

## T6. Course Specification (CS)

Institution: Najran University	Date: Second semester/2017 (1438)
College/Department: Science & Arts Faculty / Physics	

### A. Course Identification and General Information:

1. Course title and code : Mathematical Physics 2 (350 phys 2)			
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) Physics Program.			
4. Name of faculty member responsible for the course : Dr /Heba Mohamed& Dr Hossen Amar			
5. Level/year at which this course is offered :4 <sup>th</sup> level / second year			
6. Pre-requisites for this course (if any) : Physical Mathematics1 (250 phys 2)			
7. Co-requisites for this course (if any) :None			
8. Location if not on main campus: This course is offered in both males and females division			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
b. Blended (traditional and online)	<input checked="" type="checkbox"/>	What percentage?	<b>100</b>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
d. Correspondence	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
f. Other	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
Comments :NO Comments			

## B. Objectives

1. What is the main purpose for this course? The main purpose for this course is to give the student the ability to use appropriate mathematical techniques and concepts to obtain solutions to problems in physics.
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) <ul style="list-style-type: none"> <li>Update the contents of the course on the basis of recent developments.</li> </ul>

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

### Course Description :

This course is concerned with the concepts and advanced mathematical methods used in the treatment of advanced physical topics such as the solution of differential equations in series, and the special functions: for gender - Hermite - beta - gamma as well as molecular differential equations and composite functions.

1. Topics to be Covered :		
List of Topics	No. of Weeks	Contact Hours
Series solutions of differential equations.	2.5	5
Legendre and hermit functions.	3.5	7
Partial differential equations: separation of variables – Boundary conditions – wave equation – Laplace equation- complex functions.	2	6
Special functions: gamma function – recurrence relation – Beta function – relation between gamma function and beta function – Stirling formula (approximation for large number)	4	8
Integral transforms – introduction to probability.	2	4

1.Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or studio	Practical	Other:	Total
Contact Hours	30	----	-----	-----	-----	30
Credit	2	----	-----	-----	-----	2

3-Additional private study/learning hours expected for students per week	2h/week
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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy.
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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
<b>1.0</b>	<b>Knowledge</b>		
1.1	Student should be able to state the basic laws and relations related to Legendre and hermit functions, Special functions, Partial differential equations, Integral transforms and probability	Lecture dialogue and discussion	midterm and final exams

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.2	Student should be able to describe the series solutions method for the differential equations.	Lecture dialogue and discussion	midterm and final exams
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Student should be able to Interpret theories and facts contained in Legendre function, Hermit functions, Partial differential equations, Special functions (gamma and beta), Integral transforms and Introduction to probability.	Lecture dialogue and discussion	midterm and final exams
2.2	Student should be able to Drive the laws and equation contained in Legendre function, Hermit functions, Partial differential equations, Special functions (gamma and beta), Integral transforms and Introduction to probability.	Lecture dialogue and discussion	midterm and final exams + assignment
2.3	Student should be able to Apply theories and facts contained in Legendre function, Hermit functions, Partial differential equations, Special functions (gamma and beta), Integral transforms and Introduction to probability.	Lecture dialogue and discussion	midterm and final exams + assignment
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Student should be able to Express his /her opinion and accept the opinions of others	Active learning Cooperative learning	Observation card
3.2	Student should be able to Take responsibility and participate effectively as a team member	Active learning Cooperative learning	Observation card
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Student should be able to Demonstrate effective Communicate with the others.	Active learning	Observation card
4.2	Student should be able to Research by using Information Technology and analyze numerical values to get information behind them	Cooperative learning	Observation card
<b>5.0</b>	<b>Psychomotor</b>		
5.1	Not applicable		

5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, Quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
	First semester exam	5-6	20%
	Second semester exam	11-12	20%
	Assignment	During semester	10
	Final exam	16-18	50%

#### 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)

- Two office hours per a week
- The instructor will generally be available after lectures times during official working hours for extra help.
- The instructor will generally be available at Blackboard forum for extra help.

#### E. Learning Resources

1. List Required Textbooks:

1.
  - George B. Arfken and Hans J. Weber, MATHEMATICAL METHODS FOR PHYSICISTS, FIFTH EDITION, Harcourt Academic Press, 2001.
  - Mary L. Boas, MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES, second edition, John Wiley & Sons Inc., 1983.

2. List Essential References Materials (Journals, Reports, etc.)

**Erwin Kreyszig, Advanced Engineering mathematics, Fourth edition, John Wiley & Sons Inc., 1979.**

3. List Electronic Materials Web Sites, Facebook, Twitter, etc.

<http://sciencebooksonline.info/physics.html>

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

**Not exist**

#### 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.)

-Class room can accommodate up to 50 students equipped with all IT equipments - connected to the Internet.

2. Computing resources (AV, data show, Smart Board, software, etc.)

- Number of computers connected to the Internet.
- Data show

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

- Not exist

#### G. Course Evaluation and Improvement Processes:

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- University online questionnaire evaluation of course by students.

2. Other Strategies for Evaluation of Teaching by the Instructor or by the department.

- Course report at the end of semester.
- Evaluate the course portfolio

3. Processes for Improvement of Teaching:

- Use of modern strategies in teaching.
- Improve teaching through feedback from student's questionnaire (on the university Web site )
- Attending workshops and training courses for the development of teaching skills and strategies used in modern education
- Keeping up to date with refereed articles and books related to the topics of the course.

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)

- Use the system of measure learning outcomes to verify students' familiarity with targeted learning outcomes(KPI)
- Annual course report.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement :

- Study and compare the results of the students in course
- Guided by the students feedback about the effectiveness of the course material through student's questionnaires
- Continues development of teaching methods and student participation
- Review and update the course to fulfill the needs of the labor market
- Study of the proposals submitted by professors have experience in teaching the course
- Using feedback from rotating Evaluation of course and performance of a faculty member in Development plans
- Update learning resources for the course regularly using the Internet
- Consult with other faculty member who is teaching the same course
- Update the content of the course in line with recent developments in the field

**Name of instructor :**

Dr /Heba Mohamed& Dr Hossen Amar

**Signature :\_Heba Mohamed \_Date Report Completed: Second semester/2017 (1438)**

**Name of field experience teaching staff:** \_\_\_\_\_

**Program coordinator** \_\_\_\_\_

**Signature:** \_\_\_\_\_ **Date received: 5/2017**