4/1/4. Course Specification:

COURSE SPECIFICATIONS

Form

Course Title: **MODULAR REPRESENTATION OF GROUPS**

Course Code: **4046412-4**

Course Specifications

Institution Umm Al-Qura University	Date
College/Department College of Applied Science / Department of Mathematical Sciences	

A. Course Identification and General Information

1. Course title and code: Modular Representations Of Groups 4046412-4			
2. Credit hours 4			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Master in Mathematics			
4. Name of faculty member responsible for the course Prof. Ahmed A Khammash			
5. Level/year at which this course is offered Level1/Master			
6. Pre-requisites for this course (if any) 4046411-4 + 4046408-4			
7. Co-requisites for this course (if any)			
8. Location if not on main campus Al-Abidiyah campus and Al-Zahir campus			
9. Mode of Instruction (mark all that apply)			
a. traditional classroom	√	What percentage?	85
b. blended (traditional and online)		What percentage?	
c. e-learning	√	What percentage?	15
d. correspondence		What percentage?	
f. other		What percentage?	
Comments:			

B Objectives

1. What is the main purpose for this course? To introduce the student to the basic concepts and different techniques of modular representations theory of groups.
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) (1) Updating references and other resources used in teaching process. (2) Using e-learning facilities. (3) Encouraging students to collect problems (and conjectures) from web based resources, ask them to present their collected data and discuss it in an interactive way in the class.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description: This course is a 4 credit hours course comprising approximately 60 hours of lectures.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
- Representation over field of characteristic prime number p. - Brauer characters of finite groups and character tables of Brauer characters.	3	12
- Principal Indecomposable Characters, decomposition numbers and related topics. - Brauer and Feits Theorem of the bound of the number of irreducible characters in a block.	4	16
- G-Algebras and trace map. - Green Theory of indecomposable Modules: Green correspondence, Vertex of indecomposable module.	4	16
- Brauer's Main theorems in blocks. - Some recent conjectures in this field.	4	16

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	60	0				60
Credit	4	0				4

3. Additional private study/learning hours expected for students per week. Four hours of homework, revision and presentations	4

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

On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Develop knowledge and understanding on the modular representation of groups and the effect of changing the base field on the structure of modules and representations	Lectures , homeworks and discovery-based-learning discussions	Quizzes , periodicals and final exams as well as presentations.
1.2	Learn the different invariants related to the indecomposable modules such as defects , vertices , decomposition numbers and Cartan matrices.	Lectures , homeworks and discovery-based-learning discussions	Quizzes , periodicals and final exams as well as presentations
2.0	**Cognitive Skills**		
2.1	Demonstrate the ability to solve problems for determining the complete set of simple modules for certain group algebra as well as constructing its projective indecomposable modules and the blocks to which they belong.	Lectures , homeworks and discovery-based-learning discussions	Quizzes , periodicals and final exams as well as presentations
2.2			
3.0	**Interpersonal Skills & Responsibility**		

3.1	Practicing how to work within small team as an outcome of the discovery-based-learning discussions implemented throughout the course. Presentations teaches the student how to cite and quote.	Lectures , homework and discovery-based-learning discussions	Quizzes , periodicals and final exams as well as presentations
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1	Demonstrate communication and listening skills with the people in the class with positive attitudes and deportment. Show the ability of raising mathematical questions (problems) and how to solve them.	Lectures , homework and discovery-based-learning discussions	Quizzes , periodicals and final exams , presentations and discussion panels
4.2			
5.0	**Psychomotor**		
5.1	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	First periodic exam	6	20
2	Second periodic exam	10	20
3	Homework and tutorial activities	Overall weeks	20
4	Final exam	End	40

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)
The instructor is available for six hours at least per week. S/he is also available on appointments.

E Learning Resources

1. List Required Textbooks
   1- John L. Alperin, Local Representation Theory, Cambridge University

Press, Cambridge, 1986. 2- Charles W. Curtis and Irving Reiner, Representation Theory of Finite Groups and Associative Algebras, American Mathematical Society, New York, 1962. 3- Charles W. Curtis and Irving Reiner, Methods of Representation Theory with Applications to Finite Groups and Orders, Volume I, John Wiley and Sons, New York, 1981. 4- Charles W. Curtis and Irving Reiner, Methods of Representation Theory with Applications to Finite Groups and Orders, Volume II, John Wiley and Sons, New York, 1987. Representation of finite groups by Nagao and Tsushima 1987. 5- Representation of finite groups by Feit 1982. 6- L. Dornhoff, Group Representation Theory, Part B: Modular representation theory. Marcel Dekker Inc., New York, (1972). 7- Peter Webb, A Course in Finite Group Representation Theory, Cambridge University Press, Cambridge, 2016.
2. List Essential References Materials (Journals, Reports, etc.)
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
4. List Electronic Materials, Web Sites, Facebook, Twitter, 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.) A classroom with the capacity of 10-20 students
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 A student survey questions is implemented by the end of the semester which usually provides valuable feedback for both the teacher and the institution
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department Peer consultations and coordination
3 Processes for Improvement of Teaching In the light of the outcome of the survey questions in (1) and (2), the instructor and the department take series steps towards improving the teaching process.

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) Coordination with other colleagues in both teaching and marking.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. The department is obliged by the regulations to review the whole program each certain period of time (5 years) in the light of the different outcomes.

Name of Instructor: Prof. Ahmed Khammash

Signature: Ahmed Khammash _Date Report Completed: November 1, 2018

Name of Field Experience Teaching Staff Algebra (Representation Theory)

Program Coordinator:

Signature: _____ Date Received: