Course Specifications

Course Title:	Mathematical Physics (3)
Course Code:	42031321
Program:	BSc in Physics
Department:	Department of Physics
College:	Faculty of Science
Institution:	AlBaha University

Table of Contents

A. Course Identification

1. Credit hours:	**3 credit hours**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Fifth Level / Third Year**
4. Pre-requisites for this course(if any)**:**	Mathematical physics (2) -(42031206)
5. Co-requisites for this course(if any)**:**	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	36	80%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Correspondence**	-	-
5	**Other**	9	20%

7. Actual Learning Hours(based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	45
2	**Laboratory/Studio**	-
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	**45**
Other Learning Hours*		
1	**Study**	15
2	**Assignments**	15
3	**Library**	15
4	**Projects/Research Essays/Theses**	
5	**Others**(Lab reports and exam preparation time)	
	Total	**45**

*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

To build on basic concepts of mathematical physics (1) and(2).

2. Course MainObjective

On completing this course , the student will be able to:

- Understand the basic techniques for solving differential equations, studying the general properties of solving partial differential equations, and using methods of separating variables to solve equations such as Laplace, Poisson equations, propagation and wave equations.
- Determine analytical functions, single points, Volterra, Friedholm integration.
- Determine the fundamentals of the integration of Cauchy, Taylor and Laurent series, the theory of residues.

3. Course Learning Outcomes

	CLOs	AlignedPLOs
1	**Knowledge:**	
1.1	Define a special function and state its type.	K1
1.2	List deferent types of partial differential equations of physics.	K2
1.3	Describe and recognize special types of partial differential equations.	K3
2	**Skills :**	
2.1	Apply the methods of solving ODEs (Mathematical Physics (2)) to get expressions of a special function.	S1
2.2	Construct a partial differential equationand solve it.	S2
2.3	Verify whether a complex function is analytic or not and evaluate it integral.	S4
3	**Competence:**	
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standard on assigned tasks in mathematical physics.	C1
3.2	Search in the internet and libraries for certain topic in the field of mathematical physics	C3
....	-	

C. Course Content

No	List of Topics	Contact Hours
	Lectures	
1	**Special functions:** Generating functions, recurrence relations, orthonormal properties for Legendre, Bessel, Hermite, Laguerre, and Gauss functions.	14
2	**Partial differential equations of physics:** Laplace's equation, Poisson's equation, diffusion equation, wave equation, Green's functions, methods of solving PDEs, separation of variables, Fourier transform etc.	12
3	**Complex variables:** Complex variable, functions of complex variables, logarithms, trigonometric and hyperbolic functions, differentiation and integration (definite, indefinite, line and contour integrals) of functions of	14

No	List of Topics	Contact Hours
	complexvariables, analytic functions, Cauchy's integral, singular points, Taylor and Laurent series, Residue theorem.	
4	Solving some physical problems.	5
	Total (Lectures)	45
Total (Lectures)		**45**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	Define a special function and state its various type.	Lectures, Open discussion.	Quizzes, Short exams, final exam
1.2	List deferent type PDEs of physics.	Lectures, Open discussion.	Quizzes, Short exams, final exam
1.3	Describe and recognize special types of partial differential equations.	Lectures, Open discussion, Group working	Quizzes, Short exams, final exam
2.0	**Cognitive Skills**		
2.1	Apply the methods of solving ODEs (Mathematical Physics (2)) to get expressions of a special function.	Lectures, Open discussion, Search activities	Quizzes, Short exams, final exam
2.2	Construct a partial differential equation and solve it.	Lectures, Open discussion, Search activities	Quizzes, Short exams, final exam,
2.3	Calculate of the polynomials constructed by special function and its associated differential equation.	Lectures, Open discussion, Search activities, brain storming	Exams, short quizzes
2.4	Verify whether a complex function is analytic or not and evaluate it integral.	Lectures, Brain storming, problem solving.	Exams, short quizzes
3.0	**Competence**		
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standard on assigned tasks in mathematical physics.	-Search activities - working group - Discussion	Worksheet, presentations
3.2	Search in the internet and libraries for certain topic in the field of mathematical physics	-Search activities - working group - Discussion	Worksheet, presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical exam 1	5	10 %
2	Mid- Term exam	9	20 %
3	Periodical exam 2	13	10 %
4	Home works	During the term	10 %
5	Practical (lab reports)	-	-
6	Final practical	-	-
7	Theoretical Exam	17	50 %

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

1. Student Academic Counseling
   - The arrangements for academic counseling and advices for the students, including scheduling of faculty office hours, advices on program planning, subjects selection and career planning are announced and published to the students in the physics department and the faculty website.
   - The students are divided into groups, whereas each student has academic counseling.
2. Student Appeals
   - The regulations for student appeals on academic matters are announced and published in the physics department and the faculty website.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	- "Mathematical Physics, Applied Mathematics for Scientists and Engineers", Bruce R. Kusse and Erik A. Westwig, 2nd, 2006, by WILEY-VCH Verlag GmbH & Co. KGaA. "Higher Mathematics for Physics and Engineering",HiroyukiShima • Tsuneyoshi Nakayama, 2010, by Springer-Verlag Berlin Heidelberg.
Essential References Materials	Hans J. Weber and George B. Arfken, Essential Mathematical Methods for Physicists, Academic Press, (2003)..
Electronic Materials	*None*
Other Learning Materials	*None*

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- One classroom containing computer access, and white board
Technology Resources (AV, data show, Smart Board, software, etc.)	- One AV - One data show - One Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Effectiveness of Teaching. **- The course content.** **- Satisfaction with the course.** **- Quality of Learning Resources.**	Students	Questionnaires
- Teaching Methods. **- Planned and actual study hours.** **- A achievement of course learning outcomes.**	Faculty (staff member)	Observation of lectures, analysis of assessment data
- Teaching Methods. **- Planned and actual study hours.** **- A achievement of course learning outcomes.**	Program leader	Observation of lectures, interviews with involved faculty, analysis of assessment data
- Teaching Methods. **- Planned and actual study hours.** **- A achievement of course learning outcomes.**	Peer Reviewer	interviews with involved faculty, and course participants, analysis of assessment data

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Quality oflearning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,Peer Reviewer, Others (specify)
Assessment Methods(Direct, Indirect)

H. Specification Approval Data

Council / Committee	Curriculum Committee
Reference No.	
Date	

Course Specifications

Course Title:	Classical Mechanics (2)
Course Code:	42031325
Program:	B. Sc in Physics
Department:	Department of Physics
College:	Faculty of science
Institution:	Albaha University

Table of Contents

A. Course Identification

1. Credit hours:	**3 credit hours**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Fifth Level / Third Year**
4. Pre-requisites for this course (if any)**:**	Classical mechanics (1) - (42031208)
5. Co-requisites for this course (if any)**:**	**None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	36	80 %
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**	9	20 %

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	45
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	45
Other Learning Hours*		
1	**Study**	10
2	**Assignments**	10
3	**Library**	10
4	**Projects/Research Essays/Theses**	10
5	**Others**(specify)	
	Total	40

*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

To introduce the student to the basic concepts of classical mechanics (2).

Course main Objectives

On completion of this course the students will be able to:

- Recognize the basic principles of Lagrange's mechanics, Hamilton's mechanics, central forces, oscillations and stability of systems, variation principle and physics of rotation.
- Apply the basic laws of canonical transformations correctly.
- Find suitable set of generalized coordinates and kinetic energy , potential energy, the Lagrangian and Hamiltonian equations of some physical systems.
- To impart knowledge on equations of motions of central forces, attractive potentials systems, classical treatment of scattering.
- To construct Canonical transformations Poisson brackets, canonical transformations, generating functions, Hamilton – Jacobi equation.

3. Course Learning Outcomes

CLOs		AlignedPLOs
1	**Knowledge:**	
1.1	Statethe Euler's theorem, Lagrange's equation and variation principle.	**K1**
1.2	Describe the central forces, oscillations and stability of systems and canonical transformations.	**K2**
1.4	Determine the equation of motion of simple plane pendulum using the Lagrangain and Hamilton's approaches	**K3**
2	**Skills :**	
2.1	Compare the Lagrange's with the Hamilton's formalism.	**S1**
2.2	Deduce the Hamilton and Lagrange's of classical Hydrogen atom (Rutherford model)	**S2**
2.3	Construct Poisson brackets of angular momentum	**S4**
3	**Competence:**	
3.1	Search in the internet and libraries for satellite launching and stability in certain orbits using classical mechanics	**C3**
3.2	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standards on assigned tasks in Classical mechanics (2) .	**C1**
3.3	Manage a certain topic in the field of in Classical mechanics (2) with his classmates.	**C2**

C. Course Content

No	List of Topics	Contact Hours
1	**Variation principle:** Calculus of variation, Hamilton's principle, Euler-Lagrange equations, principle of least action.	9
2	**Lagrange's equations:** Generalized coordinates, principle of virtual work, D.A lembert's principle, conservative and none-conservative systems, Lagrange's equations, Hamilton's equations.	6
3	**Central forces:**	9

	Equations of conic curves, equations of the motion for central forces, attractive potentials systems, classical treatment of scattering.	
4	**Oscillations and stability:** Stability of equilibrium, conservative systems, linear harmonic motion, normal coordinates, continuum system.	9
5	Canonical transformations Poisson brackets, canonical transformations, generating functions, Hamilton – Jacobi equation.	6
6	**Physics of rotation:** Rotation matrix, Euler's angles, Euler's theorem, force-free motion of a rigid body.	6
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	State the Euler's theorem, Lagrange's equation and variation principle.	Lectures, discussion,	Quizzes, Short exams, final exam
1.2	Describe the central forces, oscillations and stability of systems and canonical transformations.	Lectures,Open discussion.	Quizzes, Short exams, final exam.
1.3	Determine the equation of motion of simple plane pendulum using the Lagrangain and Hamilton's approaches.	Lectures, Open discussion.	Quizzes, Short exams, final exam
2.0	**Skills**		
2.1	Compare the Lagrange's with the Hamilton's formalism.	Lectures,Open discussion.	Exams, short quizzes.
2.2	Deduce the Hamilton and Lagrange'sof classical Hydrogen atom (Rutherford model).	Lectures, Open discussion.	Exams, short quizzes
2.3	Construct Poisson brackets of angular momentum.	Lectures,problem solving.	Exams, short quizzes
3.0	**Competence**		
3.1	Search in the internet and libraries for satellite launching and stability in certain orbits using classical mechanics	-Search activities - working group - Discussion	Worksheet, presentations
3.2	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standards on assigned tasks in Classical mechanics (2).	-Search activities - working group - Discussion	Worksheet, presentations
3.3	Manage a certain topic in the field of in Classical mechanics (2) with his classmates.	-Search activities - working group - Discussion	Worksheet, presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical exam 1	5	10 %
2	Mid- Term exam	9	20 %
3	Periodical exam 2	13	10 %
4	Home works	During the term	10 %
5	Final theoretical Exam.	17	50 %

