

المركز الوطني للتقويم والاعتماد الاكاديمي National Center for Academic Accreditation and Evaluation

# ATTACHMENT 5.

# T6. COURSE SPECIFICATIONS (CS)



Institution: University of Tabuk	Date: 17-4-2019
College/Department : Physics, science	

# A. Course Identification and General Information

1. Course title and code: statistical, PHYS 456					
2. Credit hours: 3Hr					
3. Program(s) in which the course is offered.					
(If general elective available in many programs indicate this rather than list programs)					
4. Name of faculty member responsible for the course Dr Taymour Ahmed Hamdalla					
5. Level/year at which this course is offered: 7, year 4					
6. Pre-requisites for this course (if any): PHYS 222 and PHYS 354					
7. Co-requisites for this course (if any):non					
8. Location if not on main campus: On main campus					
9. Mode of Instruction (mark all that apply):					
a. traditional classroom * What percentage? 100%					
b. blended (traditional and online) What percentage?					
c. e-learning What percentage?					
d. correspondence What percentage?					
f. other What percentage?					
Comments:					



#### **B** Objectives

- What is the main purpose for this course? By the end of this course the students will demonstrate the ability to assimilate and integrate information from lectures, and independent activities on statistical mechanics regarding the review of the classical thermodynamics, the basics of the classical statistical mechanics and the basics of quantum statistical mechanics. Also, student will demonstrate the ability to gain practical skills enabling him to recognize and differentiate theories of the statistical mechanics such as Maxwell Boltzmann, Bose Einstein and Fermi Dirac Statistics.
- 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)
- Teaching material in a lectures or power point available to students
- □ Increased use of electronic based reference material.
- Content following the most recent research in the field
- Some of the topics are planned to be added to related modules
- Use of recent illustrating overhead projectors, electronic screen in teaching
  - Tutorials are improved from questions asking to discussion of statistical mechanics

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

Course Description: Review of the three thermodynamics laws, Introduction to statistical physics ( a particle in a box, energy levels, microstates, macrostates, entropy). Statistical thermodynamics ( distribution of energy between systems in equilibrium, equilibrium of a system in a heat bath, the partition function).

List of Topics	No of	Contact
	Weeks	hours
The microscopic and macroscopic view	1	3
The thermodynamic processes	2	3
Some consequences of the first law of thermodynamic	3	3
Basic of classical statistical mechanics	4	3
Density distribution in the phase space and microcanonical	5	3
Revision+ First Exam	6	3
The quantum statistical mechanics	7	3

Course Specifications, Ramadan 1438H, June 2017.



The fundamental concepts	8	3
Energy state and the thermodynamic probability	9	3
The equilibrium distribution	10	3
Revision+ Second Exam	11	3
Maxwell Boltzmann statistics	12	3
Bose Einstein statistics	13	3
Fermi Dirac statistics	14	3
The relation between the Partition function and the thermodynamic functions	15	3

2. Course components (total contact hours and credits per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact	Planed	45 hr					45 hr
Hours	Actual	45 hr					45 hr
Credit	Planed	3					3
	Actual	3					3

3. Additional private study/learning hours expected for students per week. 6 hr

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.

<u>First</u>, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). <u>Second</u>, 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	NOF Learning Domains	Course Teaching	Course
#	And Course Learning Outcomes	Strategies	Assessment Methods
1.0	Knowledge		•
1.1	understand the basic principles of classical and quantum mechanics.	Demonstrating the basic principles through lectures. Brain storming 6. Start each chapter by general idea and the benefit Discussing phenomena with illustrating pictures and diagrams Board, Power point Discussions. 2	<ul> <li>Presentatio ns</li> <li>Homework.</li> <li>Classwork</li> </ul>
1.2	- understand the theoretical basis of statistical mechanics of thermodynamic system.	Show the best ways to demonstrate the results. Show the best way to write the reports about the experiment. Discussion with the student about the results	<ul> <li>Presentatio ns</li> <li>Homework.</li> <li>Classwork</li> </ul>
2.0	Cognitive Skills		
2.1	- Using discussion, Lessons, examples and illustrations to demonstrate the difference among topics	Search through the internet and use the library. • Small group discussion. • Enhance educational skills. • Develop their interest in Science through :( lab work, field trips, visits to scientific and research. • Encourage the student to attend lectures regularly • Give students tasks of dutie	Midterm theoretical exams (2) 30% Homework and Activities 10% quizzes 10% Final exam 50% Discussions of how to simplify or analyze some phenomena
2.2	- Improve scientific English of students		



	Relation between statistical mechanics and	1331011	
2.3	Thermodynamics.		
2.4	- Encourage students to use online library		
3.0	Interpersonal Skills & Responsibility		
3.1	Directing the student to self-learning and greater knowledge in the field of course	• Search through the internet and use the library. • Small group discussion. • Enhance educational skills. • Develop their interest in Science through :( lab work, field trips, visits to scientific and research. • Encourage the student to attend lectures regularly • Give students tasks of duties	<ul> <li>Evaluate the efforts of each student in preparing the report.</li> <li>Evaluate the scientific values of reports.</li> <li>Evaluate the work in team</li> <li>Evaluation of the role of each student in lab group assignment</li> <li>Evaluation of students presentations</li> </ul>
3.2	-Tutorial Classes.		
3.3	-Encourage students to think critically and involve in discussions with the instructor in classroom.		
4.0	Communication, Information Technology, Numerica	1	
4.1	Develop the scientific language skills	• Homework •	• Evaluation of presentations
4.2	- Develop communication skills with others via websites or e-mail		
5.0	Psychomotor		Γ
5.1	Description of the psychomotor skills to be developed and the level of performance required		

5. Schedule of Assessment Tasks for Students During the Semester				
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment	



1	Student's participation, homework assigned questions, and evaluation	15	10%
2	- Two midterm tests	7 &11	25%
3	- Final examination (40%).	16	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)

- Students can approach during the office hours for the faculty member to ask questions to clarify some points missed during the lecture.

- Students can communicate with the teaching staff through the website and ask questions related to all aspects of the lesson. The students will get written answers as soon as possible, The teaching staff are available during all the day in the faculty and are ready to clarify any points related to the course.

- The teaching staff are available during all the day, where they are ready to clarify any points related to the course.

#### **E Learning Resources**

1. Required Text(s): Statistical physics by: F. Mandl, John and sons (2002) reprinted 2009

### 2. Essential References

Statitical mechanics by: B. K. Agarwal, M. Eisner, V. R. Damodaran, Wiley Estern Limited, New Delhi (1989).

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

Thermodynamics and statistical mechanics by: W. P. Allis, M. A. Herlin, McGraw-Hill, New York, (1992).

4-.Electronic Materials, Web Sites etc <u>Wikipedia, the free encyclopedia - mechanics Statistical</u> *en.wikipedia.org/.../Statistical\_mechanics* 



5- Other learning material such as computer-based programs/CD, professional standards/regulations

CDs accompanied with the text book and essential references



# F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

- Classrooms ready and equipped with educational media

- Labs equipped with material for teaching Physics

2. Computing resources

- Data show and internet.

- Computer and microphone in Lecture rooms

3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

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# G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Regular evaluation of the theoretical and practical parts of the course to identify the weaknesses areas

- Performance appraisal form filled up by each student to show level of fulfilment

- Confidential completion of standard course evaluation questionnaire

2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

A statistical regular review and analysis of the students' achievement in the department.
Prepare a questionnaire which should be filled by the students at the end of the term. The questionnaire should be after that analyzed and carefully studied.

# 3 Processes for Improvement of Teaching

- Provide training and workshop opportunities for the teaching staff to improve their teaching strategies.

- Form committees to follow up progress and work on improvement.

- Provide opportunities to improve academic courses and research through conferences.

- Provide the teaching staff members with all the references and electronic resources.

- Updating through more reading books and articles related to the course

- Improve relations between instructor and students.



4. Processes for Verifying Standards of Student Achievement (eg. 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)

- Check marking of the answer sheets of examination papers with other colleagues

- Check progress level of the students (this can be done by an independent teacher by reviewing students' records and compare the students' work with another from a different institute).

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

- Student's feedback on the quality of the course.

- Consulting other faculty members or collaborators in overseas universities for their views on the method of quality of improvement

- Check other universities web sites to compare our lectures with them

- Compare the syllabus with the syllabus of standard universities.

- Form a specialized committee from the department to review the progress of teaching and update the resources

- Consult distinguished students and discuss with them positive and negative points in Lectures.

Name of Course Instructor: \_taymour ahmed

Signature: \_\_\_\_\_ Date Specification Completed: \_\_\_17-4-2019\_

Program Coordinator: Dr. Fahad Alharbi Signature: *Dr. Fahad Alharbi* Date Received: 7/7/2019