Course Title: Nanostructured materials Course Code: 23066205-2

Date : 2018 – 12 – 28	Institution: Umm Al-Qura University				
College: Al-Jamoum University College	Department: Physics				
A. Course Identification and Gener	al Informat	tion			
1. Course title and code: Nanostructured m	aterials (2306	6205-2).			
2. Credit hours: 2 credit hours.					
3. Program(s) in which the course is offered:	Nano physics	Program, Al-Jan	noum University College.		
(If general elective available in many program	ns indicate this	s rather than list p	orograms)		
4. Name of faculty member responsible for t	he course:				
5. Level/year at which this course is offered:	3 ^{ed} Level.				
6. Pre-requisites for this course (if any): Nan	ostructural p	roperties (23066)	104-2)		
7. Co-requisites for this course (if any): -					
8. Location if not on main campus: Al-Jamo	um University	y College.			
9. Mode of Instruction (mark all that apply):					
a. Traditional classroom	\checkmark	percentage?	70%		
b. Blended (traditional and online)		percentage?			
c. E-learning	\checkmark	percentage?	30%		
d. Correspondence		percentage?			
e. Other:		percentage?			
Comments:					

B. Objectives

1. The main objective of this course

Introduction of general concepts in soft matter.

Description of soft matter categories.

Basis for self-assembly.

Nanostructured materials based on soft systems.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

Introduction of general concepts in soft matter:

- universal aspects shared by soft materials
- kinds of soft materials

Description of soft matter categories:

- colloids
- polymers
- amphiphiles
- liquid crystals
- biomolecules
- **Basis for self-assembly**

Nanostructured materials based on soft systems

1. Topics to be Covered

List of Topics					No. of	Contact	
List of Topics						Weeks	hours
Introduct	ion of gene	eral concept	ts in soft ma	itter.		1	2
Universa	l aspects sł	nared by so	ft materials.			2	4
Descripti	on of soft 1	matter.				2	4
Descripti	on of soft 1	matter: coll	oids.			2	4
Descripti	on of soft 1	matter: poly	mers and a	mphiphiles		2	4
Description of soft matter: liquid crystals and biomolecules					2	4	
Basis for self-assembly.					2	4	
Nanostructured materials based on soft systems					2	4	
2. Cours	e compone	ents (total o	contact and	credit hours pe	r semester)	0	•
Lecture Tutorial Laboratory/ Studio Practical				Other	Total		
Contact	Planned	30					30
Hours	Actual	30					30
Cradit	Planned	1					2
Credit	Actual	1					2

3. Individual study/learning hours expected for students per week.

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

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 targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code	NQF Learning Domains	Course Teaching	Course					
#	And Course Learning Outcomes	Strategies	Assessment					
			Methods					
1.0	Knowledge							
1 2	The process and mechanisms supporting the structure							
1.5	and function are specific topics.							

1.4	Related terminology, numbering and classification systems.			
1.6	Knowledge development related to the program.			
2.0	Cognitive Skills			
2.2	Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data.			
2.3	Develop the argument and divorce the appropriate judgments according to scientific theories and concepts.			
3.0	Interpersonal Skills & Responsibility			
3.2	Application of techniques and tools related to scientific ethics.			
4.0	Communication, Information Technology, Numerical			
4.1	Use information and communication technology effectively			
4.3	Think independently, assign tasks and solve problems on a scientific basis.			
4.5	Taking into account societal problems associated with customs, traditions and ethics.			
4.6	Ability to learn self and continuously.			
4.7	Apply models, scientific systems and tools effectively.			
5. Ass	essment Task Schedule for Students During the Semes	ster		
	Assessment task (i.e., essay, test, quizzes, group proje examination, speech, oral presentation, etc.)	ect,	Week Due	Proportion of Total Assessment
1	1 st Quiz.		7	10
2	2 nd Quiz.		11	10
3	1 st Homework (E-Learning).		4	10
4	2 nd Homework (E-Learning).		8	10
5	Research.		12	20
6	Final written Examination.		16	40

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

Soft condensed matter, richard A.L. Jones, Oxford university press, 2002

Introduction to soft matter. Polymers, colloids, amphiphiles and liquid crystals Ian W. Hamley John Wiley & sons, ltd., 2000

Introduction to physical polymer science (4th ed) l. H. Sperling John Wiley & sons, ltd., 2002

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

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

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

F. Facilities Required	
Indicate requirements for the course including size of classrooms and lab	oratories (i.e. number
of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/lal	bs, etc.)
Class room for 10 students.	
2. Technology resources (AV, data show, Smart Board, software, etc.)	
The class room should be equipped with a pc and data-show.	
3. Other resources (specify, e.g. if specific laboratory equipment is requ	ired, list requirements
or attach list)	
G. Course Evaluation and Improvement Procedures	
1. Strategies for Obtaining Student's Feedback on Effectiveness of Teach	ning
Questioners.	
2. Other Strategies for Evaluation of Teaching by the Instructor or the D	Department
Using course report.	
3. Procedures for Teaching Development	
Using course report.	
4. Procedures for Verifying Standards of Student's Achievement (e.g.	check marking by an
independent member teaching staff of a sample of student's work, p	periodic exchange and
remarking of tests or a sample of assignments with staff members at an	other institution)
A random sample of students' assessments is corrected through the	committee formed by
the department.	
5. Describe the planning arrangements for periodically reviewing cou	rse effectiveness and
planning for developing it.	
Review stakeholders and conduct periodic questioners.	

Name of Course Instructor: _____

Signature:	Date Completed:

Program Coordinator: _____

Signature:	
-	

Date	Received:	

Course Title: Advanced topics in nanomaterials Course Code: 23066207-2

Date : 2018 – 12 – 28	Institution: Umm Al-Qura University						
College: Al-Jamoum University College	Department: Physics						
A. Course Identification and Genera	al Information						
1. Course title and code: Advanced topics in nanomaterials (23066207-2).							
2. Credit hours: 2 credit hours.							
3. Program(s) in which the course is offered: I	Nano physics Program, Al-Jamoum University College.						
(If general elective available in many program	ns indicate this rather than list programs)						
4. Name of faculty member responsible for the	he course:						
5. Level/year at which this course is offered:	3 ^{ed} Level.						
6. Pre-requisites for this course (if any): Nane	ostructural properties (23066104-2)						
7. Co-requisites for this course (if any): Nano	structured materials (2306205-2)						
8. Location if not on main campus: Al-Jamou	ım University College.						
9. Mode of Instruction (mark all that apply):							
a. Traditional classroom	✓ percentage? 70%						
b. Blended (traditional and online)	percentage?						
c. E-learning	✓ percentage? 30%						
d. Correspondence	percentage?						
e. Other:	percentage?						
Comments:							
B. Objectives							
1 The main chiesting of this course							

1. The main objective of this course

This course will review the optical properties of nanoscale metallic and semiconductor particles.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The focus of the course will be the understanding of the physics of surface plasmons in metallic nanoparticles, and excitons in semiconductor quantum dots.

1. Topics to be Covered		
List of Topics	No. of	Contact
List of Topics	Weeks	hours
Basics of electromagnetism. Optical response.	2	4

Surface plasmon polaritons.						2	4	
Localized surface plasmons in metal nanoparticles.						4	8	
Semico	nductor quai	ntum dots.					3	6
Near-fie	eld nanoscor	oic for mate	rial characte	erization.			2	4
Photoni	c crystals.						2	4
2. Cour	se compone	ents (total o	contact and	credit hour	s per	semester):		
	•	Lecture	Tutorial	Laborator Studio	·y/	Practical	Other	Total
Contact	Planned	30						30
Hours	Actual	30						30
Credit	Planned	1						2
Creuit	Actual	1						2
3. Indiv	idual study/	learning ho	ours expecto	ed for stude	ents p	er week.		
4. Cours and Te	e Learning O eaching Strate	utcomes in l eg <mark>ies</mark>	NQF Domain	s of Learning	; and <i>i</i>	Alignment wit	th Assessme	ent Methods
First, ins domains align wi assessm outcome integrate each do	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 targeted learning outcomes. Third , insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)							riate learning s that fit and appropriate urse learning st to form an tcomes from
Codo			Cur	riculum Ma	<u>ט</u>			Course
#	Code NQF Learning Domains Course Teachi # And Course Learning Outcomes Strategies			Strategies	As	ssessment Methods		
1.0	Knowledge						I	
1.3	The process ar and function ar	nd mechanism e specific top	is supporting t	the structure				
1.4	Related termin systems.	nology, num	bering and c	lassification				
1.6	1.6 Knowledge development related to the program.							
2.0	Analyzing. e	> valuating ar	nd interpretin	ng relevant				
2.2	2.2 Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data.							
2.3 judgments according to scientific theories and concepts.								
3.0	nterpersonal	Skills & Respo	onsibility					
3.2	3.2 Application of techniques and tools related to scientific ethics.							
4.0	Communicatio	on, Informatio	on Technology,	, Numerical				
4.1	Use informat effectively	ion and com	munication t	echnology				

43	Think independently, assign tasks and solve			
4.5	problems on a scientific basis.			
15	Taking into account societal problems associated with			
4.5	customs, traditions and ethics.			
4.6	Ability to learn self and continuously.			
4.7	Apply models, scientific systems and tools effectively.			
5. Ass	essment Task Schedule for Students During the Sem	ester		
	Assessment task (i.e., essay, test, quizzes, group pro	oject,		Proportion of Total
	examination, speech, oral presentation, etc.)		week Due	Assessment
1	1 st Quiz.		7	10
2	2 nd Quiz.		11	10
3	1 st Homework (E-Learning).		4	10
4	2 nd Homework (E-Learning).		8	10
5	Research.		12	20
6	Final written Examination.		16	40

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

William D. Callister , Jr., "Material Science and Engineering: An Introduction", Wiley 10 edition 2018.

G. Gottstein "Physical Foundations of Materials Science", Springer, 2004 edition.

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

G. Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **Questioners.**

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **Using course report.**

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

A random sample of students' assessments is corrected through the committee formed by the department.

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

Review stakeholders and conduct periodic questioners.

Name of Course Instructor: _____

Signature:	Date Completed:
Program Coordinator:	
Signature:	Date Received:

Course Title: Introduction to materials science Course Code: 23066209-2

College: Al-Jamoum University College Department: Physics										
A. Course Identification and General Information										
1. Course title and code: Introduction to materials science (23066209-2).										
2. Credit hours: 2 credit hours.										
3. Program(s) in which the course is offered: Nano physics Program, Al-Jamoum University College.										
(If general elective available in many programs indicate this rather than list programs)										
4. Name of faculty member responsible for the course:										
5. Level/year at which this course is offered: 3 ^{ed} Level.										
6. Pre-requisites for this course (if any): Fundamentals of solid state physics (23066106-2)										
7. Co-requisites for this course (if any): Nanostructured materials (23066205-2)										
8. Location if not on main campus: Al-Jamoum University College.										
9. Mode of Instruction (mark all that apply):										
a. Traditional classroom \checkmark percentage? 70%										
b. Blended (traditional and online) percentage?										
c. E-learning ✓ percentage? 30%										
d. Correspondence percentage?										
e. Other: percentage?										
Comments:										

B. Objectives

1. The main objective of this course

The student to acquire a basic knowledge in materials science: a classification of materials depending on their structure and an overview and a description of thermal, mechanical optical, electric and magnetic properties of materials.

The student must learn the importance of the different types of defects which change the properties of materials, like doping of semiconductors, and the structural changes appearing when submitting the materials to pressure, temperature or composition changes.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

Under the recent research results in materials science, a revision of the new methods for the design of new materials will be presented.

1. TOPIC	.s to be cover	eu						
List of Topics						No. of	Contact	
~							hours	
Classif	ication of ma	aterials :stru	ucture and fu	indamental p	roperties.	1	2	
Imperf	ections: defe	cts, disloca	tion, impuri	ties		2	4	
Mecha	nical propert	ies				2	4	
Therma	al properties					2	4	
Optical	properties					2	4	
Electri	c properties					2	4	
Magne	tic properties	s				2	4	
Differe	nt type of	materials	: polymers,	ceramics,	alloys, new	2	4	
materia	uls. Preparati	on techniqu	ies			2	4	
2. Cou	rse compon	ents (total	contact and	credit hours	per semester):		
		Lecture	Tutorial	Laboratory Studio	/ Practical	Other	Total	
Contact	Planned	30					30	
Hours	Actual	30					30	
Credit	Planned	1					2	
Creuit	Actual	1					2	
3. Indiv	3. Individual study/learning hours expected for students per week.							
4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies								
On the First, in domain align w assessn outcom integrat each do	table below a sert the suital s (see sugges with the asse ment methods es, assessme ted learning a pomain.)	are the five I ble and meas tions below ssment meas that accurate nt method, nd teaching	NQF Learning surable cours the table). <u>So</u> thods and ta tely measure and teaching process. (Cou	Domains, nu e learning out econd, insert argeted learn and evaluate t strategy shou urses are not re	mbered in the l comes required supporting teac ing outcomes. the learning out ild fit in togethe equired to inclu	eft column. in the appropu hing strategie <u>Third</u> , insert come. Each co er with the res de learning ou	riate learning s that fit and appropriate urse learning st to form an tcomes from	
Code		ing Cours	e Assessment					
#	And	d Course Lear	ning Outcome	S	Strategies		Methods	
1.0	Knowledge	nd machanian	a supporting t	ha atmiatura				
1.3	and function a	re specific top	ns supporting t	ne structure				
1.4	Related termi systems.	nology, num	bering and c	lassification				
1.6	Knowledge de	velopment rel	lated to the pro	gram.				
2.0	Cognitive Skill	S						
2.2	Analyzing, e qualitative and	valuating and a second se	nd interpretin scientific data.	ig relevant				

2.3	Develop the argument and divorce the appropriate judgments according to scientific theories and		
3.0	Interpersonal Skills & Responsibility		
3.2	Application of techniques and tools related to scientific ethics.		
4.0	Communication, Information Technology, Numerical		
4.1	Use information and communication technology effectively		
4.3	Think independently, assign tasks and solve problems on a scientific basis.		
4.5	Taking into account societal problems associated with customs, traditions and ethics.		
4.6	Ability to learn self and continuously.		
4.7	Apply models, scientific systems and tools effectively.		
5. Ass	sessment Task Schedule for Students During the Semes	ster	
	Assessment task (i.e., essay, test, quizzes, group	Week Due	Proportion of Total
	project, examination, speech, oral presentation, etc.	.) Week Due	Assessment
1	1 st Quiz.	7	10
2	2 nd Quiz.	11	10
3	1 st Homework (E-Learning).	4	10
4	2 nd Homework (E-Learning).	8	10
5	Research.	12	20
6	Final written Examination.	16	40

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

William D. Callister , Jr., "Material Science and Engineering: An Introduction", Wiley 10 edition 2018.

G. Gottstein "Physical Foundations of Materials Science", Springer, 2004 edition.

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Class room for 10 students.

2. Technology resources (AV, data show, Smart Board, software, etc.) The class room should be equipped with a pc and data-show.

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirement
or attach list)
G. Course Evaluation and Improvement Procedures
1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
Questioners.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
Using course report.
3. Procedures for Teaching Development
Using course report.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an
independent member teaching staff of a sample of student's work, periodic exchange and
remarking of tests or a sample of assignments with staff members at another institution)
A random sample of students' assessments is corrected through the committee formed by
the department.
5. Describe the planning arrangements for periodically reviewing course effectiveness and
planning for developing it.
Review stakeholders and conduct periodic questioners.
Name of Course Instructor:
Signature: Date Completed:
Program Coordinator:
Signature: Date Received:

Course Title: Thesis Course Code: 23066202

Date: 2018 -	- 12 – 28	Institution	: Umm Al-Qura	University							
College: Al	-Jamoum University College	Department: Physics									
A. Course	A. Course Identification and General Information										
1. Course title and code: Thesis (23066202).											
2. Credit hours: 10 credit hours.											
3. Program(s) in which the course is offered: Nano physics Program, Al-Jamoum University College.											
(If general elective available in many programs indicate this rather than list programs)											
4. Name of f	aculty member responsible for the	ne course:									
5. Level/year	r at which this course is offered:	4 th Level.									
6. Pre-requis	sites for this course (if any):										
7. Co-requisi	tes for this course (if any): -										
8. Location if	f not on main campus: Al-Jamo u	ım University	V College.								
9. Mode of li	nstruction (mark all that apply):										
a. Tradition	nal classroom		percentage?								
h Dianataa											
D. Blended	(traditional and online)		percentage?								
c. E-learnir	ng		percentage?								
			P								
d. Correspo	ondence		percentage?								
e. Other:			percentage?								
Comments:											

B. Objectives

1. The main objective of this course

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:										
1. Topics	to be Cover	ed								
		No. of Weeks	Contact hours							
2. Cours	2. Course components (total contact and credit hours per semester):									
Lecture Tutorial Laboratory/ Studio Practical							Total			
Contact Planned										
Hours	Actual									

Planned										
Actual										
3. Individual study/learning hours expected for students per week.										
4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods										
and Teaching Strategies										
	re the five N		Domaina n		anad in the left	aaluman				
e lable below a	le and moac	urable cours	Domains, n		ered in the left	the approx	riato loarning			
<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										
ment methods	that accurat		and evaluate	the	learning outco	me Fach co				
nes assessmer	t method	and teaching	strategy sho	uld f	fit in together	with the re	st to form an			
nes, assessment	nd teaching i		strategy site	roqu	ired to include		st to form an			
omain)				requ						
omann.)		Cur	riculum Mai	n						
	NOF Learning	g Domains		<u>,</u>	Course Teaching	Cour	se Assessment			
And	Course Lear	ning Outcome	S		Strategies		Methods			
Knowledge		0			0					
Relevant theori	es and their a	pplications.								
The process an	d mechanism	ns supporting t	the structure							
and function ar	e specific top	ics.								
Related termin systems.	nology, num	bering and c	elassification							
Knowledge development related to the program.										
Knowledge dev	velopment rel	ated to the pro	gram.							
environment.	ip between	studied subje	cts and the							
Cognitive Skills	5									
Analyzing, ev qualitative and	valuating an quantitative s	nd interpretir	ng relevant							
Develop the a	rgument and	l divorce the	appropriate							
judgments ac	cording to	scientific th	leories and							
Develop and	develop me	chanisms to	deal with							
scientific probl	ems.	chamshis to	dear with							
Build relevant	and integrate	ed information	n to confirm							
evidence subm	ission and tes	t hypotheses.								
Interpersonal S	Skills & Respo	onsibility								
Design plans an	nd method of	treatment and	report based							
on data that ha	as been inves	stigated, using	appropriate							
teenniques and	Ulisideration بالأخلاقيات العلم	ع <u>r or scientific ع</u> الأده ات المر تبطة	guidance. تطبيق التقنيات							
Application of	techniques an	d tools related	to scientific							
ethics.										
Solve scientific	problems us	ing a range of	formats and							
approaches.										
Identify and c	critique the	various metho	ods used to							
address the top	ic related issu	ies.	Numerical							
	Planned Actual ividual study/ rse Learning O Teaching Strate istable below a nsert the suitable ns (see suggest with the assessment methods nes, assessmer ated learning ar omain.) And Knowledge Relevant theori The process an and function ar Related termin systems. Knowledge dev The relationsh environment. Cognitive Skills Analyzing, ev qualitative and Develop the a judgments ac concepts. Develop the a judgments ac concepts. Develop and scientific probl Build relevant evidence subm Interpersonal S Design plans ar on data that ha techniques and .iw Application of ethics. Solve scie	Planned Actual ividual study/learning here rse Learning Outcomes in I Teaching Strategies etable below are the five N nsert the suitable and meases ns (see suggestions below with the assessment mett ment methods that accurat nes, assessment method, a ated learning and teaching i omain.) NQF Learning And Course Learning And Verse Learning Anowledge development rel Knowledge development rel Knowledge development rel The relationship between environment. Cognitive Skills Analyzing, evaluating ar qualitative and quantitative se Develop the argument and judgments a	Planned Actual ividual study/learning hours expects rse Learning Outcomes in NQF Domain Teaching Strategies etable below are the five NQF Learning sert the suitable and measurable cours ns (see suggestions below the table). Servith the assessment methods and tament methods that accurately measure nest, assessment method, and teaching netd learning and teaching process. (Couromain.) Cum NQF Learning Domains And Course Learning Outcome Knowledge Relevant theories and their applications. The process and mechanisms supporting and function are specific topics. Related terminology, numbering and cosystems. Knowledge development related to the profile relationship between studied subje environment. Cognitive Skills Analyzing, evaluating and interpreting qualitative and quantitative scientific data. Develop the argument and divorce the judgments according to scientific the concepts. Develop and develop mechanisms to scientific problems. Build relevant and integrated information evidence submission and test hypotheses. Interpersonal Skills & Responsibility Design plans and method of treatment and on data that has been investigated, using techniques	Planned Actual Actual Actual ividual study/learning hours expected for stude rse Learning Outcomes in NQF Domains of Learning Teaching Strategies etable below are the five NQF Learning Domains, masser the suitable and measurable course learning outs (see suggestions below the table). Second, insert with the assessment methods and targeted learning and teaching process. (Courses are not comain.) Curriculum Ma NQF Learning Domains And Course Learning Outcomes Knowledge Relevant theories and their applications. The process and mechanisms supporting the structure and function are specific topics. Related terminology, numbering and classification systems. Knowledge development related to the program. The relationship between studied subjects and the environment. Cognitive Skills Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data. Develop the argument and divorce the appropriate judgments according to scientific theories and concepts. Develop and develop mechanisms to deal with scientific problems. Build relevant and integrated information to confirm evidence submission and test hypotheses. Interpersonal Skills & Responsibility Design plans and method of treatment and report ba	Planned Image: Control of the second of the s	Planned Image: Constraint of the program. Actual Image: Constraint of the program. ividual study/learning hours expected for students per week. resching Strategies it table below are the five NQF Learning Domains, numbered in the left issert the suitable and measurable course learning outcomes required in nos (see suggestions below the table). Second, insert supporting teaching with the assessment methods and targeted learning outcomes. If ment methods that accurately measure and evaluate the learning outcomes, assessment method, and teaching strategy should fit in together ted learning and teaching process. (Courses are not required to include omain.) Curriculum Map NQF Learning Domains Course Teaching Strategies And Course Learning Outcomes Strategies Relevant theories and their applications. Course Teaching Strategies Rowledge Course Teaching Strategies Rowledge development related to the program. The relationship between studied subjects and the environment. Cognitive Skills Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data. Develop the argument and divorce the appropriate judgments according to scientific theories and concepts. Steat With Scientific problems. Build relevant and integrated information to confirm evidence submission and test hypotheses. Interpersonal Skill & Responsibility	Planned Image: Control of the second s			

11	Use information and communication technology			
4.1	effectively			
12	Think independently, assign tasks and solve			
4.5	problems on a scientific basis.			
15	Taking into account societal problems associated with			
4.5	customs, traditions and ethics.			
4.6	Ability to learn self and continuously.			
4.7	Apply models, scientific systems and tools effectively.			
48	Dealing with scientific patents and consideration of			
4.0	property rights.			
5.0	Psychomotor			
5.1	Conduct relevant scientific experiments.			
5.2	Developing scientific experiments and establishing			
5.2	techniques related to the experiments under study.			
5. Ass	sessment Task Schedule for Students During the Semest	er		
	Assessment task (i.e., essay, test, quizzes, group project	ct,	Maak Dua	Proportion of Total
	examination, speech, oral presentation, etc.)		week Due	Assessment
1	Obtain the scientific material			5
2	Results analysis.			5
3	Responding to the guidance of supervisors.			5
4	Writing the thesis.			5
F	Candidate commitment to attend and conduct			5
J	research.			5
6	Proposal defense.			75

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **Questioners.**

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **Using course report.**

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

A random sample of students' assessments is corrected through the committee formed by the department.

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

Review stakeholders and conduct periodic questioners.

Name of Course Instructor: ____

Signature:	Date Completed:

Program Coordinator:

	_	 		

Date Received: _____

Course Title: Thesis Course Code: 23066202-10

Da	te: $2018 - 12 - 28$	Institution	: Umm Al-Qura	University				
Со	llege : Al-Jamoum University College	Departme	nt: Physics					
Α.	A. Course Identification and General Information							
1.	1. Course title and code: Thesis (23066202-10).							
2.	2. Credit hours: 10 credit hours.							
3. 1	Program(s) in which the course is offered: I	Nano physics	Program, Al-Ja	moum University College.				
(If ۽	(If general elective available in many programs indicate this rather than list programs)							
4.	Name of faculty member responsible for the second	he course:						
5.	Level/year at which this course is offered:	4 th Level.						
6.	Pre-requisites for this course (if any):							
7.	Co-requisites for this course (if any): -							
8.	Location if not on main campus: Al-Jamou	um University	y College.					
9.	Mode of Instruction (mark all that apply):							
a.	Traditional classroom		percentage?					
b.	Blended (traditional and online)		percentage?					
с.	E-learning		percentage?					
d.	Correspondence		percentage?					
e.	Other:		percentage?					
Cor	nments:							

B. Objectives

1. The main objective of this course

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course D	Course Description:						
1. Topics	to be Cover	ed					
			No. of Weeks	Contact hours			
2. Cours	e compone	ents (total o	contact and	credit hours pe	r semester)		
Lecture Tutorial Laboratory/ Studio Practical						Other	Total
Contact	Planned						
Hours	Actual						

