teaching Strategies*	*Course Assessment Methods*
1.0	**Knowledge**		
1.1	**To apply knowledge and skills to a research problem.@**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report • Oral presentation
1.2	**To acquire a skill set relevant to a specific research project.@**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report • Oral presentation
1.3	**To provide in-depth knowledge of currently active research areas in Mathematics.@**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report • Oral presentation
2.0	**Cognitive Skills**		
2.1	**To acquire experience in searching and assessing current literature.@**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report • Oral presentation
2.2	**To analyze arguments, in relation to their premises, assumptions, contexts, and conclusions.@**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report • Oral presentation
3.0	**Interpersonal Skills & Responsibility**		

	NQF Learning Domains And Course Learning Outcomes	*Course Teaching Strategies*	*Course Assessment Methods*
3.1	**To construct logical and reasonable arguments that include anticipation of counter-arguments.**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report. • Oral presentation
3.2	**To demonstrate creative and innovative approaches to his (her) research project subject.@**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report. • Oral presentation
4.0	**Communication, Information Technology, Numerical**		
4.1	**To communicate knowledge and skills gained in conducting a research project.@**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report • Oral presentation
4.2	**To revise and improve written and visual content and use appropriate technology to achieve desired outcomes.@**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report • Oral presentation
4.3	**To express themselves effectively in presentations using numerical or visual technologies.@**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report • Oral presentation
4.4	**To comprehend information accessed through reading and discussion.@**	Independent study under the guidance of the research supervisor with further discussion with supervisor weekly.	• Continuous evaluation of the research supervisor • Written report • Oral presentation
5.0	**Psychomotor**		

	NQF Learning Domains And Course Learning Outcomes	*Course Teaching Strategies*	*Course Assessment Methods*
5.1.	**To combine verbal and nonverbal movement.**	Simulation of presentation monitored by the supervisor.	Face to face presentation.

5. *Map course LOs with the program LOs.*

Course LOs #	***Program LOs****																	
	1.1	**1.2**	**1.3**	**1.4**	**1.5**	**2.1**	**2.2**	**2.3**	**2.4**	**2.5**	**3.1**	**3.2**	**3.3**	**4.1**	**4.2**	**4.3**	**5.1**	**5.2**	**5.3**
1.1	✓	✓	✓	✓	✓														
1.2	✓	✓	✓	✓	✓														
1.3	✓	✓	✓	✓	✓														
2.1						✓	✓	✓	✓	✓									
2.2						✓	✓	✓	✓	✓									
3.1											✓	✓	✓						
3.2											✓	✓	✓						
4.1														✓	✓				
4.2															✓	✓			
4.3														✓	✓	✓			
4.4															✓				
5.1																	✓		✓

6. *Schedule of Assessment Tasks for Students During the Semester*

Tasks of research project are individuality processed and the research supervisor will evaluate weekly the eventual effort deployed by the student. The student normally produces a written report and he/she gives a short talk about it (contributing 50% of the final assessment mark). The dates for submission for the written report and project talk will be set once appropriate groupings of students have been constructed, and students will be informed by email and an entry in their online timetable.

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	*Week Due*	*Proportion of Total Assessment*
1	**First continuous evaluation (reported by the supervisor)**	**6thweek**	**20%**
2	**Second continuous evaluation (reported by the supervisor)**	**12th week**	**30%**
3	**Written report in English (20-35 pages)**	**During the semester**	**50%**
4	**Short talk in English language (oral presentation 15 minutes)**	**16thweek**	

D. Student Academic Counseling and Support

1. *Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)*

- **Each student admitted to the bachelor program will be assigned an academic advisor to give him the appropriate academic counselling and support.**
- **The lecturer for each course will allocate 6 office hours per week, these times will be advertised on the office door, and reserved by the instructor as part of his teaching schedule to help the students on any academic problems/difficulties.**
- **The student is able to get individual consultation and academic advice appointment with teaching staff via e-mail or phone calls.**
- **A list of teaching staff members with their room numbers, their phone numbers and their e-mail addresses is given in the Department website.**

E. Learning Resources

Students will be guided by study notes, books, research articles and original sources (or English translations where necessary), which are provided. The students will need to master the appropriate mathematics and ultimately present his /her work in the form of a final presentation. Other appropriate learning resources are possible related to the nature of the research project.

1. *List Required Textbooks*

2. *List Essential References Materials (Journ*als, Reports, etc.)

3. *List Recommended Textbooks and Reference Material (Journals, Reports, etc)*
4. *List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)*
5. *Other learning material such as computer-based programs/CD, professional standards or regulations and software.*

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. *Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)* **Open lab containing Microsoft Office, LaTeX, Matlab, internet access to use the electronic resources provided by the University Library.**
2. *Computing resources (AV, data show, Smart Board, software, etc.)*
3. *Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)*

G. Course Evaluation and Improvement Processes

1. *Strategies for Obtaining Student Feedback on Effectiveness of Teaching* **Students are asked at the end of this course to fill electronically an anonymous questionnaire on their assessment of the course. The forms will be analyzed, and the summary of results posted as a feedback to the head of the department for evaluation and action if necessary.**
2. *Other Strategies for Evaluation of Teaching by the Program/Department Instructor* **At the end of each semester the course supervisor should complete a course report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.**
3. *Processes for Improvement of Teaching* **Student evaluations and the supervisor's course report will be used to decide improving parameters. Benchmarking with similar programs in other universities inside and outside the Kingdom of Saudi Arabia.**
4. *Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)* **The written research project report and the oral presentation will be assessed by a dissertation committee.**
5. *Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.* **Twice annually following the Teaching\Learning Quality Assurance Process Diagram adopted by the Department Council.**

Academic Accreditation Committee Member: **Dr. Brahim CHAOURAR**

Signature: _____ ***Date Report Completed:*** **05/10/2019**

Course Responsible: **Dr. Abdelouahed EL KHALIL**

Program Coordinator: **Dr. Ibrahim ALDAYAL**

Signature: _____ ***Date Received:*** **05/10/2019**