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

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)

1. Student Academic Counseling

- The arrangements for academic counseling and advices for the students, including scheduling of faculty office hours, advices on program planning, subjects selection and career planning are announced and published to the students in the physics department and the faculty website.
- The students are divided into groups, whereas each student has academic counseling.

2. Student Appeals

The regulations for student appeals on academic matters are announced and published in the physics department and the faculty website.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	"Classical Mechanics", Herbert Goldstein, Charles P. Poole, and John L. Safko, 3rd,2001, Addison Wesley.
Essential References Materials	Classical Mechanics Systems of Particles and Hamiltonian Dynamics", Walter Greiner, 2nd, 2010, Springer-Verlag Berlin Heidelberg
Electronic Materials	Web Sites, Facebook, Twitter, etc. Web Sites, Facebook, Twitter, etc.
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	One classroom containing computer access, and white board
Technology Resources (AV, data show, Smart Board, software, etc.)	- One AV - One data show

Item	Resources
	- One Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Effectiveness of teaching. - The course content. - Satisfaction with the course Quality of Learning Resources	Students	Questionnaire
- Teaching methods. - Planned and actual study hours. Achievement of course learning outcomes.	Faculty (staff member)	Observation of lectures, analysis of assessment data,
- Teaching methods. - Planned and actual study hours. Achievement of course learning outcomes.	Program Leader	Observation of lectures, interviews with involved faculty, analysis of assessment data,
- Teaching methods. - Planned and actual study hours. Achievement of course learning outcomes.	Peer Reviewer	interviews with involved faculty and course participants, analysis of assessment data,

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Quality oflearning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,Peer Reviewer, Others (specify)
Assessment Methods(Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Course Specifications

Course Title:	Electronics (1)
Course Code:	42031311
Program:	BSc in Physics
Department:	Department of Physics
College:	Faculty of Science
Institution:	AlBaha University

Table of Contents

A. Course Identification

1. Credit hours:	**3 credit hours (2 T + 1 P)**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Fifth Level / Third Year**
4. Pre-requisites for this course(if any)**:**	**General Physics (2) - (42031219)**
5. Co-requisites for this course(if any)**:**	**None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	24	40%
2	**Blended**	12	20%
3	**E-learning**	-	-
4	**Correspondence**	-	-
5	**Other (Laboratory)**	24	40%

7. Actual Learning Hours(based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	30
2	**Laboratory/Studio**	30
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	**60**
Other Learning Hours*		
1	**Study**	15
2	**Assignments**	15
3	**Library**	15
4	**Projects/Research Essays/Theses**	-
5	**Others**(Lab reports and exam preparation time)	20
	Total	**65**

*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

To introduce the students to the basic concepts of electronic physics.

2. Course Main Objective

- Recognize the basic of electronic functions.
- Deduce the signal form relative to a given circuit and vice versa
- Model a circuit using non-linear components by linear functions.
- Gain practical experience in analyzing elementary linear/non-linear electronic circuits (measuring voltage/current, visualizing signals in the oscilloscope)

3. Course Learning Outcomes

	CLOs	AlignedPLOs
1	**Knowledge:**	
1.1	Outline basic analog electronic circuits and describe the linear models of non-linear components and their characteristics	K1
1.2	Memorize the operation of non-linear components (diodes, transistor) And give the difference between transistor biasing techniques	K1, K2
1.3	Organize the amplifying techniques regarding their properties (voltage/ current/power amplifiers, large band/low frequency/ high frequency amplifiers)	K3
2	**Skills :**	
2.1	Compute the value of current and voltage relative to a linear circuit by using fundamental theorems.	S1
2.2	Analyze a rectifier/filter circuit and deduce the signal form	S2
2.3	Calculate the operation point coordinates for a given transistor biasing circuit in a given mode of operation	S3
2.4	Model an amplifier circuit and calculate its parameters.	S4
3	**Competence:**	
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standards on assigned tasks in analog electronic circuits.	C1
3.2	Manage a discussion in a certain topic in the field of analog electronic physics with his classmates.	C2
....	-	

C. Course Content

No	List of Topics	Contact Hours
	Lectures	
1	**Review of fundamentals of electronic circuits** Voltage, Current, Ohm's law. Kirchhoff's laws (KCL, KVL) and applications. Linear models of electric dipoles (ideal and real current/voltage sources) operating point.	2
2	**Diodes and rectifier:** Diode model. Rectifier circuits. Clipper circuits. Clamper circuits. Zener diode circuits.	10
3	**Bipolar junction transistors** Working principle and parameters. The transistor as a switch (cutoff and saturation). Biasing techniques (active mode operation).	6
4	**Single stage and multistage amplifiers** Small signal model of transistor. Amplifier models. The common-emitter amplifier. The common-collector amplifier. The common-base amplifier. Presentation of multistage amplifiers (Class B, Current mirror, Cascade)	6
5	**Field effect transistors** The transistor as a switch. Biasing techniques. The common-source amplifier. The common-drain amplifier. The common-gate amplifier	2
6	**Operational amplifier**	4

No	List of Topics	Contact Hours
	Differential amplifier. Operational amplifier parameters (input/output impedances, gain and bandwidth). Operational amplifier model and transfer function. Negative-Feedback. Linear circuits (Emitter follower,	
	Total (Lectures)	30
Practical Part		
1	Getting familiar with working knowledge of the following Instruments. (Multimeter, Function generator, Regulated power supply, Active and passive components).	2
2	Diodes Characteristics	2
3	Zener diode Characteristics	2
4	Rectifiers Circuits (Half wave rectifier, Full wave rectifier	4
5	Rectifier filter circuit	2
6	Bipolar Junction Transistor Characteristics	2
7	Transistor as a switch	2
8	Transistor biasing	2
9	The BJT Common EmitterAmplifier	4
10	JFET Characteristics	2
11	JFET Amplifier	2
12	Operational amplifier circuits (Emitter follower/non-inverting amplifier)	2
13	Operational amplifier circuits (Differentiator/integrator)	2
	Total (practical)	30
	Total (Lectures + practical)	**60**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	Outline basic analog electronic circuits and describe the linear models of non-linear components and their characteristics	Lectures, blended learning, open discussion and brainstorming	Quizzes, homework periodical Exams, midterm and final exam
1.2	Memorize the operation of non-linear components (diodes, transistor) And give the difference between transistor biasing techniques	Lectures, blended learning, open discussion and brainstorming	Quizzes, homework periodical exams, midterm and final exam.
1.3	Organize the amplifying techniques regarding their properties (voltage/ current/power amplifiers, large band/low frequency/ high frequency amplifiers)	Lectures, blended learning, open discussion and brainstorming	Quizzes, homework periodical exams, midterm and final exam.
2.0	**Skills**		

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
2.1	Compute the value of current and voltage relative to a linear circuit by using fundamental theorems.	Lectures, blended learning, open discussion and brainstorming, Problem based learning, cooperative learning and lab working.	Quizzes, homework periodical Exams, midterm and final exam.
2.2	Analyze a rectifier/filter circuit and deduce the signal form	Lectures, blended learning, open discussion and brainstorming, problem based learning, Cooperative learning and computer Simulated labs	Quizzes, homework periodical exams, midterm and final exam.
2.3	Calculate the operation point coordinates for a given transistor biasing circuit in a given mode of operation	brainstorming, problem based learning, cooperative learning, lab working and computer Simulated labs	Lab report, oral exam, final practical exam
2.4	Model an amplifier circuit and calculate its parameters.	Lectures, cooperative learning, lab working and computer Simulated labs	Quizzes, lab report, oral exam, final practical exam
3.0	**Competence**		
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standards on assigned tasks in analog electronic circuits.	Group working, cooperative learning	Worksheet, presentations
3.2	Manage a discussion in a certain topic in the field of analog electronic circuits with his classmates.	Group working, cooperative learning	Worksheet, presentations
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical exam 1	5	5 %
2	Mid- Term exam	9	10 %
3	Periodical exam 2	13	5 %
4	Home works	During the term	10 %
5	Practical (lab reports)	During the term	10 %
6	Final practical	16	10 %
7	Theoretical Exam	17	50%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

1. Student Academic Counseling
   - The arrangements for academic counseling and advices for the students, including scheduling of faculty office hours, advices on program planning, subjects selection and career planning are announced and published to the students in the physics department and the faculty website.
   - The students are divided into groups, whereas each student has academic counseling.
2. Student Appeals
   - The regulations for student appeals on academic matters are announced and published in the physics department and the faculty website.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	- Principles of Electronics, V. K. Mehta, Rohit Mehta, S.Chand, 2005 - Electronic Devices and Circuit Theory, Robert L. Boylestad, Louis Nashelsky, Prentice Hall, 2012 - Lessons in Electric Circuits (Vol. I-II-III), Tony R. Kuphaldt, Koros press, 2012 - Electronics Principles, Alber Paul Malvino, David Bates, Mc-Graw HILL , 2016
Essential References Materials	None
Electronic Materials	- https://www.coursera.org/ - https://www.edx.org/ - https://player.fm - https://en.wikipedia.org
Other Learning Materials	- Proteus design suite (Or any other environment based on SPICE (Simulation Program with Integrated Circuit Emphasis)

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- One classroom containing computer access, and white board ,One laboratory
Technology Resources (AV, data show, Smart Board, software, etc.)	- One AV. - One data show. - One Smart Board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Effectiveness of teaching. - The course content. - Satisfaction with the course - Quality of Learning Resources	Students	Questionnaire
- Teaching methods. - Planned and actual study hours. - Achievement of course learning outcomes.	Faculty (staff member)	Observation of lectures, analysis of assessment data,
- Teaching methods. - Planned and actual study hours. - Achievement of course learning outcomes.	Program Leader	Observation of lectures, interviews with involved faculty, analysis of assessment data,
- Teaching methods. - Planned and actual study hours. - Achievement of course learning outcomes.	Peer Reviewer	interviews with involved faculty and course participants, analysis of assessment data,

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Quality oflearning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,Peer Reviewer, Others (specify)
Assessment Methods(Direct, Indirect)

H. Specification Approval Data

Council / Committee	Curriculum Committee
Reference No.	
Date	

Course Specifications

Course Title:	Scientific Programming
Course Code:	42031323
Program:	BSc in Physics
Department:	Department of Physics
College:	Faculty of Science
Institution:	AlBaha University

Table of Contents

A. Course Identification

1. Credit hours:	**3 credit hours (2 T + 1 P)**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Fifth Level / Third Year**
4. Pre-requisites for this course(if any)**:**	**Mathematical Physics (2) - (42031206)**
5. Co-requisites for this course(if any)**:**	**None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	24	40%
2	**Blended**	12	20%
3	**E-learning**	-	-
4	**Correspondence**	-	-
5	**Other (Laboratory)**	24	40%

7. Actual Learning Hours(based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	30
2	**Laboratory/Studio**	30
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	**60**
Other Learning Hours*		
1	**Study**	15
2	**Assignments**	15
3	**Library**	15
4	**Projects/Research Essays/Theses**	-
5	**Others**(Seminars, presentations)	20
	Total	**65**

*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course offers the fundamentals of scientific programming to physics students.

2. Course MainObjective

The main objective of this course is to give students a deep knowledge about:

- Fundamental of programming with a focus on understanding the functions and variables and control structures.
- Understanding the basics of computer programming.
- Tools used in programming devices including editing and translators.

3. Course Learning Outcomes

CLOs		AlignedPLOs
1	**Knowledge:**	
1.1	Recall elements of programming language, simple data types, declarations, keywords, operators, and input and outputs statements.	K1
1.2	Describe how selections, iteration, array are declared in a programming language and in mathematical package.	K2
1.3	Recognize the roll of scientific programming of changing our world.	K3
2	**Skills :**	
2.1	Utilize scientific mathematical package confirm your previousobtained results in physics courses mathematical physics 1, 2, 3 and any other courses such as matrices manipulations, DEs, etc.	S1
2.2	Solve physical problems using programming languages	S2
2.3	Simulate simple physics experiment using computer programming language or packages.	S3
2.4	Analyze and interpret physical problem with assistance of plotting tools.	S4
3	**Competence:**	
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standard on assigned tasks in Scientific Programming.	C1
3.2	Search in the internet and libraries for certain topic in the field of Scientific Programming	C2

C. Course Content

No	List of Topics	Contact Hours
	Lectures	
1	**Introduction to high-level programming language:** Interpreters and compliers languages (Fortran, or C++, or Payson, etc.).	2
2	**Elements of programming languages**: Simple data types, declarations, keywords, operators (arithmetic and logical), input and outputs statements(Fortran or C++,or Payson, etc.)	4
3	**Selections and iteration statements**: (ifand switch statements) and iteration statements(for , while, do statements).	4
4	**Function and Array**: Array, functions(procedures sub-programs), modules, libraries	6

No	List of Topics	Contact Hours
5	**Introduction to mathematical packagesMathematica, or Maple, or Mathcad, orMatlab etc.:** Algebraic manipulations, integration,differentiation, lists and array manipulations, numerical and analytical and numerical solutions of DEs, plotting functions and data (2D and 3D) plots.	8
6	**Algorithm design:** Flow charts, Program structure diagram (PSD), pseudo-codes.	2
7	Solving simple physical applications such as finding roots, differential equations etc.using programming languages and mathematical packages.	4
Total (Lectures)		30
Practical Part		
1	Writing simple programs using elements of programming language iterations	4
2	Writing simple programs involving array, functions(procedures sub-programs), modules, libraries	6
3	Applying mathematical package, simplify, combine and expand a given expression, get roots of an equation, roots of system of equations, estimate the (determent, inverse, egien value and eigen vectors) of a matrix, plot, differentiate and integrate a function, solve a given DEs.	6
4	Solving simple physical problems using programming language	8
5	Solving simple physical problems using Mathematical package	6
Total (practical)		30
Total (Lectures + practical)		**60**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	Recall elements of a programming language, simple data types, declarations, keywords, operators, and input and outputs statements.	Lectures, Open discussion, Search activities, brain storming, lab working	Quizzes, Short exams, final exam, practical exam
1.2	Define the physical variables and functions	Lectures, Open discussion, Search activities, brain storming, lab working	Quizzes, Short exams, final exam, practical exam
1.3	Recognize the roll of scientific programming of changing our world. phenomena using scientific program.	Search activities.	Presentation, home works
2.0	**Skills**		

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
2.1	Utilize scientific mathematical package confirm your previous obtained results in physics courses mathematical physics 1, 2, 3 and any other courses such as matrices manipulations, DEs, etc.	Lectures, lab working	practical exam
2.2	Solve physical problems using programming languages	Lectures, lab working	Short exams, final exam, practical exam
2.3	Simulate simple physics experiment using computer programming language or packages.	lab working	practical exam
2.4	Analyze and interpret physical problem with assistance of plotting tools	Lectures, discussion, Search activities, brain storming, lab working	Quizzes, Short exams, final exam, practical exam
3.0	**Competence**		
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standard on assigned tasks in Scientific Programming.	Open discussion, Search activities, brain storming	Worksheet, presentations
3.2	Search in the internet and libraries for certain topic in the field of Scientific Programming	Open discussion, Search activities	Worksheet, presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical exam 1	5	5 %
2	Mid- Term exam	9	10 %
3	Periodical exam 2	13	5 %
4	Home works	During the term	10 %
5	Practical (lab reports)	During the term	10 %
6	Final practical	16	10 %
7	Theoretical Exam	17	50%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

1. Student Academic Counseling
   - The arrangements for academic counseling and advices for the students, including scheduling of faculty office hours, advices on program planning, subjects selection and career planning are announced and published to the students in the physics department

and the faculty website.
- The students are divided into groups, whereas each student has academic counseling.

2. Student Appeals
- The regulations for student appeals on academic matters are announced and published in the physics department and the faculty website.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	- Computing for Scientists. Principles of Programming with Fortran 90 and C++. R. J. Barlow and A. R. Barnett, John Wiley and Sons Ltd, June 1998 - Mathematica:A Problem-Centered Approach. RoozbehHazrat, Springer London Dordrecht Heidelberg New York 2010.
Essential References Materials	A First Course in Scientific Computing, RUBIN H. LANDAU, PRINCETON UNIVERSITY PRESS, 2005
Electronic Materials	Wolfram mathematica
Other Learning Materials	Wolfram mathematica

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- Laboratory for lecturing 20 students with. - Class for lecturing 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	- 20 computer sets are needed with network connection.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Effectiveness of teaching. - The course content. - Satisfaction with the course - Quality of Learning Resources	Students	Questionnaire
- Teaching methods. - Planned and actual study hours. - Achievement of course learning outcomes.	Faculty (staff member)	Observation of lectures, analysis of assessment data,
- Teaching methods. - Planned and actual study hours. - Achievement of course learning outcomes.	Program Leader	Observation of lectures, interviews with involved faculty, analysis of assessment data,
- Teaching methods. - Planned and actual study hours.	Peer Reviewer	interviews with involved faculty and course participants, analysis of

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Achievement of course learning outcomes.		assessment data,

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Qualityoflearning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,PeerReviewer, Others (specify)
Assessment Methods(Direct, Indirect)

H. Specification Approval Data

Council / Committee	Curriculum Committee
Reference No.	
Date	

Course Specifications

Course Title:	Modern Physics
Course Code:	42031313
Program:	BSc in Physics
Department:	Physics
College:	Faculty of Science
Institution:	AlBaha University

Table of Contents

A. Course Identification

1. Credit hours: 3 credit hours (2 T + 1 P)	
2. Course type	
a. University ☐	College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered: Fifth Level / Third Year	
4. Pre-requisites for this course (if any)**:General Physics (2) - (42031219)**	
5. Co-requisites for this course (if any)**:None**	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	24	40%
2	**Blended**	12	20%
3	**E-learning**		
4	**Correspondence**		
5	**Other**	24	40%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	30
2	**Laboratory/Studio**	30
3	**Tutorial**	
4	**Others** (specify)	
	Total	60
Other Learning Hours*		
1	**Study**	15
2	**Assignments**	15
3	**Library**	15
4	**Projects/Research Essays/Theses**	-
5	**Others**(specify)	20
	Total	65

*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description:

The items of the course are proposed to give students basic knowledge of modern physics theories and its consequences. In the first chapter , the course describes the basics of special theory of relativity.The second chapter, deals with the theories of origin of quantum mechanics, including Black body radiation theories ,Photoelectric effect and Compton effect. The third chapter discuss the wave nature of material particles and consequences. The fourth chapter, give introduction to the x-rays and x-ray diffraction.

2. Course MainObjective:

This course is designed to givestudents the following basic concepts and knowledge :

- Recognizing the basics of Special theory of relativity.
- Understanding the concepts and basics of Black body radiation, Photoelectric effect and Compton effect.
- Memorizing concepts and basics of wave nature of material particles.
- Describing the main information of x-rays and x-ray diffraction.

3. Course Learning Outcomes

	CLOs	AlignedPLOs
1	**Knowledge:**	
1.1	Recognize the basic principles of modern physics.	K1, K2
1.2	Recall different recent theoriesin modern physics (special relativity, black body radiation, photoelectric effect , Compton effect, De Broglie wavelength and x-rays).	K1
1.3	Recognize the latest development in modern physics.	K3
2	**Skills :**	
2.1	Apply appropriate mathematical concepts and computational Techniques to solve problems in modern physics	S2
2.2	Explain the physical phenomena related to modern physics	S1
2.3	Conduct experiments in basic modern physics	S3
2.4	Analyze data using modern physics principles	S4
3	**Competence:**	
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standards on assigned tasks in modern physics.	C1
3.2	Manage a certain topic in the field of modern physics with his classmates.	C2

C. Course Content

No	List of Topics	Contact Hours
Theoretical part		
1	**The Special Theory of Relativity:** Galilean transformation, Michelson-Morley experiment, Lorentz transformations, velocity transformation, simultaneity, time, Doppler's effect, variation of mass, energy, momentum	8
2	**Origin of Quantum Concepts :** Classical theories of black body radiation, Planck's radiation law, photoelectric effect, Compton's effect, pair production and annihilation	8
3	**Wave Nature of Material Particles:** de Broglie Hypothesis, duality property, wave packet, uncertainty principle.	8
4	**X-ray: X-ray product, X-ray diffraction**	6
	Total (Lectures)	30