Planned							
Actual							
3. Individual study/learning hours expected for students per week.							
4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods							
Teaching Strate	egies			,	0		
	re the five N		Domaina n		anad in the left	aaluman	
e lable below a	le and moac	urable cours	Domains, n		ered in the left	the approx	riato loarning
ns (see suggest	ions below	the table) S	e learning ou econd insert		norting teachi	une approp	s that fit and
with the acces	smont mot	hods and ta	econd, insent	ning		ig strategie	annronriate
ment methods	that accurat		and evaluate	the	learning outco	me Fach co	
nes assessmer	t method	and teaching	strategy sho	uld f	fit in together	with the re	st to form an
nes, assessment	nd teaching i		strategy site	roqu	ired to include		st to form an
omain)				requ			
omann.)		Cur	riculum Mai	n			
	NOF Learning	g Domains		<u>,</u>	Course Teaching	Cour	se Assessment
And	Course Lear	ning Outcome	S		Strategies		Methods
Knowledge		0			0		
Relevant theori	es and their a	pplications.					
The process an	d mechanism	ns supporting t	the structure				
and function ar	e specific top	ics.					
Related termin systems.	nology, num	bering and c	elassification				
Knowledge dev	velopment rel	ated to the pro	gram.				
Knowledge dev	velopment rel	ated to the pro	gram.				
environment.	ip between	studied subje	cts and the				
Cognitive Skills	5						
Analyzing, ev qualitative and	valuating an quantitative s	nd interpreting interpreting interpreting in the second se	ng relevant				
Develop the a	rgument and	l divorce the	appropriate				
judgments ac	cording to	scientific th	leories and				
Develop and	develop me	chanisms to	deal with				
scientific probl	ems.	chamshis to	dear with				
Build relevant	and integrate	ed information	n to confirm				
evidence submission and test hypotheses.							
Interpersonal Skills & Responsibility							
Design plans an	nd method of	treatment and	report based				
on data that ha	on data that has been investigated, using appropriate						
teenniques and	Ulisideration بالأخلاقيات العلم	ع <u>r or scientific ع</u> الأده ات المر تبطة	guidance. تطبيق التقنيات				
Application of	techniques an	d tools related	to scientific				
ethics.							
Solve scientific	problems us	ing a range of	formats and				
approaches.							
Identify and c	critique the	various metho	ods used to				
address the top	ic related issu	ies.	Numerical				
	Planned Actual ividual study/ rse Learning O Teaching Strate istable below a nsert the suitable ns (see suggest with the assessment methods nes, assessmer ated learning ar omain.) And Knowledge Relevant theori The process an and function ar Related termin systems. Knowledge dev The relationsh environment. Cognitive Skills Analyzing, ev qualitative and Develop the a judgments ac concepts. Develop the a judgments ac concepts. Develop and scientific probl Build relevant evidence subm Interpersonal S Design plans ar on data that ha techniques and .iw Application of ethics. Solve scie	Planned Actual ividual study/learning here rse Learning Outcomes in I Teaching Strategies etable below are the five N nsert the suitable and meases ns (see suggestions below with the assessment mett ment methods that accurat nes, assessment method, a ated learning and teaching i omain.) NQF Learning And Course Learning And Verse Learning Anowledge development rel Knowledge development rel Knowledge development rel The relationship between environment. Cognitive Skills Analyzing, evaluating ar qualitative and quantitative se Develop the argument and judgments a	Planned Actual ividual study/learning hours expects rse Learning Outcomes in NQF Domain Teaching Strategies etable below are the five NQF Learning sert the suitable and measurable cours ns (see suggestions below the table). Servith the assessment methods and tament methods that accurately measure nest, assessment method, and teaching netd learning and teaching process. (Couromain.) Cum NQF Learning Domains And Course Learning Outcome Knowledge Relevant theories and their applications. The process and mechanisms supporting and function are specific topics. Related terminology, numbering and cosystems. Knowledge development related to the profile relationship between studied subje environment. Cognitive Skills Analyzing, evaluating and interpreting qualitative and quantitative scientific data. Develop the argument and divorce the judgments according to scientific the concepts. Develop and develop mechanisms to scientific problems. Build relevant and integrated information evidence submission and test hypotheses. Interpersonal Skills & Responsibility Design plans and method of treatment and on data that has been investigated, using techniques	Planned Actual Actual Actual ividual study/learning hours expected for stude rse Learning Outcomes in NQF Domains of Learning Teaching Strategies etable below are the five NQF Learning Domains, masser the suitable and measurable course learning outs (see suggestions below the table). Second, insert with the assessment methods and targeted learning and teaching process. (Courses are not comain.) Curriculum Ma NQF Learning Domains And Course Learning Outcomes Knowledge Relevant theories and their applications. 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Actual Image: Constraint of the program. ividual study/learning hours expected for students per week. resching Strategies it table below are the five NQF Learning Domains, numbered in the left issert the suitable and measurable course learning outcomes required in nos (see suggestions below the table). Second, insert supporting teaching with the assessment methods and targeted learning outcomes. If ment methods that accurately measure and evaluate the learning outcomes, assessment method, and teaching strategy should fit in together ted learning and teaching process. (Courses are not required to include omain.) Curriculum Map NQF Learning Domains Course Teaching Strategies And Course Learning Outcomes Strategies Relevant theories and their applications. Course Teaching Strategies Rowledge Course Teaching Strategies Rowledge development related to the program. The relationship between studied subjects and the environment. Cognitive Skills Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data. Develop the argument and divorce the appropriate judgments according to scientific theories and concepts. Steat With Scientific problems. Build relevant and integrated information to confirm evidence submission and test hypotheses. Interpersonal Skill & Responsibility	Planned Image: Control of the second s

11	Use information and communication technology								
4.1	effectively								
12	Think independently, assign tasks and solve								
4.5	problems on a scientific basis.								
15	Taking into account societal problems associated with								
4.5	customs, traditions and ethics.								
4.6	Ability to learn self and continuously.								
4.7	Apply models, scientific systems and tools effectively.								
48	Dealing with scientific patents and consideration of								
4.0	property rights.								
5.0	Psychomotor								
5.1	Conduct relevant scientific experiments.								
5.2	Developing scientific experiments and establishing								
5.2	techniques related to the experiments under study.								
5. Ass	sessment Task Schedule for Students During the Semest	ter							
	Assessment task (i.e., essay, test, quizzes, group project	ct,	Maak Dua	Proportion of Total					
	examination, speech, oral presentation, etc.)		week Due	Assessment					
1	Obtain the scientific material			5					
2	Results analysis.			5					
3	Responding to the guidance of supervisors.			5					
4	Writing the thesis.			5					
F	Candidate commitment to attend and conduct			5					
J	research.			5					
6	Proposal defense.			75					

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **Questioners.**

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **Using course report.**

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

A random sample of students' assessments is corrected through the committee formed by the department.

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

Review stakeholders and conduct periodic questioners.

Name of Course Instructor: ____

Signature:	Date Completed:

Program Coordinator:

	_	 		

Date Received: _____

Course Title: Experimental techniques I structural characterization Course Code: 23066101-2

Date : 2018 – 12 – 28	Institution: Umm Al-Qura University	Institution: Umm Al-Qura University					
College: Al-Jamoum University College	Department: Physics						
A. Course Identification and General Information							
1. Course title and code: Experimental techniques I structural characterization (23066101-2).							
2. Credit hours: 2 credit hours (1 credit	for lectures and 1 credit for practical part).						
3. Program(s) in which the course is offered	ed: Nano physics Program, Al-Jamoum University (College.					
(If general elective available in many prog	grams indicate this rather than list programs)						
4. Name of faculty member responsible f	or the course:						
5. Level/year at which this course is offer	5. Level/year at which this course is offered: 1 st Level.						
6. Pre-requisites for this course (if any): -							
7. Co-requisites for this course (if any): -							
8. Location if not on main campus: Al-Ja	moum University College.						
9. Mode of Instruction (mark all that app	ly):						
a. Traditional classroom	✓ percentage? 35%						
b. Blended (traditional and online)	percentage?						
c. E-learning	\checkmark percentage? 15%						
d. Correspondence	percentage?						
a Others Lab							
e. Other: Lab	v percentage? 50%						
Comments:							
B. Objectives							
1 The main objective of this course							

1. The main objective of this course

The goal of this course is to approximate the student to the theoretical and experimental founding of the structural characterization techniques in materials, focusing in the ones that are more used in the characterization of nanostructured materials.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

Improving Course content using course report and references text book. Using recent scientific research for improving course content.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

Studying surface structure characterizing techniques (scanning microscopies, tunneling microscopy, atomic force microscopy) as well as bulk structure techniques (transmission electronic microscopy, x-ray diffraction, neutron diffraction) are introduced.

1. Topics to be Covered						
List of Toxics	No. of	Contact				
List of Topics	Weeks	hours				
Introduction: measuring at the nanoscale	1	1				

The limits of optical microscopy. Confocal microscopy	2	2
Electron microscopies.	4	4
Practical transmission electron microscopy, scanning electron microscopy	2	6
Scanning probe microscopy: principles of operation. Tunneling microscopy.	4	4
Atomic force microscopy. Basic principles and multimode operation.	4	4
Practical diffraction techniques: introduction to diffraction,	4	12
Practical X-ray diffraction (wide angle and small angle techniques)	4	12
Particle diffraction (neutrons, electrons, atoms)	4	12

2. Course components (total contact and credit hours per semester):							
Lecture Tutorial Laboratory/ Studio Practical Other To						Total	
Contact	Planned	15		42			57
Hours	Actual	15		42			57
Credit	Planned	1		1			2
	Actual	1		1			2

3. Individual study/learning hours expected for students per week.

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

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 targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

	Curriculum Map							
Code	NQF Learning Domains	Course Teaching	Course Assessment					
#	And Course Learning Outcomes	Strategies	Methods					
1.0	Knowledge							
1.1	Understanding the nature of observation and scientific knowledge in the field of study.							
1.2	Relevant theories and their applications.							
1.5	Related terminology, numbering and classification systems.							
1.7	Related terminology, numbering and classification systems.							
2.0	Cognitive Skills							
2.1	Distinguish the relevant theories and evaluate its concepts and principles.							

2.2	Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data.	
2.4	Develop and develop mechanisms to deal with scientific problems.	
3.0	Interpersonal Skills & Responsibility	
3.1	Design plans and method of treatment and report based on data that has been investigated, using appropriate techniques and consideration of scientific guidance.	
3.3	Solve scientific problems using a range of formats and approaches.	
4.0	Communication, Information Technology, Numerical	
4.2	Define roles, responsibilities and performance methods	
4.4	Work in groups effectively; manage time, collaborate and communicate with others positively.	
5.0	Psychomotor(if any)	
5.1	Conduct relevant scientific experiments.	
5.2	Developing scientific experiments and establishing techniques related to the experiments under study.	

5. Assessment Task Schedule for Students During the Semester					
	Assessment task (i.e., essay, test, quizzes, group	Wook Duo	Proportion of Total		
	project, examination, speech, oral presentation, etc.)	week Due	Assessment		
1	1 st Quiz.	7	5		
2	2 nd Quiz.	12	5		
3	1 st Homework (E-Learning).	5	5		
4	2 nd Homework (E-Learning).	11	5		
5	1 st Quiz (Practical).	6	5		
6	2 nd Quiz (Practical).	10	5		
7	1 st Homework (Practical E-Learning).	4	5		
8	2 nd Homework (Practical E-Learning).	9	5		
9	Research.	13	5		
01	Final Practical Examination.	14	15		
11	Final written Examination.	16	40		

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week

E. Learning Resources

1. List Required Textbooks

Robert h webb, confocal optical microscopy, rep. Prog. Phys. 59 (1996) 427–471

E. Meyer, h. J. Hug and r. Bennewitz "scanning probe icroscopy: the lab on a tip", springer verlag.

The nanotechnology multimedia encyclopedic courses, "exploring nanotechnology" nanopolis.

Scanning probe microscopy. The lab on a tip. E. Meyer, h.j. hug, r. Bennewitz. Springer J. P. Eberhart "structural and chemical analisys of materials: xray, electron and neutron diffraction - x-ray, electron and ion spectrometry - electron microscopy", wiley, 1991 "international tables for crystallography", kluwer, 1995.

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

G. Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

Questioners.

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

Using course report.

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking

of tests or a sample of assignments with staff members at another institution)

A random sample of students' assessments is corrected through the committee formed by the department

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

Review stakeholders and conduct periodic questioners.

Name of Course	Instructor:	

Signature: _____ Date Completed: _____

Program	Coordinator:
<u> </u>	_

Signature:

Date Received: _____

Course Title: Modelling and molecular dynamics simulations at the nanoscale Course Code: 23066102-2 Date: 2018 - 12 - 28

Institution: Umm Al-Qura University

percentage?

percentage?

College: Al-Jamoum University College Department: Physics

A. Course Identification and General Information

A. Course identification and General information						
1. Course title and code: Modelling an	d molecular	dynamics simu	lations at the nanoscale			
(23066102-2)						
2. Credit hours: 2 credit hours.						
3. Program(s) in which the course is offered:	Nano physics	Program, Al-Ja	moum University College.			
(If general elective available in many program	ms indicate thi	s rather than list	programs)			
4. Name of faculty member responsible for	the course:					
5. Level/year at which this course is offered	: 2 nd Level.					
6. Pre-requisites for this course (if any): -						
7. Co-requisites for this course (if any): -						
8. Location if not on main campus: Al-Jamo	oum Universit	y College.				
9. Mode of Instruction (mark all that apply):						
a. Traditional classroom	\checkmark	percentage?	70%			
b. Blended (traditional and online)		percentage?				
c. E-learning	\checkmark	percentage?	30%			

e.	Other:	

Comments:

B. Objectives

d. Correspondence

1. The main objective of this course

The student should be trained on the basic knowledge about the computer methods of simulation and modelling used at present to study systems of nanometric size.

Moreover, the student should become familiar with the use of standard software packages in which this type of methods are relevant and should master their possible applications and limitations.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The subject will be divided in two great blocks, one due to the simulations of molecular dynamics and a second one aimed to the description of the methods of first principles used in the Nano-structure modelling.

1. Topics to be Covered

List of Topics					No. of	Contact		
					Weeks	hours		
Introduction to ab-initio methods in the modelling of nanostructures.					2	2		
Solid-s	tate methods	S					3	6
Quantu	m physics m	nethods.					3	6
Introdu	ction to mol	ecular dyna	mics simula	tion in the	nano	scale.	2	4
The con	ncept of forc	efield.					2	4
Needed	l algorithms.	1					2	4
Mesosc	copic method	ls.					2	4
2. Cou	rse compon	ents (total	contact and	credit hou	rs pe	er semester):	
		Lecture	Tutorial	Laborato Studio	r y/	Practical	Other	Total
Contact	Planned	30						30
Hours	Actual	30						30
Credit	Planned	1						2
	Actual	1						2
3. Indiv	vidual study,	/learning h	ours expect	ed for stud	ents	per week.		
4. Cours and T	se Learning O eaching Strat	utcomes in eg <mark>ies</mark>	NQF Domain	s of Learnin	g anc	Alignment	with Assess	ment Methods
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 targeted learning outcomes. <u>Third</u> , insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)								
Curriculum Map								
Code #	NQF Learning Domains Course Teach			Course Teachi	ng Co	urse Assessment		
# 1.0	# And Course Learning Outcomes Strategies Methods 0 Knowledge Know							
1.3	The process ar and function a	nd mechanism re specific tor	ns supporting t	he structure				
1.4	Related termi systems.	nology, num	bering and c	lassification				
1.6	Knowledge de	velopment rel	ated to the pro	gram.				
2.0	Cognitive Skill	s					1	
2.2	Analyzing, e qualitative and	valuating ar quantitative	nd interpretin scientific data.	ig relevant				

2.3	Develop the argument and divorce the appropriate judgments according to scientific theories and			
3.0	Interpersonal Skills & Responsibility			
3.2	Application of techniques and tools related to scientific ethics.			
4.0	Communication, Information Technology, Numerical			
4.1	Use information and communication technology effectively			
4.3	Think independently, assign tasks and solve problems on a scientific basis.			
4.5	Taking into account societal problems associated with customs, traditions and ethics.			
4.6	Ability to learn self and continuously.			
4.7	Apply models, scientific systems and tools effectively.			
5. Ass	sessment Task Schedule for Students During the Seme	ester		
	Assessment task (i.e., essay, test, quizzes, group			Proportion of Total
	project, examination, speech, oral presentation, etc	c.)	week Due	Assessment
1	1 st Quiz.		7	10
2	2 nd Quiz.		11	10
3	1 st Homework (E-Learning).		4	10
4	2 nd Homework (E-Learning).		8	10
5	Research.		12	20
6	Final written Examination.		16	40

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

Computer Simulation of Liquids, M.P. Allen D.J. Tildesley, Oxford Science Publications, 2nd edition (2017).

Modelling Molecular Structures, A. Hinchliffe, Wiley and Sons, (2000).

Computational Materials Science, K. Ohno, K. Esfarjani, and Y. Kawazoe Springer, Berlin, 2nd edition (2018).

Electronic structure: basic theory and practical methods, Richard M. Martin, Cambridge University Press, (2004)

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Class room for 10 students. 2. Technology resources (AV, data show, Smart Board, software, etc.) The class room should be equipped with a pc and data-show. 3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) G. Course Evaluation and Improvement Procedures 1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **Ouestioners.** 2. Other Strategies for Evaluation of Teaching by the Instructor or the Department Using course report. 3. Procedures for Teaching Development Using course report. 4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) A random sample of students' assessments is corrected through the committee formed by the department. 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. Review stakeholders and conduct periodic questioners. Name of Course Instructor: Signature: _____ Date Completed: _____ Program Coordinator: _____

Signature: Date Received:

Course Title: Experimental techniques II spectroscopies Course Code: 23066103-2
Date : 2018 – 12 – 28	Institution: Umm Al-Qura University				
College: Al-Jamoum University College	College:Al-Jamoum University CollegeDepartment: Physics				
A. Course Identification and Genera	al Information				
1. Course title and code: Experimental tech	niques II spectroscopies (23066103-2)				
2. Credit hours: 2 credit hours (1 credit for	lectures and 1 credit for practical part).				
3. Program(s) in which the course is offered:	Nano physics Program, Al-Jamoum University College.				
(If general elective available in many program	ns indicate this rather than list programs)				
4. Name of faculty member responsible for t	the course:				
5. Level/year at which this course is offered:	1 st Level.				
6. Pre-requisites for this course (if any): -					
7. Co-requisites for this course (if any): -					
8. Location if not on main campus: Al-Jamo	um University College.				
9. Mode of Instruction (mark all that apply):					
a. Traditional classroom	✓ percentage? 35%				
b. Blended (traditional and online)	percentage?				
c. E-learning	✓ percentage? 15%				
d. Correspondence	percentage?				
e. Other: Lab	✓ percentage? 50%				
Comments:					
B. Objectives					
1. The main objective of this course					
The main goal of the course is to intro	duce the spectroscopic experimental techniques in				
the nanoscience and nanotechnology co	ntext. two main groups are considered, techniques				
involving electron spectroscopy and the	ose focus on molecular spectroscopy.				
2. Describe briefly any plans for developing and improving the course that are being implemented.					
(e.g. increased use of the IT or online reference material, changes in content as a result of new					
research in the field)					
Improving Course content using course report and references text book.					
Using recent scientific research for improving course content.					
C. Course Description (Note: General of	lescription in the form used in the program's bulletin or				
handbook)					
,					

Course Description:

The course must be thought after basic scientific subjects, such as quantum physics and mathematics.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
Introduction: measuring electronic states in nanostructures	1	1
Surface approach ultra-high vacuum atomically clean surfaces	2	2

Evaporation of materials thin film growth quantum dots, stripes and	1	1
wires	7	+
Practical evaporation of materials thin film growth.	2	6
Practical surface sensitive techniques, particle sources and particle analyzers	4	12
Low energy electron diffraction.	4	4
Practical Scanning tunneling microscopy and atomic force microscopy	4	12
photoemission	4	4
Practical Surface science	4	12

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact	Planned	15		42			57
Hours	Actual	15		42			57
Cradit	Planned	1		1			2
Credit	Actual	1		1			2

3. Individual study/learning hours expected for students per week.

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

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 targeted learning outcomes. <u>Third</u>, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map					
Code	NQF Learning Domains	Course Teaching	Course Assessment		
#	And Course Learning Outcomes	Strategies	Methods		
1.0	Knowledge				
1 1	Understanding the nature of observation and scientific				
1.1	knowledge in the field of study.				
1.2	Relevant theories and their applications.				
1 5	Related terminology, numbering and classification				
systems.					
17	Related terminology, numbering and classification				
systems.					
2.0	Cognitive Skills				
2.1	Distinguish the relevant theories and evaluate its concepts and				
2.1	principles.				

2.2	Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data.
2.4	Develop and develop mechanisms to deal with scientific problems.
3.0	Interpersonal Skills & Responsibility
3.1	Design plans and method of treatment and report based on data that has been investigated, using appropriate techniques and consideration of scientific guidance.
3.3	Solve scientific problems using a range of formats and approaches.
4.0	Communication, Information Technology, Numerical
4.2	Define roles, responsibilities and performance methods
4.4	Work in groups effectively; manage time, collaborate and communicate with others positively.
5.0	Psychomotor(if any)
5.1	Conduct relevant scientific experiments.
5.2	Developing scientific experiments and establishing techniques related to the experiments under study.

5. Assessment Task Schedule for Students During the Semester				
	Assessment task (i.e., essay, test, quizzes, group	up Proportion of Total		
	project, examination, speech, oral presentation, etc.)	week Due	Assessment	
1	1 st Quiz.	7	5	
2	2 nd Quiz.	12	5	
3	1 st Homework (E-Learning).	5	5	
4	2 nd Homework (E-Learning).	11	5	
5	1 st Quiz (Practical).	6	5	
6	2 nd Quiz (Practical).	10	5	
7	1 st Homework (Practical E-Learning).	4	5	
8	2 nd Homework (Practical E-Learning).	9	5	
9	Research.	13	5	
01	Final Practical Examination.	14	15	
11	Final written Examination.	16	40	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week

E. Learning Resources

1. List Required Textbooks

Physics at surfaces, A. Zangwill, cambridge university press (1996)

Very high resolution photoelectron spectroscopy, ed. S. Hüfner, lect. notes in physics 715, Springer, Berlin, Heidelberg 2007.

Scanning Probe Microscopy and Spectroscopy: Methods and Applications. Roland Wiesendanger, Cambridge University Press (1994)

Broadband dielectric spectroscopy. F. Kremer, A. Schönhals, Springer-Verlag, Berlin 2003.

Exploring matter with Neutrons - 2nd edition, 2nd volume of the NANOPOLISTM encyclopedia series. Multimedia distributed knowledge network in nanotechnology . www.nanopolis.net

Modern Raman Spectroscopy: A Practical Approach, Ewen Smith y Geoffrey Dent., Wiley (2005).

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

G. Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

Questioners.

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

Using course report.

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an

independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

A random sample of students' assessments is corrected through the committee formed by the department

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

Review stakeholders and conduct periodic questioners.

Name of Course Instructor:	
Signature:	Date Completed:
Program Coordinator:	
Signature:	Date Received:

Date: 2018 – 12 – 28	Institution: Umm Al-Qura University
College : Al-Jamoum University College	Department: Physics
A. Course Identification and Genera	al Information
1. Course title and code: Nanostructural pro	perties (23066104-2).
2. Credit hours: 2 credit hours.	
3. Program(s) in which the course is offered: N	Nano physics Program, Al-Jamoum University College.
(If general elective available in many program	s indicate this rather than list programs)
4. Name of faculty member responsible for the	ne course:
5. Level/year at which this course is offered: 2	2 nd Level.
6. Pre-requisites for this course (if any): Nano	science and nanotechnology (23066105-2)
7. Co-requisites for this course (if any): -	
8. Location if not on main campus: Al-Jamou	m University College.
9. Mode of Instruction (mark all that apply):	
a. Traditional classroom	\checkmark percentage? 70%
b. Blended (traditional and online)	percentage?
c. E-learning	✓ percentage? 30%
d. Correspondence	percentage?
e. Other:	percentage?
Comments:	

1. The main objective of this course

The main goal of this module is to establish the connection between the nanostructures that have been presented in previous moduli and the different physical properties that those nanostructured materials hold.

Special emphasis will be addressed for a deeper understanding of the electronic structure in low dimensional systems, an introduction to transport properties, as well as an introductory review of magnetic, optical and mechanical properties of nanostructures.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The modulus will be taught during the second semester of the first course of the master. In this way, the student will develop a solid basis on structural and electronic properties of different nanostructures during the first semester, and the connection with the different mechanical, optical, magnetic and transport properties can be reached progressively along the course.

1. Topics to be Covered							
List of Topics					No. of Weeks	Contact hours	
Introduction. Thermodynamically approach to solid surfaces and nanostructured systems, Surface energy and stability, and Wulff construction.					1	2	
Electroni Jellium n electrons systems:	Electronic properties.Jellium model, Periodicity: Bloch theorem and bands, Nearly-free electrons in solids and surfaces, Tight binding method, Truncated36systems: electron localization effects,36					6	
Transpor Friedel n transitior	t propertie nodel. Sur 1. Origin o	s. face core le f magnetic o	evel shifts, a exchange.	and Hubbard me	odel. Mott	3	6
Optical properties.Light propagation in a material, Localized and propagating plasmonic resonances in metallic nanostructures, Dielectric nanostructures, Microscopic description of the optical properties of materials, Microscopic polarizability, Forced damped harmonic oscillator model, and Drude Model.24					4		
Magnetic properties.Exchange and anisotropy, X-ray magnetic circular dichroism (XMCD), Layers, Magnetism in nanoparticles, and Giant36					6		
Mechanical properties. Linear Elastic Properties, Nonlinear Elasticity and Shell Model, Atomic Relaxation and Failure Mechanisms, Kinetic Theory of Strength, Coalescence of Nanotubes as a Reversed Failure.					6		
2. Cours	e compon	ents (total	contact and	credit hours po	er semester	·):	
Lecture Tutorial Laboratory/ Studio Practical Other Tota				Total			
Contact	Planned	30					30
Hours	Actual	30					30
Credit	Planned	1					2
cicuit	Actual	1					2
3. Individual study/learning hours expected for students per week.							
and Teaching Strategies							

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 targeted learning outcomes. <u>Third</u>, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

	Curriculum Ma	р		
Code	NQF Learning Domains	Cou	urse Teaching	Course Assessment
#	And Course Learning Outcomes		Strategies	Methods
1.0	Knowledge			- 1
1.3	The process and mechanisms supporting the structure and function are specific topics.			
1.4	Related terminology, numbering and classification systems.			
1.6	Knowledge development related to the program.			
2.0	Cognitive Skills			
2.2	Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data.			
2.3	Develop the argument and divorce the appropriate judgments according to scientific theories and concepts.			
3.0	Interpersonal Skills & Responsibility			
3.2	Application of techniques and tools related to scientific ethics.			
4.0	Communication, Information Technology, Numerical			
4.1	Use information and communication technology effectively			
4.3	Think independently, assign tasks and solve problems on a scientific basis.			
4.5	Taking into account societal problems associated with customs, traditions and ethics.			
4.6	Ability to learn self and continuously.			
4.7	Apply models, scientific systems and tools effectively.			
5. Ass	sessment Task Schedule for Students During the Sen	nester		
	Assessment task (i.e., essay, test, quizzes, grou	р	Wook Duo	Proportion of Total
	project, examination, speech, oral presentation,	etc.)	Week Due	Assessment
1	1 st Quiz.		7	10
2	2 nd Quiz.		11	10
3	1 st Homework (E-Learning).		4	10
4	2 nd Homework (E-Learning).		8	10
5	Research.		12	20
6	Final written Examination.		16	40
D. St	tudent Academic Counseling and Suppor	t	•	

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

-"Handbook of nanoscience, Engineering, and technology", Donald Brenner, Sergey Lyshevski, Gerald Lafrate, William A. Goddard III (eds.) CRC PRESS, 3ed edition (2012).

