### ATTACHMENT 2 (e)

### Course Specifications

**Kingdom of Saudi Arabia**

**The National Commission for Academic Accreditation & Assessment**

**Course Specifications**

**(CS)**

**Research Project, Math 499**

**Amendatory Course**

**Course Specifications**

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| Institution King Saud University Date of Report:10/12/2015 |
| College/Department College of science/ Department of Mathematics |

**A. Course Identification and General Information**

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| 1. Course title and code: Research Project, MATH 499 |
| 2. Credit hours 3 (3+0+0) |
| 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 mathematics |
| 4. Name of faculty member responsible for the course  The faculty member who acts as a supervisor of the student |
| 5. Level/year at which this course is offered Eight level/ Last year |
| 6. Pre-requisites for this course (if any)  The completion of 100 credit hours |
| 7. Co-requisites for this course (if any)  None |
| 8. Location if not on main campus |
| 9. Mode of Instruction (mark all that apply)  a. Traditional classroom What percentage?  40%  b. Blended (traditional and online) What percentage?  c. e-learning What percentage?  60%%  d. Correspondence What percentage?  f. Other What percentage?  Comments: |

**B Objectives**

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| **1. What is the main purpose for this course?**  - Write a research using an organized scientific mode.  - Guide the students to self-learning and training them to come out with findings and conclusions.  - Train the students to be self-dependent in collecting the required data through personal efforts.  - Train the student to collect the data from various resources.  - Train the student how to write mathematical reports and research.  - Train the student how to present and defend scientific topic in front of a number of audience. |
| **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)**  - Choose modern and diversified topics.  - Investigate and analyzing mathematical results.  - Use modern resources depending on information technology.  - Change in the syllabus contents based on the scientific research results.  - Use the data on the internet, using the latest articles in the scientific journals.  - Use of mathematical software programs such as Mathematica and MATLAB. |

**C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)**

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| 1. Topics to be Covered | | |
| List of Topics | No. of  Weeks | Contact Hours |
| Collection of data and readings about the subject | 4 | 12 |
| Conduction of research | 7 | 21 |
| Writing the research and reports | 2 | 6 |
| Discussion and presentation of the project | 2 | 6 |
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| 2. Course components (total contact hours and credits per semester): | | | | | | |
|  | Lecture | Tutorial | Laboratory | Practical | Other: | Total |
| Contact  Hours | 45 hours | 0 | If required | 0 | 0 | 45 |
| Credit | 45 hours | 0 | If required | 0 | 0 | 45 |

Note: 45 hours during the academic term for discussion with the supervisor.

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| 3. Additional private study/learning hours expected for students per week.  3  To discuss completed. |

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

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The ***National Qualification Framework*** provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

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. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.

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|  | **NQF Learning Domains**  **And Course Learning Outcomes** | **Course Teaching**  **Strategies** | **Course Assessment**  **Methods** |
| **1.0** | **Knowledge** | | |
| 1.1 | Define a particular subject under supervision of staff member. | -Self -study.  -Weekly meeting with the supervisor to discuss completed parts.  -Training the students to write scientific research. | -Evaluation of the supervisor of the homework and giving remarks.  -Evaluation of the research progress.  -Presentation of written copy to one of the staff-member for evaluation and discussion with the student at the end of the term.  -Presentation of the research in front of a group of staff-members in special meeting for this purpose.  -Evaluation and giving a achieved marks to the students |
| 1.2 | Collect data from different sources. |
| 1.3 | Write, state and present a topic in scientific subject. |
| 1.4 | List some methods and instruments of scientific research. |
| 1.5 | Use analytic programs related to research topic. |
| **2.0** | **Cognitive Skills** | | |
| 2.1 | Analyze and reach results and conclusions. | -Guidance and follow up through periodical meeting with the supervisor.  -Self-study through solving drills and practical problems related to the research topic.  -Oral presentation of the research topic throughout the term. | -Investigating and checking the home work and giving remarks to be included in the research to raise the quality of the performance.  -Oral discussion and guidance to improve the performance.  -Comprehensive evaluation of the performance from the supervisor. |
| 2.2 | Scientific study to identify special results. |
| 2.3 | Compare and reaching results. |
| 2.4 | Show the students how to use references and self- study. |
| 2.5 | Explain students to a quire fast reading skills and to conduct and reach the information and employ them to serve the research. |
| **3.0** | **Interpersonal Skills & Responsibility** | | |
| 3.1 | Work independently depending on one self. Cooperation skills and team work in case the project is conducting by more than one student. | -Writing of mathematical reports in scientific methodology.  -Researching for data from different sources.  -Discussion of homework and how to use them to support the topic.  -Presentation of comprehensive research in front of a group of specialists. | -Follow up of research progress through weekly meeting with the supervisor.  -Evaluation of the home works partially and in totality.  -Evaluation of the comprehensive work at the end of the term. |
| 3.2 | Demonstrate team work spirit and group work. |
| 3.3 | Develop discussion skills and how to share and communicate the data with other. |
| 3.4 | Show others the students efforts during the term by presentation and explanations  on scientific bases to convince others. |
| **4.0** | **Communication, Information Technology, Numerical** | | |
| 4.1 | Use of computer skills and simple programs. | -Making up the calculations to reach and write the conclusion through using mathematical programs by using the available resources in the department and library and the computer laboratories. | -Evaluation of the arithmetic homework's through using the computers and related programs in the computer lab in practical mathematics and comparing them with obvious results and other similar results. |
| 4.2 | Use the internet in the practical research. |
| **5.0** | **Psychomotor** | | |
| None | | | |

**Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching**

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| **NQF Learning Domains** | **Suggested Verbs** |
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| **Knowledge** | list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write |
| **Cognitive Skills** | estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise |
| **Interpersonal Skills & Responsibility** | demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write |
| **Communication, Information**  **Technology, Numerical** | demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize |
| **Psychomotor** | demonstrate, show, illustrate, perform, dramatize, employ, manipulate, operate, prepare, produce, draw, diagram, examine, construct, assemble, experiment, and reconstruct |

Suggested ***verbs not to use*** when writing measurable and assessable learning outcomes are as follows:

Consider Maximize Continue Review Ensure Enlarge Understand

Maintain Reflect Examine Strengthen Explore Encourage Deepen

Some of these verbs can be used if tied to specific actions or quantification.

**Suggested assessment methods and teaching strategies are:**

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.

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| **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 | Research progress through discussion with the supervisor through the term along with attendance. |  | 30% |
| 2 | Writing of final research in scientific methods |  | 30% |
| 3 | Evaluation of the discussant |  | 20% |
| 4 | Evaluation of the presentation by the committee |  | 20% |
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**D. Student Academic Counseling and Support**

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| 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)**  - 10 scheduled office hours per week.  - 5 hours weekly for academic advice through the academic guidance unit in the department.  - 3 hours weekly meeting with the supervisor. |

**E. Learning Resources**

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| 1**. List Required Textbooks**  - Selected books depending on subject.  - An article from a periodical journal.  - Selected researches results from international conferences. |
| 2. **List Essential References Materials (Journals, Reports, etc.)**  - References and journals related to the subject available in the main library. |
| 3. **List Recommended Textbooks and Reference Material (Journals, Reports, etc)**  - Books and journals related to the subject AMS, SIAM, IEEE, and Science direct. |
| 4. **List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)**  - Websites on the internet that are relevant to subject of the course.  - Mathematics journals website: science direct.  - Instructors website.  - Other internet periodical. |
| 5. **Other learning material such as computer-based programs/CD, professional standards or regulations and software.**  - Related association magazines.  - Matlab, Mathematica, Scientific Workplace, Microsoft Office. |

**F. Facilities Required**

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| 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.)**  - Lecture room equipped with blackboard and data show.  - Computer laboratory. |

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| 2. **Computing resources (AV, data show, Smart Board, software, etc.)**  - Computers equipped with suitable software. |
| 3. **Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)**  - Printers connected to the computers with the supervisor and student to exchange the data of the research. |

**G Course Evaluation and Improvement Processes**

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| 1 **Strategies for Obtaining Student Feedback on Effectiveness of Teaching**   * Course evaluation by student at the end of the semester. |
| 2 **Other Strategies for Evaluation of Teaching by the Program/Department Instructor**   * Analyzing the students evaluation. * Peer consultation on teaching. * Departmental council discussions. * Supervisors observations. |
| 3 **Processes for Improvement of Teaching**   * Workshops conducted by the deanship of skills developments. * Using different references and subjects. * Encouraging the student to search for other references from other scientific journal related to the topic. |
| 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)**  - Evaluation of the project by a group of faculty members in the final session.  - Exchange and correction of the homework between the supervisors for the same subject.  - Discussion of the results from one staff member from other department. |

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| 5 **Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.**   * Periodic revision of contents and conclusions of previous projects every two years. * Update the contents and conclusions according to the ability of the student. * Involving more faculty members from different specialties in the supervision process. * Contribution of all staff- members from different specialties to evaluate the contents of the subject. |

**Faculty or Teaching Staff: D. Widad Babiker**

**Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date Report Completed: 10/12/2015**

**Received by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Dean/Department Head**

**Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**