Practical Part		
1	X-ray diffraction (Bragg's law)	2
2	Photoelectric effect	2
3	Compton effect	2
4	Determination of Planck's constant	4
5	Study of hydrogen atoms spectra (Rydberg constant) & (Balmer series)	4
6	Determination of Zeeman effect (Zeeman shift)	4
7	Electron diffraction	4
8	Determination of e/m	4
9	Frank-Hertz Experiment	2
10	Stefan - Boltzmann law of radiation	2
Total (Practical)		30
Total (Lectures +Practical)		60

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	Recognize the basic principles of modern physics.	Lectures, Open discussion, Search activities	Quizzes, Short exams, final exam
1.2	Recall different recent theories in modern physics (special relativity, black body radiation, photoelectric effect , Compton effect, De Broglie wavelength and x-rays).	Lectures, Open discussion, Search activities.	Quizzes, Short exams, final exam.
1.3	Recognize the latest development in modern physics.	Lectures, Open discussion, Search activities.	Quizzes, Short exams, final exam.
2.0	**Skills**		
2.1	Apply appropriate mathematical concepts and computational Techniques to solve problems in modern physics	Lectures, lab working	Exams, short quizzes, practical exams.
2.2	Explain the physical phenomena related to modern physics	Lectures, Open discussion, Brain storming.	Exams, short quizzes
2.3	Conduct experiments in basic modern physics	Lectures, Brain storming,	Exams, short quizzes
2.4	Analyze data using modern physics principles	Lectures, lab working group	Exams, short quizzes, practical exams..
3.0	Competence		
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standards on assigned tasks in modern physics.	Utilize Web resources	Worksheet, presentations
3.2	Manage a discussion in a certain topic	Conduct experiments,	Worksheet,

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
	in the field of modern physics with his classmates.	utilize some soft wires	presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical exam 1	5	5 %
2	Mid- Term exam	9	10 %
3	Periodical exam 2	13	5 %
4	Home works	During the term	10 %
5	Practical (lab reports)	During the term	10 %
6	Final practical	16	10 %
7	Theoretical Exam	17	50%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

1. Student Academic Counseling
 - The arrangements for academic counseling and advices for the students, including scheduling of faculty office hours, advices on program planning, subjects selection and career planning are announced and published to the students in the physics department and the faculty website.
 - The students are divided into groups, whereas each student has academic counseling.
2. Student Appeals

The regulations for student appeals on academic matters are announced and published in the physics department and the faculty website.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Introduction to modern physics, R. B. Singh, Second edition, Copyright © 2009, NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS
Essential References Materials	Modern Physics, RAYMOND A. SERWAY, CLEMENT J. MOSES and CURT A. MOYER, Copyright 2005 Thomson Learning, Inc.
Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- One classroom containing computer access, and white board ,One laboratory
Technology Resources (AV, data show, Smart Board, software, etc.)	- One AV. - One data show. - One Smart Board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Effectiveness of teaching - The course content - Satisfaction with the course - Quality of learning resources	Student	Questionnaire
- Teaching methods - Planned and actual study hours - Achievement of course learning Outcomes	Staff Members	Observation of lectures , analysis of assessment data
- Teaching methods - Planned and actual study hours - Achievement of course learning Outcomes	Program Leader	Observation of lectures , interviews with involved Staff Members , analysis of assessment data
- Teaching methods - Planned and actual study hours - Achievement of course learning Outcomes	Peer Reviewer	Interviews with involved Staff Members and course participants , analysis of assessment data

Evaluation areas(e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Quality oflearning resources, etc.)
Evaluators(Students,Faculty, Program Leaders,Peer Reviewer, Others (specify)
Assessment Methods(Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Course Specifications

Course Title:	Statistical Physics
Course Code:	42031315
Program:	BSc in Physics
Department:	Department of Physics
College:	Faculty of Science
Institution:	AlBaha University

Table of Contents

A. Course Identification

1. Credit hours:	**3 credit hours**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Fifth Level / Third Year**
4. Pre-requisites for this course(if any)**:**	**Thermodynamics (42031212)**
5. Co-requisites for this course(if any)**:**	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	36	80%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Correspondence**	-	-
5	**Other**	9	20%

7. Actual Learning Hours(based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	45
2	**Laboratory/Studio**	-
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	**45**
Other Learning Hours*		
1	**Study**	15
2	**Assignments**	15
3	**Library**	15
4	**Projects/Research Essays/Theses**	-
5	**Others**(Lab reports and exam preparation time)	-
	Total	**45**

*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

To give the students a thorough understanding of the theory and methods of statistical physics

2. Course MainObjective

On completion of this course the students will be able to :
Recognize the basic principles of Probabilities and distributions including Probability distribution functions, Phase space, Density function, Velocities of gas molecules, energy Distribution function of molecules.

3. Course Learning Outcomes

CLOs		AlignedPLOs
1	**Knowledge:**	
1.1	Recall the probability distribution functions, phase space, density function, velocities of gas molecules, energy distribution function of molecules.	K1
1.2	Describe the ensembles (Micro-canonical Ensemble, Canonical ensemble, Grand canonical ensemble).	K2
1.3	Recognize the roll of Maxwell-Boltzmann distribution, Bose-Einstein distribution and Fermi-Dirac distribution in developing our understanding physics and other related sciences.	K3
2	**Skills :**	
2.1	Apply principles of statistical physics toMicro-canonical Ensemble, Canonical ensemble and Grand canonical ensemble.	S1
2.2	Estimate the energy, velocity distribution functionsof molecules.	S2
2.3	Construct the Maxwell-Boltzmann distribution, Bose-Einstein distribution, Fermi-Dirac distribution for simple physical system	S4
3	**Competence:**	
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standard on assigned tasks in statistical physics.	C1
3.2	Search in the internet and libraries for certain topic in the field of statistical physics	C2
....	-	

C. Course Content

No	List of Topics	Contact Hours
	Lectures	
1	**Probabilities and distributions:** Probability distribution functions, Phase space, Density function, Velocities of gas molecules, energy distribution function of molecules.	9
2	**Ensembles:** Statistical ensemble, Liouville'stheorem ,Micro-canonical Ensemble, Canonical ensemble, Grand canonical ensemble.	15
3	**Distributions:** Maxwell-Boltzmann distribution, Bose-Einstein distribution, Fermi-Dirac distribution, Vibrations of a solid, Black-body radiation, Fermi gas, Bose	21

No	List of Topics	Contact Hours
	gas.	
	Total (Lectures)	45
Total (Lectures)		**45**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
1.0	**Knowledge**		
1.1	Apply principles of statistical physics to Micro-canonical Ensemble, Canonical ensemble and Grand canonical ensemble.	Lectures, Open discussion	Quizzes, Short exams, final exam
1.2	Describe the ensembles (Micro-canonical Ensemble, Canonical ensemble, Grand canonical ensemble).	Lectures, Open discussion	Quizzes, Short exams, final exam, practical exams
1.3	Recognize the roll of Maxwell-Boltzmann distribution, Bose-Einstein distribution and Fermi-Dirac distribution in developing our understanding physics and other related sciences.	Lectures, Open discussion, Search activities	Quizzes, Short exams, final exam,
2.0	**Cognitive Skills**		
2.1	Apply principles of statistical physics toMicro-canonical Ensemble, Canonical ensemble and Grand canonical ensemble.	Lectures, Open discussion, Brain storming, problem solving	Exams, short quizzes.
2.2	Estimate the energy, velocity distribution functionsof molecules.	Lectures, Open discussion, problem solving	Exams, short quizzes
2.3	Construct the Maxwell-Boltzmann distribution, Bose-Einstein distribution, Fermi-Dirac distribution for simple physical system	Lectures, Brain storming, problem solving.	Exams, short quizzes
3.0	**Competence**		
3.1	Demonstrate interpersonal skills of teamwork, individual responsibility for own learning and ethical standard on assigned tasks in statistical physics.	-Search activities - working group - Discussion	Worksheet, presentations
3.2	Search in the internet and libraries for certain topic in the	-Search activities - working group	Worksheet, presentations

Code	Course Learning Outcomes	TeachingStrategies	AssessmentMethods
	field of statistical physics	- Discussion	
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical exam 1	5	10 %
2	Mid- Term exam	9	20 %
3	Periodical exam 2	13	10 %
4	Home works	During the term	10 %
5	Practical (lab reports)	-	-
6	Final practical	-	-
7	Theoretical Exam	17	50 %

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

1. Student Academic Counseling
   - The arrangements for academic counseling and advices for the students, including scheduling of faculty office hours, advices on program planning, subjects selection and career planning are announced and published to the students in the physics department and the faculty website.
   - The students are divided into groups, whereas each student has academic counseling.
2. Student Appeals
   - The regulations for student appeals on academic matters are announced and published in the physics department and the faculty website.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	-Statistical Physics", F. Mandl, John Wiley and Sons, 2000. -Thermal and statistical physics", Harvey Gould and Jan Tobochnik (2010). -Introduction to Statistical Physics" K. Huang , Taylor& Francis e-Library, 2002. -L. E. Reichl: A modern course in statistical physics. Wiley-Interscience, New York1998
Essential References Materials	W. Greiner, L. Neise, and H. Stöcker: Thermodyamics and statistical mechanics. Springer-Verlag, New York 1995 -F. Schwabl: Statistical mechanics. Springer-Verlag, New

	York 2006.
Electronic Materials	*None*
Other Learning Materials	*None*

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- One classroom containing computer access, and white board
Technology Resources (AV, data show, Smart Board, software, etc.)	- One AV - One data show - One Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Effectiveness of Teaching. - The course content. - Satisfaction with the course. - Quality of Learning Resources.	Students	Questionnaires
- Teaching Methods. - Planned and actual study hours. - A achievement of course learning outcomes.	Faculty (staff member)	Observation of lectures, analysis of assessment data
- Teaching Methods. - Planned and actual study hours. - A achievement of course learning outcomes.	Program leader	Observation of lectures, interviews with involved faculty, analysis of assessment data
- Teaching Methods. - Planned and actual study hours. - A achievement of course learning outcomes.	Peer Reviewer	interviews with involved faculty, and course participants, analysis of assessment data

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes,Quality oflearning resources, etc.)
Evaluators (Students,Faculty, Program Leaders,Peer Reviewer, Others (specify)
Assessment Methods(Direct, Indirect)

H. Specification Approval Data

Council / Committee	Curriculum Committee
Reference No.	
Date	