- "Encyclopedia of Nanoscience and Nanotechnology", Hari Singh Nalwa (ed.) American Scientific Publishers. 2005

- "Exploring Nanotechnology" CD-ROM encyclopedia. NANOPOLYS. 2005

- "Principles of Nano-optics", Lucas Novotny and Bert Hecht, Cambridge university Press, 2006

"Mesoscopic Physics and electronics", T. Ando, Y. Arakawa, F. Furuya, S. Komiyama and H. Nakashima, **Spinger, Kindle Edition** (2012).

- "Mesoscopic systems. Fundamentals and Applications", Yoshimasa Murayama, Wiley-Vch, 2001.

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

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

http://nanotech.nanopolis.net

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

G. Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **Ouestioners.**

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department Using course report.

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

A random sample of students' assessments is corrected through the committee formed by the department.

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

Review stakeholders and conduct periodic questioners.

Name of Course Instructor:

Signature: Date Completed:

Program Coordinator:	
Signature:	Date Received:

COURSE SPECIFICATIONS Form

Course Title: Nanoscience and nanotechnology Course Code: 23066105-2

Date : 2018 – 12 – 28	Institution: Umm Al-Qura University			
College: Al-Jamoum University College	Department: Physics			
A. Course Identification and Gener	al Information			
1. Course title and code: Nanoscience and n	anotechnology (23066105-2).			
2. Credit hours: 2 credit hours.				
3. Program(s) in which the course is offered:	Nano physics Program, Al-Jamoum University College.			
(If general elective available in many program	ns indicate this rather than list programs)			
4. Name of faculty member responsible for t	he course:			
5. Level/year at which this course is offered:	1 st Level.			
6. Pre-requisites for this course (if any): -				
7. Co-requisites for this course (if any): -				
8. Location if not on main campus: Al-Jamo	um University College.			
9. Mode of Instruction (mark all that apply):				
a. Traditional classroom	✓ percentage? 70%			
b. Blended (traditional and online)	percentage?			
c. E-learning	✓ percentage? 30%			
d. Correspondence	percentage?			
e. Other:	percentage?			
Comments:				
B. Objectives				
1. The main objective of this course				
The basic aim of the module is knowing the state of the art in several technology fields, the				
perspectives and the impact of nanoscie	nce in those fields.			
2. Describes briefly any glane few developing a				

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The course must be thought after basic scientific subjects, such as quantum physics and mathematics.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
Creating small objects in a controlled way and the top down strategy: Lithography	1	2

The bottom-up strategy: self-assembly					1	2	
Introd	uction to the	geometries	of nanoscal	e carbon and	Fullerenes.	1	2
Carbo	n nanotubes.					1	2
Quant	um dots.					2	4
Nanoc	omposites.					2	4
The se	miconductor	industry: st	tate of the a	rt and challen	ges.	1	2
Magne	etic recording	state of th	e art and ch	allenges and	state of the	2	1
art Lit	hography and	l its limits.				2	+
Towar	ds molecular	electronics				1	2
Nanot	echnology ch	allenges in	solar energy	y research.		1	2
Solar	Photovoltaics	•				1	2
Solar f	fuel and solar	thermal.				1	2
2. Cou	urse compon	ents (total	contact and	credit hours	per semeste	r):	
		Lecture	Tutorial	Laboratory Studio	/ Practica	Othe	r Total
Contac	t Planned	30					30
Hours	Actual	30					30
Credit	Planned	1					2
	Actual	1					2
3. Indi	vidual study,	/learning h	ours expect	ed for stude	nts per week.	[
4. Cour and	rse Learning O Feaching Strat	outcomes in reg <mark>ies</mark>	NQF Domain	s of Learning	and Alignment	with Asses	sment Methods
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 targeted learning outcomes. <u>Third</u> , insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an							
each d	omain.)	Ũ			·	0	
			Cu	rriculum Map		-	
Code #	e NQF Learning Domains Course Teach					ning Co	ourse Assessment
# 1.0	And Course Learning Outcomes Strategies Methods Methods Strategies Methods						
1.3	3 The process and mechanisms supporting the structure and function are specific topics.						
1.4	1.4 Related terminology, numbering and classification systems.						
2.0	.0 Cognitive Skills						
2.2	2 Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data.						
2.3	2.3 Develop the argument and divorce the appropriate judgments according to scientific theories and concepts.						
3.0	Interpersonal	Skills & Resp	onsibility				

3.2	Application of techniques and tools related to scientific ethics.		
4.0	Communication, Information Technology, Numerical		
4.1	Use information and communication technology effectively		
4.3	Think independently, assign tasks and solve problems on a scientific basis.		
4.5	Taking into account societal problems associated with customs, traditions and ethics.		
4.6	Ability to learn self and continuously.		
4.7	Apply models, scientific systems and tools effectively.		
5. Ass	sessment Task Schedule for Students During the Semester	•	
	Assessment task (i.e., essay, test, quizzes, group	Maak Due	Proportion of Total
	project, examination, speech, oral presentation, etc.)	week Due	Assessment
1	1 st Quiz.	7	10
2	2 nd Quiz.	11	10
3	1 st Homework (E-Learning).	4	10
4	2 nd Homework (E-Learning).	8	10
5	Research.	12	20
6	Final written Examination.	16	40

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week

E. Learning Resources

1. List Required Textbooks

1- Introduction to nanoscale science and technology springer, 2004.

2.- Nanotechnology, basis science, Wilson et al chapman, 2002

3.- International technology roadmap for semiconductors itrs-2007

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

G. Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

Questioners.				
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department				
Using course report.				
3. Procedures for Teaching Development				
Using course report.				
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an				
independent member teaching staff of a sample of student's work, periodic exchange and remarking				
of tests or a sample of assignments with staff members at another institution)				
A random sample of students' assessments is corrected through the committee formed by the				
department				
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning				
for developing it.				
Review stakeholders and conduct periodic questioners.				
Name of Course Instructor:				
Signature: Date Completed:				
Program Coordinator:				
Characterized Data Data Data d				
Signature: Date Received:				

COURSE SPECIFICATIONS Form

Course Title: Fundamentals of solid state physics Course Code: 23066106-2

Date: 2018 – 12 – 28	Institution	: Umm Al-Qura	University
College : Al-Jamoum University College	Departme	nt: Physics	
A. Course Identification and Generation	al Informa	tion	
1. Course title and code: Fundamentals of se	olid state phy	vsics (23066106-2	2).
2. Credit hours: 2 credit hours.			
3. Program(s) in which the course is offered: I	Nano physics	Program, Al-Ja	moum University College.
(If general elective available in many program	ns indicate this	s rather than list	programs)
4. Name of faculty member responsible for the	he course:		
5. Level/year at which this course is offered:	2 nd Level.		
6. Pre-requisites for this course (if any): Nane	oscience and	nanotechnology	(23066105-2)
7. Co-requisites for this course (if any): -			
8. Location if not on main campus: Al-Jamou	um Universit	y College.	
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	\checkmark	percentage?	70%
b. Blended (traditional and online)		percentage?	
c. E-learning	\checkmark	percentage?	30%
d. Correspondence		percentage?	
e. Other:		percentage?	
Comments:			

1. The main objective of this course

The goal of the module is to develop a general picture of solid state physics that can be used by students to understand the classification of Materials in terms of their properties: metals, semiconductors, and insulators.

This includes general properties of crystal symmetry: crystal lattice translational symmetry and point group operations, reciprocal lattice, one particle properties and classification of one particle states in terms of wave vectors. It also includes band structure of metals, semiconductors, and insulators; vibrations in solids; experimental and theoretical methods of study of electronic and vibrational properties of solids. Magnetism of solids – why some materials are magnetic?

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The course of the fundamentals of solid state physics will be given in the second four-month period of a master in nanoscience. This is because a knowledge of basic notions and properties of solids is fundamentals for understanding of other disciplines of a master in nanoscience. The themes of the course form a bridge that connects phenomena of extended materials and Nano size metallic.

Semiconductor and insulator systems. In particular, information obtained is necessary for study of other courses.

1. Topics to be Covered		
List of Topics	No. of	Contact
	Weeks	hours
Geometrical description of crystals: direct and Reciprocal lattices	2	4
Vibrations in solids: phonons	2	4
Free electrons in solids.	2	4
The electronic band structure of solids: Bloch theorem, the nearly	2	1
free-electron approximation, the tight-binding approximation.	2	
Band structure of selected metals	2	4
Cohesion of solids.	2	4
Magnetism in solids: why some materials are Magnetic	3	6
2. Course components (total contact and credit hours per semester	·):	•

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact	Planned	30					30
Hours	Actual	30					30
Cradit	Planned	1					2
Credit	Actual	1					2

3. Individual study/learning hours expected for students per week.

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

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 targeted learning outcomes. <u>Third</u>, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

	Curriculum Map					
Code	NQF Learning Domains	Course Teaching	Course Assessment			
#	And Course Learning Outcomes	Strategies	Methods			
1.0	Knowledge					
1.3	The process and mechanisms supporting the structure and function are specific topics.					

1.4	Related terminology, numbering and classification systems.					
1.6	Knowledge development related to the program.					
2.0	Cognitive Skills					
2.2	Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data.					
2.3	Develop the argument and divorce the appropriate judgments according to scientific theories and concepts.					
3.0	Interpersonal Skills & Responsibility					
3.2	Application of techniques and tools related to scientific ethics.					
4.0	Communication, Information Technology, Numerical					
4.1	Use information and communication technology effectively					
4.3	Think independently, assign tasks and solve problems on a scientific basis.					
4.5	Taking into account societal problems associated with customs, traditions and ethics.					
4.6	Ability to learn self and continuously.					
4.7	Apply models, scientific systems and tools effectively.					
5. Ass	sessment Task Schedule for Students During the Semes	ster				
	Assessment task (i.e., essay, test, quizzes, group	Week Due	Proportion of Total			
	project, examination, speech, oral presentation, etc	a.) Week Due	Assessment			
1	1 st Quiz.	7	10			
2	2 nd Quiz.	11	10			
3	1 st Homework (E-Learning).	4	10			
4	2 nd Homework (E-Learning).	8	10			
5	Research.	12	20			
6	Final written Examination.	16	40			
D. St	udent Academic Counseling and Support					

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

Introduction to Solid State Physics, 8th Edition, Wiley; (2004)

Advanced Solid State Physics 2nd Edition ambridge University Press; 2 edition (2012)

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
Class room for 10 students.
2. Technology resources (AV, data show, Smart Board, software, etc.)
The class room should be equipped with a pc and data-show.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements
or attach list)
G. Course Evaluation and Improvement Procedures
1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
Questioners.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
Using course report.
3. Procedures for Teaching Development
Using course report.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an
independent member teaching staff of a sample of student's work, periodic exchange and
remarking of tests or a sample of assignments with staff members at another institution)
A random sample of students' assessments is corrected through the committee formed by
the department.
5. Describe the planning arrangements for periodically reviewing course effectiveness and
planning for developing it.
Review stakeholders and conduct periodic questioners.
Name of Course Instructor:
Signature: Date Completed:
Program Coordinator:
Signature: Date Received:

COURSE SPECIFICATIONS Form

Course Title: Mathematical methods for nanoscience Course Code: 23066107-2

Date: 2018 - 12 - 28Institution: Umm Al-Qura University			University	
Col	lege: Al-Jamoum University College	Departmen	nt: Physics	
Α. (Course Identification and Genera	al Informat	ion	
1. 0	Course title and code: Mathematical mether	nods for nano	science (2306610	07-2).
2. 0	redit hours: 2 credit hours.			
3. P	rogram(s) in which the course is offered: N	Nano physics I	Program, Al-Jan	noum University College.
(If g	eneral elective available in many program	s indicate this	s rather than list p	programs)
4. N	lame of faculty member responsible for the	ne course:		
5. L	evel/year at which this course is offered:	1 st Level.		
6. P	re-requisites for this course (if any): -			
7. C	Co-requisites for this course (if any): -			
8. L	ocation if not on main campus: Al-Jamou	ım University	v College.	
9. N	Node of Instruction (mark all that apply):			
a.	Traditional classroom	\checkmark	percentage?	70%
b.	Blended (traditional and online)		percentage?	
с.	E-learning	\checkmark	percentage?	30%
d.	Correspondence		percentage?	
e.	Other:		percentage?	
Con	iments:			

1. The main objective of this course

The goal of this module is to provide the students with the required fundamental mathematical methods for the theoretical developments of the degree.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The instrumental character of the subject requires the dedication of a considerable number of seminars and practical exercises in order to apply the theoretical mathematical methods to real problems.

Since this module is aimed to provide the student with basic knowledge, the subject will be held in the first term (four month period) of the first year of the degree.

1. Topics to be Covered

List of Topics						No.	of	Contact	
List of Topics						Wee	eks	hours	
Theory of functions of a complex variable						2	2	4	
Integra	ation in the co	mplex plan	ne				2	2	4
Functi	onal analysis.	Hilbert spa	aces				2	2	4
Theory	y of linear ope	erators.					2	2	4
Theory	y of linear ope	erators. App	plications to	differential	equa	ations.	3	3	6
Group	theory						4	ļ	8
2. Cou	urse compone	ents (total o	contact and	credit hour	rs pei	r semester)	:		
		Lecture	Tutorial	Laborato Studio	r y/	Practical	Ot	her	Total
Contac	t Planned	30							30
Hours	Actual	30							30
Cradit	Planned	1							2
Creuit	Actual	1							2
3. Indi	vidual study/	learning h	ours expect	ed for stude	ents p	per week.			
4. Cour and	rse Learning O Feaching Strate	utcomes in eg <mark>ies</mark>	NQF Domain	s of Learning	g and	Alignment	with Ass	essme	nt Methods
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 targeted learning outcomes. <u>Third</u> , insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)						ate learning that fit and appropriate rse learning to form an comes from			
			Cur	rriculum Maj	0				
Code #	And	NQF Learnin	g Domains ning Outcome	S	Strategies Asse			course sessment	
				-				N	lethods
1.0	Knowledge			-					
1.3	The process and mechanisms supporting the structure and function are specific tonics								
1.4	Related terminology, numbering and classification systems.								
1.6	Knowledge development related to the program.								
2.0	2.0 Cognitive Skills								
2.2	Analyzing, ev qualitative and	valuating ar quantitative s	nd interpretir scientific data.	ng relevant					
2.3	Develop the argument and divorce the appropriate judgments according to scientific theories and concepts.								
3.0	Interpersonal S	Skills & Respo	onsibility						
3.2	Application of scientific ethics	of technique	es and tools	related to					

4.0	Communication, Information Technology, Numerical			
4.1	Use information and communication technology effectively			
4.3	Think independently, assign tasks and solve problems on a scientific basis.			
4.5	Taking into account societal problems associated with customs, traditions and ethics.			
4.6	Ability to learn self and continuously.			
4.7	Apply models, scientific systems and tools effectively.			
5. Ass	sessment Task Schedule for Students During the Seme	ster		
	Assessment task (i.e., essay, test, quizzes, group proj	ject,	Maak Due	Proportion of Total
	examination, speech, oral presentation, etc.)		week Due	Assessment
1	1 st Quiz.		7	10
2	2 nd Quiz.		11	10
3	1 st Homework (E-Learning).		4	10
4	2 nd Homework (E-Learning).		8	10
5	Research.		12	20
6	Final written Examination.		16	40

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

Complex analysis: for mathematics and engineering, fifth edition, 2006 John H. Mathews and Russell W. Howell

Graduate mathematical physics. Kelly, james j.

Advanced engineering mathematics. Erwing kreyzig. John wiley&sons

Mathematics methods for physics & engineering riley et al. Cambridge Group theory in physics

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **Questioners.**

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **Using course report.**

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

A random sample of students' assessments is corrected through the committee formed by the department.

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

Review stakeholders and conduct periodic questioners.

Name of Course Instructor: ____

Signature:	Date Completed:

Program Coordinator:

Signature:	
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Date Received: _____

Date	e: 2018 – 12 – 28	Institution	ı : Umm Al-Qura	University				
Coll	ege: Al-Jamoum University College	Departme	ent: Physics					
A. (A. Course Identification and General Information							
1. C	1. Course title and code: Advanced theoretical methods in nanoscience (23066108-2).							
2. C	2. Credit hours: 2 credit hours.							
3. Pi	rogram(s) in which the course is offered:]	Nano physics	Program, Al-Jan	moum University College.				
(If ge	eneral elective available in many program	ns indicate thi	s rather than list	programs)				
4. N	ame of faculty member responsible for t	he course:						
5. Le	evel/year at which this course is offered:	2 nd Level.						
6. P	re-requisites for this course (if any): ${f Mat}$	hematical me	ethods for nanos	cience (23066107-2).				
7. C	o-requisites for this course (if any): -							
8. Lo	ocation if not on main campus: Al-Jamo	um Universit	y College.					
9. N	1ode of Instruction (mark all that apply):							
a.	Traditional classroom	\checkmark	percentage?	70%				
b.	Blended (traditional and online)		percentage?					
с.	E-learning	\checkmark	percentage?	30%				
d.	Correspondence		percentage?					
e.	Other:		percentage?					
Com	ments:							
D	Objectives							

1. The main objective of this course

This course will introduce the student to theoretical methods such as Quantum physical methods and that are commonly used to study the electronic properties of important systems in Nanoscience.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The student will also learn the fundamentals of molecular structure, electronic and structural properties of surfaces and basic concepts on the chemical processes in gas/surface interactions. Furthermore, the student will get practice on the use of computer codes for Quantum physical calculations.

 1. Topics to be Covered
 No. of
 Contact

 List of Topics
 Weeks
 hours

Introd	uction					2	4
						2	4
Molec	ular Structure	2	4				
Quant	um physical I	Methods: T	heory.			3	6
Quant	um physical I	Methods: E	xercises.			2	4
Proper	ties of surfac	es.				2	4
Adsor	ption process	es.				2	4
Densit	y Functional	Theory.				2	4
2. Cou	urse compon	ents (total	contact and	credit hou	rs per semester):	1
	Lecture Tutorial Laboratory/ Studio Practical				y/ Practical	Other	Total
Contac	t Planned	30					30
Hours	Actual	30					30
Credit	Planned	1					2
creuit	Actual	1					2
3. Indi	vidual study	/learning h	ours expect	ed for stud	ents per week.		
4. Cour and	rse Learning O Teaching Strat	outcomes in eg <mark>ies</mark>	NQF Domain	s of Learning	g and Alignment	with Assessme	ent Methods
On the	table below a	are the five I	NQF Learning	g Domains, n	umbered in the l	eft column.	
<u>First</u> , ir	nsert the suital	ble and meas	surable cours	e learning ou	itcomes required	in the appropr	iate learning
domaiı	ns (see sugges	tions below	the table). <u>S</u>	<u>econd</u> , inser	t supporting teac	hing strategies	s that fit and
align v	with the asse	ssment met	thods and t	argeted lear	ning outcomes.	Third, insert	appropriate
assessi	ment methods	that accurat	tely measure	and evaluate	e the learning out	come. Each co	urse learning
outcon	nes, assessme	nt method,	and teaching	strategy sho	ould fit in togethe	er with the res	t to form an
Integra	ited learning a	nd teaching	process. (Col	urses are not	required to inclu	de learning ou	tcomes from
each u	omanı.)		Cu	rriculum Ma	n		
Code		NQF Learnin	g Domains		Course Teach	ng Cours	e Assessment
#	And	d Course Lear	ning Outcome	S	Strategies	о 	Vethods
1.0	Knowledge						
1.3	The process an	nd mechanisn	ns supporting t	the structure			
	and function are specific topics. Palatad_tarminology_numbering_ard_classification						
1.4	systems.						
1.6	Knowledge development related to the program.						
2.0	0 Cognitive Skills						
2.2	Analyzing, e	valuating a	nd interpretin	ng relevant			
	Develop the	argument and	divorce the	appropriate			
2.3	judgments ac	ccording to	scientific th	eories and			
	concepts.	Ū.					
3.0	Interpersonal	Skills & Resp	onsibility				
3.2	Application	of technique	es and tools	related to			
4.0	scientific ethi	ICS.	an Taskaala	Numerical			
4.0	communicatio	on, informatio	on rechnology	, ivumerical			

4.1	Use information and communication technology			
	Think independently assign tasks and solve			
4.3	problems on a scientific basis.			
4.5	Taking into account societal problems associated with customs, traditions and ethics.			
4.6	Ability to learn self and continuously.			
4.7	Apply models, scientific systems and tools effectively.			
5. Ass	essment Task Schedule for Students During the Seme	ster		
	Assessment task (i.e., essay, test, quizzes, group			Proportion of Total
	project, examination, speech, oral presentation, etc	c.)	week Due	Assessment
1	1 st Quiz.		7	10
2	2 nd Quiz.		11	10
3	1 st Homework (E-Learning).		4	10
4	2 nd Homework (E-Learning).		8	10
5	Research.		12	20
6	Final written Examination.		16	40

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

Handbook of Nanophysics: Principles and Methods (Volume 7) 1st Edition CRC Press; (2010)

Complex analysis: for mathematics and engineering, fifth edition, 2006 John H. Mathews and Russell W. Howell

Graduate mathematical physics. Kelly, james j. Wiley (2006).

Advanced engineering mathematics. Erwing kreyzig. John wiley&sons 10th edition (2015).

Mathematics methods for physics & engineering riley et al. Cambridge Group theory in physics

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

G. Course Evaluation and Improvement Procedures

1.	Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
Q	uestioners.
2	Other Strategies for Evolution of Teaching by the Instructor or the Departme

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department Using course report.

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

A random sample of students' assessments is corrected through the committee formed by the department.

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

Review stakeholders and conduct periodic questioners.

Name of Course Instructor: _____

Signature: D	Date Completed:
--------------	-----------------

Program Coordinator: _____

Signature:					
<u> </u>			 		

Date Received: _____

COURSE SPECIFICATIONS Form

Course Title: Classical electrodynamics Course Code: 23066109-2

Date: 2018 – 12 – 28	Institution: Umm Al-Qura University							
College : Al-Jamoum University College	Department: Physics							
A. Course Identification and General	A. Course Identification and General Information							
1. Course title and code: Classical electrodyna	amics (23066109-2).							
2. Credit hours: 2 credit hours.	2. Credit hours: 2 credit hours.							
3. Program(s) in which the course is offered: Na	no physics Program, Al-Jamoum University College.							
(If general elective available in many programs i	indicate this rather than list programs)							
4. Name of faculty member responsible for the	course:							
5. Level/year at which this course is offered: 1^{st}	^t Level.							
6. Pre-requisites for this course (if any): -								
7. Co-requisites for this course (if any): -								
8. Location if not on main campus: Al-Jamour	n University College.							
9. Mode of Instruction (mark all that apply):								
a. Traditional classroom	✓ percentage? 70%							
_								
b. Blended (traditional and online)	percentage?							
_								
c. E-learning	✓ percentage? 30%							
_								
d. Correspondence	percentage?							
_								
e. Other:	percentage?							
Comments:								

1. The main objective of this course

The interaction among charges is the one that determines the structure of matter from the atomic level up to the formation of macroscopic structures. Furthermore, the interaction of the electromagnetic field with matter is the basis of a great number of techniques devoted to the analysis of the structure of the materials. In many problems classical electrodynamics provides an adequate description of the interactions in Nanostructures. The aim of this subject is to familiarize the student with

The basic concepts of electric and magnetic fields, the response of macroscopic systems to external fields, and the relation of this response with the microscopic structure of the medium. Moreover, based on the Maxwell equations the fundamental concepts of optics will be presented, and the propagation, reflection and refraction of electromagnetic waves will be studied.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

Since the aim of this subject is that the student acquires basic knowledges, the subject will be taught during the first quadrisect of the first year of the master. In this way the student will be able to apply in a systematic way the acquired knowledge in the development of many subjects of the master, such as: fundamental of solid state physics low dimensional systems and nanostructures fundamentals of nanoscale characterization nanostructure properties.

1. Topics to be Covered							
List of Topics					No. of	Contact	
LIST OF TOPICS						Weeks	hours
Introduct	ion to e	1	2				
conducto	r	1	2				
Dielectric	c media. P	1	2				
of conduc	ctors. Elec	I	2				
Magneto	statics. Ma	e presence	2	1			
of magnetizable media.							+
Faraday l	aw.		1	2			
Maxwell	equations.	2	4				
Energy o	f the electr	2	4				
Electrom	agnetic wa	2	4				
Retarded	potentials	2	4				
Radiation of an oscillating dipole and potentials created by a moving							4
charge.							
2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact	Planned	30					30
Hours	Actual	30					30
Credit	Planned	1					2
	Actual	1					2
3. Individual study/learning hours expected for students per week.							
4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods							
and Teaching Strategies							

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). <u>Second</u>, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. <u>Third</u>, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map							
Code	NQF Learning Domains	Cou	Irse Teaching	Course Assessment			
#	And Course Learning Outcomes		Strategies	Methods			
1.0	1.0 Knowledge						
1.3	The process and mechanisms supporting the structure and function are specific topics.						
1.4	Related terminology, numbering and classification systems.						
1.6	.6 Knowledge development related to the program.						
2.0	2.0 Cognitive Skills						
2.2	Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data.						
2.3	Develop the argument and divorce the appropriate judgments according to scientific theories and concepts.						
3.0	Interpersonal Skills & Responsibility						
3.2	Application of techniques and tools related to scientific ethics.						
4.0	Communication, Information Technology, Numerical						
4.1	Use information and communication technology effectively						
4.3	Think independently, assign tasks and solve problems on a scientific basis.						
4.5	Taking into account societal problems associated with customs, traditions and ethics.						
4.6	Ability to learn self and continuously.						
4.7	Apply models, scientific systems and tools effectively.						
5. Assessment Task Schedule for Students During the Semester							
	Assessment task (i.e., essay, test, quizzes, grou	ρ	Wook Duo	Proportion of Total			
	project, examination, speech, oral presentation, e	tc.)	Week Due	Assessment			
1 1^{st} Quiz.			7	10			
2	2 2^{nd} Quiz.			10			
3 1 st Homework (E-Learning).			4	10			
4	4 2 nd Homework (E-Learning).			10			
5	Research.		12	20			
6	6 Final written Examination.			40			

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

J. D. Jackson, "classical electrodynamics", john wiley and sons, (1999)

F.E. Low, "classical field theory", john wiley and sons, 3ed edition (1998)

B. Di bartolo, "classical theory of electromagnetism", world Scientific, (2004)

W. Grenier, "classical electrodynamics", springer verlag, (2002).

A. S. Ilynski, g. Ya. Slepyan, a. Ya. Slepyan, "propagation, scattering and dissipation of electromagnetic waves", peter petegrinus, 1993

R. P. Feynman, r. B. Leighton, and m. Sands, "the feynman lectures on Physics: vol. 2", addison-wesley, 2006.

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

G. Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

Questioners.

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

Using course report.

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

A random sample of students' assessments is corrected through the committee formed by the department.

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

Review stakeholders and conduct periodic questioners.

Name of Course Instructor:

Signature: Date Completed:

Program Coordinator: ______

Signature:	
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Date Received: _____

COURSE SPECIFICATIONS Form

Course Title: Advanced nano-scale characterization techniques Course Code: 23066110-2

Date : 2018 – 12 – 28	Institution: Umm Al-Qura University					
College: Al-Jamoum University College	Department: Physics					
A. Course Identification and General Information						
1. Course title and code: Advanced nano-scale characterization techniques (23066110).						
2. Credit hours: 2 credit hours.						
3. Program(s) in which the course is offered: Nano physics Program, Al-Jamoum University College.						
(If general elective available in many programs indicate this rather than list programs)						
4. Name of faculty member responsible fo	or the course:					
5. Level/year at which this course is offere	ed: 2 nd Level.					
6. Pre-requisites for this course (if	Experimental techniques I structural characterization					
any):	(23066101-2)					
	Experimental techniques II spectroscopies (23066103-2)					
7. Co-requisites for this course (if any): -						
8. Location if not on main campus: Al-Jamoum University College.						
9. Mode of instruction (mark all that apply	y):					
a. Iraditional classroom	✓ percentage? 70%					
b. Blended (traditional and online)	percentage?					
c. E-learning	v percentage? 30%					
d. Company and an an						
a. Correspondence	percentage?					
a Other:	norcontago)					
e. Otter:	percentager					
Comments:						

1. The main objective of this course

The goal of this course is to introduce the student to selected experimental techniques of relevance in the nanoscale characterization. Both the theoretical and experimental findings are going to be considered in details. This year the electron energy loss spectroscopy will be considered.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The student will have to do some bibliographic work with the corresponding exposition about some part of the course.
1. Topic	cs to be Cove	red					
		List		No. of	Contact		
							hours
An intr	introduction to electron energy loss spectroscopy (EELS).						2
Instrun	nentation for	energy los	s spectroscoj	py.		2	4
Electro	on scattering	theory.				2	4
Electro	on scattering	g theory:	inner shell	l and valence	e electron	2	4
excitat	ions.						
Quanti	tative analys	is of eels.				2	4
EELS i	in Nano syst	ems:				3	6
EELS i	in Nano syst	ems: bulk a	nd surface p	lasmons		3	6
2. Cou	rse compon	ents (total	contact and	credit hours p	er semester):	
	·	Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact	Planned	30					30
Hours	Actual	30					30
Credit	Planned	1					2
	Actual	1					2
3. Individual study/learning hours expected for students per week.							
4. Cour and T	se Learning O eaching Strat	utcomes in eg <mark>ies</mark>	NQF Domain	s of Learning and	d Alignment	with Assessm	ent Methods
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). <u>Second</u> , insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. <u>Third</u> , insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from							
each do	omain.)		Cur	riculum Man			
Code		NQF Learnin	g Domains		Course Teachi	ng Cours	e Assessment
#	# And Course Learning Outcomes Strategies Methods						Methods
1.0	Knowledge			1			
1.3	The process and mechanisms supporting the structure and function are specific topics						
1.4	Related terminology, numbering and classification systems						
1.6	6 Knowledge development related to the program.						
2.0	Cognitive Skill	S					
2.2	Analyzing, e qualitative and	valuating an quantitative	nd interpretin scientific data.	g relevant			
2.3	2.3 Develop the argument and divorce the appropriate judgments according to scientific theories and concepts.						
3.0	3.0 Interpersonal Skills & Responsibility						

3.2	Application of techniques and tools related to scientific ethics.				
4.0	Communication, Information Technology, Numerical				
4.1	Use information and communication technology effectively				
4.3	Think independently, assign tasks and solve problems on a scientific basis.				
4.5	Taking into account societal problems associated with customs, traditions and ethics.				
4.6	Ability to learn self and continuously.				
4.7	Apply models, scientific systems and tools effectively.				
5. Assessment Task Schedule for Students During the Semester					
	Assessment task (i.e., essay, test, quizzes, grou	р	Week Due	Proportion of Total	
	project, examination, speech, oral presentation, e	etc.)	Week Due	Assessment	
1	1 st Quiz.		7	10	
2	2 nd Quiz.		11	10	
3	1 st Homework (E-Learning).		4	10	
4	2 nd Homework (E-Learning).		8	10	
5	Research.		12	20	
6	Final written Examination.	_	16	40	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

Electron energy loss spectroscopy in the electron microscope, R.F. Egerton Springer press 3ed edition (2011).

Elastic and inelastic scattering in electron diffraction and imaging, Z.I wang, Plenum 1995 Transmission electron energy loss spectroscopy in materials science and the EELS atlas, ed. Channing C. Ahn, Wiley, 2004

Physical principles of electron microscopy, R.F. Egerton. Springer 2005

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Class room for 10 students.

2. Technology resources (AV, data show, Smart Board, software, etc.) The class room should be equipped with a pc and data-show.

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements
or attach list)
G. Course Evaluation and Improvement Procedures
1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
Questioners.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
Using course report.
3. Procedures for Teaching Development
Using course report.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an
independent member teaching staff of a sample of student's work, periodic exchange and
remarking of tests or a sample of assignments with staff members at another institution)
A random sample of students' assessments is corrected through the committee formed by
the department.
5. Describe the planning arrangements for periodically reviewing course effectiveness and
planning for developing it.
Review stakeholders and conduct periodic questioners.
Name of Course Instructor:
Signature: Date Completed:
Program Coordinator:
Signature: Date Received:

COURSE SPECIFICATIONS Form

Course Title: Fundamentals of nanoscale characterization Course Code: 23066201-2

College: Al-Jamoun University College Department: Physics A. Course Identification and General Information 1. Course title and code: Fundamentals of nanoscale characterization (23066201-2). 2. Credit hours: 2 credit hours. 3. Program(s) in which the course is offered: Nano physics Program, Al-Jamoum University College. (If general elective available in many programs indicate this rather than list programs) 4. Name of faculty member responsible for the course: 5. Level/year at which this course is offered: 3 ^{ed} Level. 6. Pre-requisites for this course (if any): Experimental techniques I structural characterization (23066101-2) many): 7. Co-requisites for this course (if any): - 8. Location if not on main campus: Al-Jamoum University College. 9. Mode of Instruction (mark all that apply): a. Traditional classroom a. Traditional and online) percentage? 70% percentage? a. Correspondence percentage? a. Correspondence percentage? a. Correspondence percentage? a. Correspondence percentage? a. Other: percentage? c. E-learning percentage?	Date : 2018 – 12 – 28	Institution: Umm Al-Qura University						
A. Course Identification and General Information 1. Course title and code: Fundamentals of nanoscale characterization (23066201-2). 2. Credit hours: 2 credit hours. 3. Program(s) in which the course is offered: Nano physics Program, AI-Jamoum University College. (If general elective available in many programs indicate this rather than list programs) 4. Name of faculty member responsible for the course: 5. Level/year at which this course is offered: 3 ^{ed} Level. 6. Pre-requisites for this course (if any): Experimental techniques I structural characterization (23066101-2) Experimental techniques II spectroscopies (23066103-2) 7. Co-requisites for this course (if any): - Experimental techniques I spectroscopies (23066103-2) 8. Location if not on main campus: AI-Jamoum University College. 9 9. Mode of Instruction (mark all that apply): a. Traditional classroom v percentage? 70% b. Blended (traditional and online) percentage? 30% d. Correspondence percentage? 30% e. Other: percentage? 0 comments: percentage? 0	College : Al-Jamoum University College	Department: Physics						
1. Course title and code: Fundamentals of nanoscale characterization (23066201-2). 2. Credit hours: 2 credit hours. 3. Program(s) in which the course is offered: Nano physics Program, Al-Jamoum University College. (If general elective available in many programs indicate this rather than list programs) 4. Name of faculty member responsible for the course: 5. Level/year at which this course is offered: 3 ^{ed} Level. 6. Pre-requisites for this course (if any): 7. Co-requisites for this course (if any): 8. Location if not on main campus: Al-Jamoum University College. 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ percentage? 70% b. Blended (traditional and online) percentage? 9. Other: percentage? 9. Other: percentage? 9. Other: percentage?	A. Course Identification and General Information							
2. Credit hours: 2 credit hours. 3. Program(s) in which the course is offered: Nano physics Program, Al-Jamoum University College. (If general elective available in many programs indicate this rather than list programs) 4. Name of faculty member responsible for the course: 5. Level/year at which this course is offered: 3 ^{ed} Level. 6. Pre-requisites for this course (if any): Experimental techniques I structural characterization (23066101-2) 7. Co-requisites for this course (if any): - Experimental techniques II spectroscopies (23066103-2) 7. Co-requisites for this course (if any): - Experimental techniques II spectroscopies (23066103-2) 8. Location if not on main campus: Al-Jamoum University College. 9 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ a. Traditional classroom ✓ percentage? 70% b. Blended (traditional and online) percentage? 30% 30% d. Correspondence percentage? 30% 9 e. Other: percentage? 0 0 0 e. Other: percentage? 0 0 0 0 0 e. Other: comments: 0 0 0 0 0 0 0 0 <	1. Course title and code: Fundamentals of	nanoscale characterization (23066201-2).						
 3. Program(s) in which the course is offered: Nano physics Program, Al-Jamoum University College. (If general elective available in many programs indicate this rather than list programs) 4. Name of faculty member responsible for the course: 5. Level/year at which this course is offered: 3^{ed} Level. 6. Pre-requisites for this course (if any): 2. Co-requisites for this course (if any): 8. Location if not on main campus: Al-Jamoum University College. 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ percentage? 70% b. Blended (traditional and online) c. E-learning d. Correspondence e. Other: c. Difference a. Difference b. Blended (traditional and online) c. Difference d. Correspondence 	2. Credit hours: 2 credit hours.							
(If general elective available in many programs indicate this rather than list programs) 4. Name of faculty member responsible for the course: 5. Level/year at which this course is offered: 3 ^{ed} Level. 6. Pre-requisites for this course (if any): Experimental techniques I structural characterization (23066101-2) Experimental techniques II spectroscopies (23066103-2) 7. Co-requisites for this course (if any): - 8. Location if not on main campus: Al-Jamoum University College. 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ percentage? 70% b. Blended (traditional and online) c. E-learning ✓ e. Other: percentage? generation e. Other: percentage? comments:	3. Program(s) in which the course is offered:	Nano physics Program, Al-Jamoum University College.						
4. Name of faculty member responsible for the course: 5. Level/year at which this course is offered: 3 ^{ed} Level. 6. Pre-requisites for this course (if any): Experimental techniques I structural characterization (23066101-2) Experimental techniques II spectroscopies (23066103-2) 7. Co-requisites for this course (if any): Experimental techniques II spectroscopies (23066103-2) 7. Co-requisites for this course (if any): Experimental techniques II spectroscopies (23066103-2) 8. Location if not on main campus: AI-Jamoum University College. 9 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ a. Traditional classroom ✓ percentage? 70% b. Blended (traditional and online) percentage? 30% 30% d. Correspondence percentage? 10%	(If general elective available in many program	ms indicate this rather than list programs)						
5. Level/year at which this course is offered: 3 ^{ed} Level. 6. Pre-requisites for this course (if any): Experimental techniques I structural characterization (23066101-2) 7. Co-requisites for this course (if any): Experimental techniques II spectroscopies (23066103-2) 7. Co-requisites for this course (if any): - 8. Location if not on main campus: Al-Jamoum University College. 9 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ a. Traditional classroom ✓ percentage? 70% b. Blended (traditional and online) percentage? 30% d. Correspondence percentage? 30% e. Other: percentage? comments: percentage?	4. Name of faculty member responsible for	the course:						
6. Pre-requisites for this course (if any): Experimental techniques I structural characterization (23066101-2) 7. Co-requisites for this course (if any): - Experimental techniques II spectroscopies (23066103-2) 7. Co-requisites for this course (if any): - Experimental techniques II spectroscopies (23066103-2) 7. Co-requisites for this course (if any): - Experimental techniques II spectroscopies (23066103-2) 7. Co-requisites for this course (if any): - Experimental techniques II spectroscopies (23066103-2) 8. Location if not on main campus: Al-Jamoum University College. 9 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ a. Traditional classroom ✓ percentage? 70% b. Blended (traditional and online) percentage? 30% c. E-learning ✓ percentage? 30% d. Correspondence percentage? e. Other: percentage? comments:	5. Level/year at which this course is offered	: 3 ^{ed} Level.						
any): Experimental techniques II spectroscopies (23066103-2) 7. Co-requisites for this course (if any): - 8. Location if not on main campus: Al-Jamoum University College. 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ a. Traditional classroom ✓ percentage? 70% b. Blended (traditional and online) percentage? 30% c. E-learning ✓ percentage? 30% d. Correspondence percentage? e. Other: percentage? comments:	6. Pre-requisites for this course (if	xperimental techniques I structural characterization						
7. Co-requisites for this course (if any): - 8. Location if not on main campus: Al-Jamoum University College. 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ b. Blended (traditional and online) percentage? c. E-learning ✓ d. Correspondence percentage? e. Other: percentage? c. Other: percentage?	any):	(23066101-2)						
7. Co-requisites for this course (if any): - 8. Location if not on main campus: Al-Jamoum University College. 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ b. Blended (traditional and online) percentage? c. E-learning ✓ d. Correspondence percentage? e. Other: percentage? comments: percentage?		xperimental techniques II spectroscopies (23066103-2)						
8. Location if not on main campus: AI-Jamoum University College. 9. Mode of Instruction (mark all that apply): a. Traditional classroom ✓ b. Blended (traditional and online) percentage? c. E-learning ✓ d. Correspondence percentage? e. Other: percentage? comments: percentage?	7. Co-requisites for this course (if any): -							
9. Mode of instruction (mark all that apply): a. Traditional classroom ✓ percentage? 70% b. Blended (traditional and online) percentage? c. E-learning ✓ percentage? 30% d. Correspondence percentage? e. Other: percentage? Comments:	8. Location if not on main campus: AI-Jamo	bum University College.						
a. Traditional classroom ✓ percentage? 70% b. Blended (traditional and online) percentage?	9. Mode of Instruction (mark all that apply):							
 b. Blended (traditional and online) c. E-learning d. Correspondence e. Other: c. Other: c. Dercentage? 	a. Iraditional classroom	✓ percentage? 70%						
b. Biended (traditional and online) percentage? c. E-learning ✓ percentage? d. Correspondence percentage?	h Dlanded (traditional and caline)							
c. E-learning ✓ percentage? 30% d. Correspondence	b. Biended (traditional and online)	percentage?						
c. E-learning v percentage? 30% d. Correspondence percentage?								
d. Correspondence percentage? e. Other: percentage? Comments: percentage?	c. E-learning	v percentage? 30%						
e. Other: percentage? Comments:	d Correspondence	nercentage?						
e. Other: percentage? Comments:								
Comments:	e. Other:	percentage?						
	Comments:							

B. Objectives

1. The main objective of this course

The aim of this course is that the student acquires the basic theoretical concepts that are behind the experimental techniques used to characterize solids and nanostructures. Concepts on elastic and inelastic scattering processes will be developed paying attention to the characteristics of the probes and the theoretical methods that are used to describe the interaction with the targets.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This module is scheduled for the third term of the first course of the master. The idea is that the student will have acquired the basic knowledges needed to follow this subject in the fundamental subjects that are taught in the first term of the master, such as "fundamentals of quantum mechanics", "classical electrodynamics" and "fundamental of solid state physics". In addition, this module is complementary to the subjects that are also given in this first term of the master "experimental techniques 1" and "experimental techniques 2".

1. I opics	to be Cover	red						
List of Topics				No. of	Contact			
							hours	
Elastic scattering and diffraction								
Elastic sc	Elastic scattering of light with matter							
Static str	Static structure factor and pair distribution function						4	
Diffractio	on in cryst	alline solids	5			2	-	
Elastic sc	cattering of	f electrons v	with matter					
Elastic sc	cattering of	f neutrons v	with matter					
Inelastic	scattering.	Dynamic s	tructure fact	or and time cor	relation	1	2	
Density-o	density res	ponse funct	tion			2	4	
Non inter	racting fer	mi gas.				2		
The char	ged fermi l	liquid and t	he dielectric	function		r	1	
Random	phase app	roximation.	Plasmons.			Z	4	
Green fu	nctions (c	lassical, on	e-body Schi	rödinger equation	on, single-			
particle f	or many b	ody)	2	4				
Lehman	representa	ation. The	spectral fu	nction. Broade	ning (line	2	4	
width)								
Measurin	leasuring the spectral function with scanning tunneling							
spectrosc	opy.					2	4	
Two-part	icle correl	ation functi	ons (respons	se functions)				
Inelastic electrons tunneling spectroscopy						2	4	
Angle res	solved pho	otoemission	spectroscop	У		2	4	
Two pho	ton photoe	emission spe	ectroscopy (2	2ppe)				
Vibration	nal spectro	scopies: inf	rared and Ra	aman.		2	4	
X-ray absorption spectroscopy.								
2. Cours	e compon	ents (total	contact and	credit hours p	er semester):		
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total	
Contact	Planned	30					30	
Hours	Actual	30					30	
Cradit	Planned	1					2	
Credit	Credit Actual 1 2							
3. Individual study/learning hours expected for students per week.								

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

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 targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

	Curriculum Map		
Code	NQF Learning Domains	Course Teaching	Course Assessment
#	And Course Learning Outcomes	Strategies	Methods
1.0	Knowledge		1
1.3	The process and mechanisms supporting the structure		
1.0	and function are specific topics.		
1.4	Related terminology, numbering and classification		
1.6	systems.		
1.0	Cognitive Skills		
2.0	Analyzing evaluating and interpreting relevant		
2.2	qualitative and quantitative scientific data.		
	Develop the argument and divorce the appropriate		
2.3	judgments according to scientific theories and		
	concepts.		
3.0	Interpersonal Skills & Responsibility		
32	Application of techniques and tools related to		
5.2	scientific ethics.		
4.0	Communication, Information Technology, Numerical		I
4 1	Use information and communication technology		
	effectively		
43	Think independently, assign tasks and solve		
	problems on a scientific basis.		
4.5	Taking into account societal problems associated with		
	customs, traditions and ethics.		
4.6	Ability to learn self and continuously.		
4.7	Apply models, scientific systems and tools effectively.		
5. Ass	sessment Task Schedule for Students During the Semes	ter	
	Assessment task (i.e., essay, test, quizzes, group	. Week Due	Proportion of Total
	project, examination, speech, oral presentation, etc.	.)	Assessment
1	1 st Quiz.	7	10
2	2 nd Quiz.	11	10
3	1 st Homework (E-Learning).	4	10
4	2 nd Homework (E-Learning).	8	10
5	Research.	12	20
6	Final written Examination.	16	40
D. St	tudent Academic Counseling and Support		

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

"X-ray diffraction" by b. E. Warren dover publications, 1990.

"Diffraction physics" by j. M. Cowley north-holland physics publishers, 3ed ed (1995).

"Transmission electron microscopy and diffractometry of materials" by b. Fultz and j. M. Howe springer,4th edition (2013).

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

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

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

F. Facilities Required

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

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Class room for 10 students.

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

The class room should be equipped with a pc and data-show.

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

G. Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

Questioners.

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department Using course report.

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

A random sample of students' assessments is corrected through the committee formed by the department.

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

Review stakeholders and conduct periodic questioners.

Name of Course Instructor: ____

Signature: _____ Date Completed: _____

Program Coordinator: ______

Signature:		
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Date Received: _____

COURSE SPECIFICATIONS Form

Course Title: Low dimensional systems and nanostructures Course Code: 23066203-2

Date : 2018 – 12 – 28	Institution	: Umm Al-Qura	University				
College: Al-Jamoum University College	Departme	nt: Physics					
A. Course Identification and General Information							
1. Course title and code: Low dimensional systems and nanostructures (23066203-2).							
2. Credit hours: 2 credit hours.							
3. Program(s) in which the course is offered: N	Nano physics	Program, Al-Jai	noum University College.				
(If general elective available in many program	s indicate this	s rather than list _l	programs)				
4. Name of faculty member responsible for the	ne course:						
5. Level/year at which this course is offered:	3 ^{ed} Level.						
6. Pre-requisites for this course (if any): Fund	lamentals of	solid state physic	cs (23066106-2)				
7. Co-requisites for this course (if any): -							
8. Location if not on main campus: Al-Jamou	ım Universit	y College.					
9. Mode of Instruction (mark all that apply):							
a. Traditional classroom	\checkmark	percentage?	70%				
b. Blended (traditional and online)		percentage?					
c. E-learning	\checkmark	percentage?	30%				
d. Correspondence		percentage?					
e. Other:		percentage?					
Comments:		_					

B. Objectives

1. The main objective of this course

This course is intended to provide a general introduction to the most important nanostructures in nanoscience and nanotechnology, attending to their dimensionality (2d, 1d and od). The most important phenomena emerging in low dimensional systems will be described. Finally special attention will be paid to carbon and other inorganic nanostructures, which exist in all dimensions (diamond, graphite, nanotubes, fullerenes).

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

In this context, the module focus on the connection of current research activities in nanoscience to their potential technological application.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

Some exercises will be solved with the aid of the computer. The rest of the time will be devoted to the personal work of the student and will be distributed among study of the

theory	theory, solving exercises, bibliographic search and preparing an essay and its oral									
presen	presentation. This course is a continuation of fundamentals of solid state?									
1. Topi	1. Topics to be Covered									
								No. o	of	Contact
			LIST	t of lopics				Week	s	hours
Length	n scales a	nd l	ow dimensi	ionality				1		2
Electro	onic state	s an	d quantum	confined sy	stems			2		4
One di	imensior	al s	ystems: qua	antum wires	, the pearls	trar	sition and	2		4
quantu	ım transp	ort.						-		•
Two d	limensio	nal	systems: su	irfaces and	heterojunct	ions	, quantum	2		4
wells a	and supe	latti	ces.							
Two d	imensio	al s	ystems: qua	intum hall e	ffect.			2		4
Zero	dimensio	onal	systems:	quantum c	lots and r	neta	clusters.	2		4
Electro	onic and	opti	cal properti	es.						
Zero d	limensio	nal	systems: C	oulomb blo	ckade and	sing	e electron	2		4
device	S.		• •		6 11		1 1			
Carboi	n and ot	her	inorganic r	nanostructur	es: fulleren	les a	nd carbon	2		4
nanotubes.										
2. COL	irse com	pon	ents (total	contact and	credit nou	rs p	er semester):		
			Lecture	Tutorial	Studio	r y/	Practical	Othe	er	Total
Contac	t Plan	ed	30							30
Hours	Actu	al	30							30
Credit	Plan	ed	1							2
	Acti	al	1							2
3. Indi	3. Individual study/learning hours expected for students per week.									
4. Cour	rse Learn	ng C	outcomes in	NQF Domain	s of Learnin	g and	d Alignment	with Asse	ssmer	nt Methods
and 1	Feaching	Strat	tegies							
On the	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). <u>Second</u> , insert supporting teaching strategies that fit and										
align with the assessment methods and targeted learning outcomes. <u>Third</u> , insert appropriate										
assessment method, and teaching strategy should fit in together with the rest to form an										
integrated learning and teaching process (Courses are not required to include learning outcomes from										
each domain.)										
Curriculum Map										
Code			NQF Learnin	g Domains			Course Teachi	ng C	Course	Assessment
#	Knowled	And	a Course Lear	ning Outcome	2S		Strategies		M	ethods
1.0	The proc	ess a	nd mechanisn	ns supporting	the structure					
1.3 and function are specific topics.										

1.4	Related terminology, numbering and classification systems.							
1.6	Knowledge development related to the program.							
2.0	Cognitive Skills							
2.2	Analyzing, evaluating and interpreting relevant qualitative and quantitative scientific data.							
2.3	Develop the argument and divorce the appropriate judgments according to scientific theories and concepts.							
3.0	Interpersonal Skills & Responsibility							
3.2	Application of techniques and tools related to scientific ethics.							
4.0	Communication, Information Technology, Numerical							
11	Use information and communication technology							
4.1	effectively							
43	Think independently, assign tasks and solve							
7.5	problems on a scientific basis.							
4.5	Taking into account societal problems associated with							
1.0	customs, traditions and ethics.							
4.6	Ability to learn self and continuously.							
4.7	Appry models, scientific systems and tools effectively.	octor						
5. ASS	Assessment Task Schedule for Students During the Seme	ester		Descention of Total				
	Assessment task (I.e., essay, test, quizzes, group		Week Due	Proportion of Total				
- 1	project, examination, speech, oral presentation, et	.c.)	7	Assessment				
1	1 st Quiz.		/	10				
2	2 nd Quiz.		11	10				
3	1 st Homework (E-Learning).		4	10				
4	2 nd Homework (E-Learning).		8	10				
5	Research.	12	20					
6	Final written Examination.		16	40				
D. St	tudent Academic Counseling and Support							
1 Δ	1 Arrangements for availability of faculty and teaching staff for individual student							
	litations and acadomic counsoling (include the t	-imo +	aching staff	are expected to be				
Const	anations and academic counseling. (include the t	inte ti	caching stall	are expected to be				

available per week)

Academic advising hours for guidance are included in the faculty member schedule of 4 hours per week.

E. Learning Resources

1. List Required Textbooks

"The Physics and Chemistry of Solids", Stephen Elliot, Wiley, 2000.

- "Introduction to Modern Solid State Physics", Y. M. Galperin, (2014)

-"Introduction to Solid State Physics", Charles Kittel, 8th edition, Wiley, 2005.

"The Physics of low dimensional semiconductors", J.H. Davies, Cambridge Univ. Press, 1998.

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

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

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

F. Facilities Required
Indicate requirements for the course including size of classrooms and laboratories (i.e. number
of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
Class room for 10 students.
2. Technology resources (AV, data show, Smart Board, software, etc.)
The class room should be equipped with a pc and data-show.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements

or attach list)

G. Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **Ouestioners.**

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department Using course report.

3. Procedures for Teaching Development

Using course report.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) A random sample of students' assessments is corrected through the committee formed by the department.

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

Review stakeholders and conduct periodic questioners.

Name of Course Instructor:

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____

Date Received: