



હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી

NAAC A (3.02) State University

પો.બો.નં.-૨૧, યુનિવર્સિટી રોડ, પાટણ (ઉ.ગુ.) ૩૮૪૨૬૫

ફોન:(૦૨૭૬૬) ૨૩૭૦૦૦

ફેક્સ : (૦૨૭૬૬) ૨૩૧૯૧૭

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પરિપત્ર ક્રમાંક - ૨૨૫ / ૨૦૧૯

વિષય :- એમ.એસસી.- ફીઝીક્સ વિષયના ઈલેક્ટીવ પેપરનાં અભ્યાસક્રમમાં ફેરફાર અંગે...

આ યુનિવર્સિટીના એમ.એસસી- ફીઝીક્સ વિભાગના કો. ઓર્ડીનેટરશ્રીને તથા સંલગ્ન સાયંસ કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, વિજ્ઞાન વિદ્યાશાખામાં એમ.એસસી - ફીઝીક્સ વિષયના ઈલેક્ટીવ પેપરનાં બે ક્રેડીટ વેઈટેજ ધરાવતા વિષયમાં ૫૦ ગુણનું વિભાજન ૩૫ ગુણ યુનિવર્સિટી પરીક્ષાના અને ૧૫ ગુણ આંતરીક પરીક્ષાના તે મુજબનાં ફેરફાર કરી અભ્યાસ સમિતિના ચેરમેનશ્રીએ રજૂ કરેલ સામેલ પરિશિષ્ટ મુજબનો સુધારેલ અભ્યાસક્રમ જૂન-૨૦૧૯ થી ક્રમશઃ અમલમાં આવે તે રીતે એકેડેમિક કાઉન્સિલવતી માન.કુલપતિશ્રીએ મંજૂર કરેલ છે. જેનો અમલ થવા સારૂ સંબંધિતોને આથી આ સાથે મોકલવામાં આવે છે.

આ બાબતની સંબંધિતોને આપના સ્તરેથી જાણ કરવા વિનંતી છે.

નોંધ: (૧) વિદ્યાર્થીઓની જરૂરીયાત માટે પરિપત્રની એક નકલ વિભાગ / કોલેજોના ગ્રંથાલયમાં મૂકવાની રહેશે.

(૨) આ પરિપત્ર યુનિવર્સિટીની વેબ સાઈટ www.ngu.ac.in પર પણ ઉપલબ્ધ કરાવવામાં આવનાર છે.

બિડાણ : ઉપર મુજબ

નં.-એ કે/અ સ/૬૨૫૪ / ૨૦૧૯

તારીખ: ૦૬ / ૧૦ / ૨૦૧૯

પ્રતિ

૧. અધ્યક્ષશ્રી/ કો.ઓર્ડીનેટરશ્રી-વિજ્ઞાન વિદ્યાશાખા અંતર્ગત વિષયોના અનુસ્નાતક વિભાગો, હેમ. ઉ.ગુ. યુનિવર્સિટી, પાટણ.
૨. સંલગ્ન સાયંસ કોલેજોના આચાર્યશ્રીઓ
૩. ડૉ. એમ. બી. પ્રજાપતિ (ડીનશ્રી), ગણિતશાસ્ત્ર ભવન, હેમ. ઉ.ગુ. યુનિવર્સિટી, પાટણ.
૪. પરીક્ષા નિયામકશ્રી, હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (બે નકલ)
૫. ગ્રંથપાલશ્રી, હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (વિદ્યાર્થીઓના ઉપયોગ સારૂ રેકર્ડ ફાઈલ માટે)
૬. સિસ્ટમ એનાલીસ્ટશ્રી, કોમ્પ્યુટર (રીઝલ્ટ) સેન્ટર, હેમ.ઉ.ગુ.યુનિવર્સિટી, પાટણ. તરફ પરિણામ માટે તથા વેબસાઈટ પર મૂકવા સારૂ.
૭. મુખ્ય હિસાબી અધિકારીશ્રી (મહેકમ), હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ તરફ → પરિપત્રની ફાઈલ અર્થે
૮. સિલેક્ટ ફાઈલે. (૨ નકલ)



હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી

NAAC A (3.02) State University

પો.બો.નં.-૨૧, યુનિવર્સિટી રોડ, પાટણ (ઉ.ગુ.) ૩૮૪૨૬૫

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પરિપત્ર ક્રમાંક - ૪૪/૨૦૧૯

વિષય: વિજ્ઞાન વિદ્યાશાખાના અનુસ્નાતક કક્ષાના સેમેસ્ટર-૧ થી સેમેસ્ટર-૪ સુધીના નવા અભ્યાસક્રમોનું માળખું તેમજ નવા અભ્યાસક્રમ અંગે...

આ યુનિવર્સિટીના વિજ્ઞાન વિદ્યાશાખા અંતર્ગત વિષયોના અનુસ્નાતક વિભાગો તથા સંલગ્ન વિજ્ઞાન વિદ્યાશાખાની તમામ કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, એકેડેમીક કાઉન્સિલ ની તા. ૫/૬/૨૦૧૯ ની સભા ના નિર્દિષ્ટ ઠરાવો અન્વયે UGC ની Model curriculum અંગેની Guideline સંદર્ભે વિજ્ઞાન વિદ્યાશાખા હેઠળના નીચેના વિષયોના અનુસ્નાતક કક્ષાના સામેલ પરિશિષ્ટ પ્રમાણેના નવા અભ્યાસક્રમનું માળખું તેમજ અભ્યાસક્રમો **શૈક્ષણિક વર્ષ: ૨૦૧૯-૨૦ થી ક્રમશઃ અમલ માં આવે તે રીતે** મંજૂર કરેલ છે. જેનો અમલ કરવા સારૂ સંબંધિતોને આ સાથે મોકલવામાં આવે છે.

ક્રમ નં.	અભ્યાસક્રમ	એકેડેમીક કાઉન્સિલની તારીખ: ૦૫/૦૬/૨૦૧૯ના ઠરાવ ક્રમાંક	સેમેસ્ટર
૧	અભ્યાસક્રમો નું માળખું	૦૭	તમામ સેમેસ્ટર
૨	રસાયણશાસ્ત્ર	૪૪	સેમ.-૧ થી સેમ.-૨
૩	પ્રાણીશાસ્ત્ર	૪૫	સેમ.-૧ થી સેમ.-૪
૪	બાયોટેકનોલોજી	૪૬	સેમ.-૧ થી સેમ.-૪
૫	ગણિતશાસ્ત્ર	૪૭	સેમ.-૧ થી સેમ.-૪
૬	એમ.એસ.સી. ઈલેક્ટ્રોનિક્સ	૪૯	સેમ.-૧ થી સેમ.-૪
૭	ભૌતિકશાસ્ત્ર	૫૦	સેમ.-૧ થી સેમ.-૪

આ બાબતની સંબંધિત અધ્યાપકો તથા વિદ્યાર્થીઓને આપના સ્તરેથી જાણ કરવા વિનંતી છે.

નોંધ :- (૧) વિદ્યાર્થીઓની જરૂરીયાત માટે પરિપત્રની એક નકલ કોલેજના ગ્રંથાલયમાં મૂકવાની રહેશે.

(૨) આ અભ્યાસક્રમ / સ્કીમ યુનિવર્સિટીની વેબ સાઈટ www.ngu.ac.in પર પણ ઉપલબ્ધ કરાવવામાં આવનાર છે.

બિડાણ : ઉપર મુજબ

સહી/-
કુલસચિવવતી

નં.-એ કે / અ× સ / ૧૦૧૬૩ / ૨૦૧૯

તારીખ : ૧૪ / ૦૩ / ૨૦૧૯

પ્રતિ,

૧. અધ્યક્ષશ્રી/ કો.ઓર્ડીનેટરશ્રી-વિજ્ઞાન વિદ્યાશાખા અંતર્ગત વિષયોના અનુસ્નાતક વિભાગો, હેમ. ઉ.ગુ. યુનિવર્સિટી, પાટણ.

૨. સંલગ્ન સાયન્સ કોલેજોના આચાર્યશ્રીઓ

૩. ડૉ. એમ. બી. પ્રજાપતિ (ડીનશ્રી), ગણિતશાસ્ત્ર ભવન, હેમ. ઉ.ગુ. યુનિવર્સિટી, પાટણ.

૪. પરીક્ષા નિયામકશ્રી, હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (પાંચ નકલ)

૫. ગ્રંથપાલશ્રી, હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (વિદ્યાર્થીઓના ઉપયોગ સારૂ રેકર્ડ ફાઈલ માટે)

૬. સિસ્ટમ એનાલીસ્ટશ્રી, કોમ્પ્યુટર (રીઝલ્ટ) સેન્ટર, હેમ.ઉ.ગુ.યુનિવર્સિટી, પાટણ. તરફ પરિણામ માટે તથા વેબસાઈટ પર મૂકવા સારૂ.

૭. માન.કુલપતિશ્રી/ કુલસચિવશ્રીનું કાર્યાલય, હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ.

૮. અનુસ્નાતક પ્રશાખા (એકેડેમીક શાખા) હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ.

૯. મુખ્ય હિસાબી અધિકારીશ્રી (મહેકમ), હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ તરફ → પરિપત્રની ફાઈલ અર્થે

૧૦. સિલેક્ટ ફાઈલે. (૨ નકલ)

**HEMCHANDRACHARYA NORTH GUJARAT
UNIVERSITY, PATAN**

M.Sc. (Physics) CBCS Syllabus 2019

Document code	SYLLABUS MSPHY2019
Revision No.	00
Name of Faculty	SCIENCE
Faculty Code	SC
Program Name	MASTER OF SCIENCE (PHYSICS)
Program Code	MSPHY
Effective from	June 2019

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

The proposed New Course in M.Sc. PHYSI CS PROGRAM is based on Choice Based Credit System (CBCS) which is in force from June-2019.

CBCS Course Pattern

1. This Program is divided into four Semesters (Two Years). The duration of an academic year consists of two semesters, each of 15 weeks for teaching. The academic session in each semester will provide 90 teaching days. 24 credit each semester X 4 semester = 96 credits at master level.
2. There will be three categories of courses/papers in this Program:
 - A. FOUR Compulsory-Core theory courses with 4 credits each in first three semesters and Three Compulsory-Core theory courses with 4 credits each in Semester IV.
 - B. One Choice Based Elective Course (disciplinary/interdisciplinary) with 2 credits in First Three semesters.
 - C. One Practical course (PR) with 6 credits in first three semesters.
 - D. In Semester IV, instead of practical there is a project/field work with 12 - credits.
3. Detailed Course Pattern for each Semester is given below.

The Proposed New Structure for M.Sc. Course is based on choice Based Credit System (CBCS) which is in force from June – 2019.

M.Sc.: Semester – I

Course	Name of the Course	Exam. Duration (Hours)	Ext. Marks	Int. Marks	Total Marks	Teach, Hours Per week	Credit point
Paper – I	Core-I	2 : 30	70	30	100	4	4
Paper – II	Core-II	2 : 30	70	30	100	4	4
Paper – III	Core-III	2 : 30	70	30	100	4	4
Paper – IV	Core-IV	2 : 30	70	30	100	4	4
Practical : Paper – I	Pract-I	3	75	--	75	6	3
Practical : Paper – II	Pract-II	3	75	--	75	6	3
Elective Course (Any One) Disciplinary/ Interdisciplinary		2 : 00	35	15	50	2	2
TOTAL			465	135	600	30	24

M.Sc.: Semester – II

Course	Name of the Course	Exam. Duration (Hours)	Ext. Marks	Int. Marks	Total Marks	Teach, Hours Per week	Credit point
Paper – V	Core-V	2 : 30	70	30	100	4	4
Paper – VI	Core-VI	2 : 30	70	30	100	4	4
Paper – VII	Core-VII	2 : 30	70	30	100	4	4
Paper – VIII	Core-VIII	2 : 30	70	30	100	4	4
Practical : Paper – III	Pract-III	3	75	--	75	6	3
Practical : Paper – IV	Pract-IV	3	75	--	75	6	3
Elective Course (Any One) Disciplinary / Interdisciplinary		2 : 00	35	15	50	2	2
TOTAL			465	135	600	30	24

M.Sc.: Semester – III

Course	Name of the Course	Exam. Duration (Hours)	Ext. Marks	Int. Marks	Total Marks	Teach, Hours Per week	Credit point
Paper – IX	Core-IX	2 : 30	70	30	100	4	4
Paper – X	Core-X	2 : 30	70	30	100	4	4
Paper – XI	Core-XI	2 : 30	70	30	100	4	4
Paper – XII	Pract-XII	2 : 30	70	30	100	4	4
Practical : Paper – V	Pract-V	3	75	--	75	6	3
Practical : Paper – VI	Pract-VI	3	75	–	75	6	3
Elective Course (Any One) Disciplinary / Interdisciplinary		2 : 00	35	15	50	2	2
TOTAL			465	135	600	30	24

M.Sc.: Semester – IV

Course	Name of the Course	Exam. Duration (Hours)	Ext. Marks	Int. Marks	Total Marks	Teach, Hours Per week	Credit point
Paper – XIII	Core-X	2 : 30	70	30	100	4	4
Paper – IX	Core-XI	2 : 30	70	30	100	4	4
Paper – XV	Core-XII	2 : 30	70	30	100	4	4
Project	PROJECT	4	210	90	300	18	12
TOTAL			420	180	600	30	24

NOTE:

1. For 4 credit course: Each syllabus is of 4 Units having equal weightage.
2. For 2 credit course: Each syllabus is of 2 Units having equal weightage.
3. There is no section in semester end examinations i.e. questions Paper is without sections.
4. For question paper of 70 marks: Each Question paper contains 4 questions: Q-1 from unit-I of 18 marks, Q-2 from unit-II of 17 marks, Q-3 from unit-III of 18 marks and Q-4 from unit – IV of 17 marks.
5. For question paper of 35 marks: Each Question paper contains 3 questions: Q-1 from unit-I of 12 marks, Q-2 from unit-II of 12 marks, and last Q-3 is of short questions and objective types having 11 marks from unit I and unit II.

Sem	Paper Code	Paper Type	Paper Name	Marking scheme				Credit	Total	Remarks
				External		Internal				
				The	Pra	The	Pra			
1	MSPHY101CC	CC	MATHEMATICAL PHYSICS-1 AND "C" PROGRAMMING-1	70		30		4	100	
1	MSPHY102CC	CC	CLASSICAL MECHANICS-1 AND ELECTRODYNAMICS-1	70		30		4	100	
1	MSPHY103CC	CC	QUANTUM MECHANICS-1 AND SOLID STATE PHYSICS-1	70		30		4	100	
1	MSPHY104CC	CC	ELECTRONICS-1	70		30		4	100	
1		PRACT			150			6	150	
1	MSPHY101ES	ES	SPACE PHYSICS	35		15		2	50	Any one from Two ES PAPER
1	MSPHY102ES	ES	ENERGY TECHNOLOGY AND STORAGE SYSTEMS (ETS)	35		15		2	50	

Sem	Paper Code	Paper Type	Paper Name	Marking scheme				Credit	Total	Remarks
				External		Internal				
				The	Pra	The	Pra			
2	MSPHY201ES	CC	MATHEMATICAL PHYSICS-2 AND "C" PROGRAMMING-2	70		30		4	100	
2	MSPHY202CC	CC	STATISTICAL MECHANICS-1 COMPUTER-1	70		30		4	100	
2	MSPHY203CC	CC	QUANTUM MECHANICS-2 AND SOLID STATE PHYSICS-2	70		30		4	100	
2	MSPHY204CC	CC	ELECTRONICS-2	70		30		4	100	
2		PRACT			150			6		
2	MSPHY201ES	ES	APPLICATION OF COMPUTER IN PHYSICS	35		15		2	50	Any one from Two ES PAPER
2	MSPHY201ES	ES	SYNTHESIS OF MATERIALS	35		15		2	50	

Sem	Paper Code	Paper Type	Paper Name	Marking scheme				Credit	Total	Remarks
				External		Internal				
				The	Pra	The	Pra			
3	MSPHY301CC	CC	NUCLEAR PHYSICS-1 INSTRUMENTS	70		30		4	100	
3	MSPHY302CC	CC	STATISTICAL MECHANICS-2 COMPUTOR-2	70		30		4	100	
3	MSPHY303CC	CC	QUANTUM MECHANICS-3 SOLID STATE PHYSICS-3,	70		30		4	100	
3	MSPHY304CC	CC	ELECTRONICS-3	70		30		4	100	
3		PRACT			150			6	150	
3	MSPHY301ES	ES	RESEARCH METHODOLOGY	35		15		2	50	Any one from Two ES PAPER
3	MSPHY301 ES	ES	MICROCONTROLLER	35		15		2	50	

Sem	Paper Code	Paper Type	Paper Name	Marking scheme				Credit	Total	Remarks
				External		Internal				
				The	Pra	The	Pra			
4	MSPHY401CC	CC	NUCLEAR PHYSICS-2 BIO- PHYSICS	70		30		4	100	
4	MSPHY402CC	CC	CLASSICAL MECHANICS-2 ELECTRODYNEMICS-2	70		30		4	100	
4	MSPHY403CC	CC	QUANTUM MECHANICS-4 SOLID STATE PHYSICS-4,	70		30		4	100	
4		PR		210		90		12	300	

PATTERN/SCHEME OF EXAMINATION

There will be examinations at the end of each semester ordinarily during November / December for odd semesters and during April/May for even semesters.

Theory Examinations:

Out of the total marks for each course/paper maximum 30% marks shall be earmarked for Internal Exam. (Through continuous internal evaluation process) and remaining 70% for External Exam. (Through semester-end examinations).

There will be one semester-end examination of two hours and thirty minutes duration for core theory papers and two hours for elective papers. Each answer script of semester end examination (theory) will be evaluated by internal as well as external examiner.

The passing marks in each paper shall be 40%.

PRACTICAL EXAMINATION:

In the case of science faculty, there will be a practical examination at the end of every semester. There will be **TWO** Practical (one from each groups) (75Marks each for Sem.-I to Sem.-III) in the Exam. The passing marks for practical will be 40%. The practical examinations shall be conducted with one internal and one external examiner.

In 4th Semester one minor project work there will be of 300 marks. Assessment method is given below.

Project Report (70 Marks): Aims & Objectives-Clearly stated and achieved? Layout, Writing style, quality of Figures, Tables, Proper organization of work etc. Use of Lib./Int./Ref.: Literature review, survey, referencing etc

Presentation (70 Marks): Way of presentation, quality of presentation, Language, clarity of speech, Method of analysis, conclusion and Recommendations, Discussion of work etc.

Viva-Voce (70 Marks): ability to answer queries and question.

There will be no internal assessment test for practical, and Elective courses in first three semester but in fourth semester there will be internal assessment for Project work .

INTERNAL ASSESSMENT

For each paper/course in a semester there will be Continuous internal evaluation process which includes

- Unit Test / Internal Test
- MCQ Test / QUIZ Test/Viva
- Seminar/ Poster Presentation/ Assignment work/Workshop
- Attendance - Regularity & Study Tour
- Library work -Book Review

STRUCTURE OF THE PAPER IN EXAMINATION

For Core Courses (Disciplinary/Interdisciplinary):

There will be total four questions. First question will be from Unit - I, Second question from Unit-II, Third question from Unit-III, and fourth question will be from Unit -4. All the questions are detailed as under. (Total 70 Marks and 2 Hours thirty minutes time for the Paper)

1	(a) Answer the following. (Any one out of two) (Theory questions)	8 Marks
1	(b) Answer the following. (Any two out of three) (application/ Problem/ example type)	8 Marks
1	(c) Answer the following. (Any one out of two or Any Two out of three) (Short answer questions / objective type questions)	2 Marks
2	(a) Answer the following. (Any one out of two) (Theory questions)	7 Marks
2	(b) Answer the following. (Any two out of three) (application/ Problem/ example type)	8 Marks
2	(c) Answer the following. (Any one out of two or Any Two out of three) (Short answer questions / objective type questions)	2 Marks
3	(a) Answer the following. (Any one out of two) (Theory questions)	8 Marks
3	(b) Answer the following. (Any two out of three) (application/ Problem/ example type)	8 Marks
3	(c) Answer the following. (Any one out of two or Any Two out of three) (Short answer questions / objective type questions)	2 Marks
4	(a) Answer the following. (Any one out of two) (Theory questions)	7 Marks
4	(b) Answer the following. (Any two out of three) (application/ Problem/ example type)	8 Marks
4	(c) Answer the following. (Any one out of two or Any Two out of three) (Short answer questions / objective type questions)	2 Marks

For Elective Courses (Disciplinary/Interdisciplinary):

There will be three questions first and second questions are of 12 marks each and third question is of 11marks. First question will be from Unit - I, Second question from Unit-II, Third question will be from both Units. All the questions are detailed as under. (Total 35 Marks and 2 Hours' time for the Paper)

1	(a) Answer the following (Any one out of two) (Theory questions)	6 Marks
	(b) Answer the following (Any two out of three) (short note/ application/ Problem/ example type)	6 Marks
2	(a) Answer the following (Any one out of two) (Theory questions)	6 Marks
	(b) Answer the following (Any two out of three) (short note/ application/ Problem/ example type)	6 Marks
3	(a) Answer any three out of five.(Short question)	6 Marks
	(b) Answer any five out of eight.(objective)	5 Marks

DETAILED CURRICULMSUMMARY IS GIVENIN FOLLOWING TABLE.

SEM	PAPER CODE	PAPER NAME	UNIT	TITLE OF UNIT
I	MSPHY-101CC	MATHEMATICAL PHYSICS -1 AND PROGRAMMING IN C-1	I	FUNCTION OF A COMPLEX VARIABLE
			II	INTEGRALTRANSFORMS
			III	DECISION MAKING AND LOOPING & ARRAYS
			IV	CHARACTER ARRAYS AND STRINGS &FUNCTIONS
I	MSPHY-102CC	CLASSICAL MECHANICS-1 ELECTRODYNAMICS -1	I	CANONICAL TRANSFORMATION
			II	SMALL OSCILLATION AND ROTATING FRAME
			III	ELECTOMAGNETIC WAVES
			IV	POYNTING VECTOR AND THE FLOW OF POWER&GUIDED WAVES:
I	MSPHY-103CC	QUANTUM MECHANICS – ISOLID STATE PHYSICS-I	I	REPRESENTATION OF QUANTUM STATES
			II	ANGULAR MOMENTUM
			III	ENERGY BANDS
			IV	SEMICONDUCTOR CRYSTALS
I	MSPHY-104CC	ELECTRONICS-1	I	FETAMPLIFIER&MULTIVIBRATORS
			II	POWER AMPLIFIER
			III	WAVE SHAPING CIRCUIT
			IV	IC FABRICATION & TIMER 555 IC
I	MSPHY-101ES	SPACE PHYSICS	I	BASIC CONCEPTS OF EARTH’S ATMOSPHERE AND IONOSPHERE
			II	AURORA , AIRGLOW, AND MAGNETOSPHERE
I	MSPHY-102ES	ENERGY TECHNOLOGY AND STORAGE SYSTEMS	I	ENERGY TECHNOLOGY
			II	ENERGY STORAGE SYSTEMS

SEM	PAPER CODE	PAPER NAME	UNIT	TITLE OF UNIT
II	MSPHY-201CC	MATHEMATICAL PHYSICS -2 AND PROGRAMMING IN C-2	I	TENSOR ANALYSIS
			II	GROUP THEORY
			III	STRUCTURES AND UNIONS & POINTER
			IV	FILE MANAGEMENT IN C:&DEVELOPING A C PROGRAM
II	MSPHY-202CC	STATISTICAL MECHANICS-1 COMPUTER-1	I	BASIC CONCEPT IN STATISTICAL MECHANICS AND QUANTUM STATISTICS
			II	IDEAL BOSE AND FERMI SYSTEM
			III	WINDOWS AND POWER POINT
			IV	MICRO-SOFT WORD
II	MSPHY-203CC	QUANTUM MECHANICS–2 SOLID STATE PHYSICS-2	I	APPROXIMATION METHODS FOR STATIONARY STATES:
			II	EVOLUTION WITH TIME
			III	FERMI SURFACES AND METALS
			IV	DIAMAGNETISM AND PARAMAGNETISM
II	MSPHY-204CC	ELECTRONICS-2	I	OPERATIONAL AMPLIFIER
			II	DIGITAL ELECTRONICS
			III	MICROPROCESSOR – I
			IV	MICROPROCESSOR –II
II	MSPHY-201ES	APPLICATIONS OF COMPUTER IN PHYSICS	I	
			II	
II	MSPHY-202ES	SYNTHESIS OF MATERIAL	I	
			II	

SEM	PAPER CODE	PAPER NAME	UNIT	TITLE OF UNIT
III	MSPHY-301CC	NUCLEAR PHYSICS-1 AND INSTRUMENTS	I	TWO BODY FORCES
			II	NUCLEAR REACTION
			III	MICROSCOPY
			IV	UV-VIS
III	MSPHY-302CC	STATISTICAL MECHANICS-2 COMPUTER-2	I	PHASE EQUILIBRIA
			II	TRANSPORT PHENOMENA
			III	MICRO-SOFT EXCEL
			IV	COMPUTER NETWORK,INTERNET AND VIRUS
III	MSPHY-303CC	QUANTUM MECHANICS-3 SOLID STATE PHYSICS-3	I	SCATTERING THEORY
			II	PARTIAL WAVE ANALYSIS
			III	FERROMAGNETISM AND ANTI FERROMAGNETISM
			IV	MAGNETIC RESONANCE
III	MSPHY-304CC	ELECTRONICS	I	PULSE MODULATION AND DIGITAL COMMUNICATION
			II	DEMODULATION
			III	REMOTE SENSING
			IV	POWER ELECTRONICS
III	MSPHY-301ES	RESEARCH METHODOLOGY	I	
			II	
III	MSPHY-302ES	MICROCONTROLLER	I	
			II	

SEM	PAPER CODE	PAPER NAME	UNIT	TITLE OF UNIT
IV	MSPHY-401CC	NUCLEAR PHYSICS-2 AND BIO-PHYSICS	I	NUCLEAR MODEL
			II	ELEMENTARY PARTICLE
			III	SEPARATION TECHNIQUES
			IV	BIO-MECHANICS
IV	MSPHY-402CC	CLASSICAL MECHANICS-2 ELECTRODYNAMICS -2	I	NON LINEAR OSCILLATIONS AND CHAOS
			II	RELATIVISTIC ELECTRODYNAMICS
			III	WAVE GUIDE
			IV	RADIATION
IV	MSPHY-403CC	QUANTUM MECHANICS-4 SOLID STATE PHYSICS-4	I	RELATIVISTIC WAVE EQATIONS-1
			II	RELATIVISTIC WAVE EQATIONS-2
			III	OPTICAL PROCESSES AND EXCITONS
			IV	SOLAR CELL AND OPTO ELECTRONIC DEVICES
IV		PROJECT		

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN				
PROGRAM CODE	MSPHY	PROGRAM NAME		M.SC.PHYSICS
COURSE CODE	MSPHY 401 CC	SEMESTER		4
NUCLEAR PHYSICS-2 AND BIO PHYSICS				
COURSE TYPE	CORE COMPULSORY	TOTAL CREDIT:	04	
TEACHING TIME (HOURS)	EXAMINATION MARKING SCHEME			
THEORY (HRS)	PRACTICAL (MARKS)	INTERNAL (MARKS)	EXTERNAL (MARKS)	TOTAL (MARKS)
4 X 15 = 60	-	30	70 (2.5 HRS)	100

UNIT-I

NUCLEAR MODEL:

Single particle shell model, spin-orbit potential, analysis of shell model predictions—spins and parities of nuclear ground states, magnetic moments, electric quadrupole moment, nuclear isomerism, stripping reactions and shell model, Collective nuclear model – rotational states and vibrational states, a brief description of Nilsson model.

UNIT-II

ELEMENTARY PARTICLES:

Classification of elementary particles, type of interaction, Baryon number, lepton number, parity, charge conjugation and time reversal, CPT theorem, charge independence nuclear forces, Isospin consequences of Isospin, G-Parity, Strange particles, associated prediction, Gell-mann Nishijima scheme, Neutral K- meson, strangeness, hypercharge, CP-violation in K- decay, Isospin and SU(2) and SU(3), Baryon and meson multiplets, Gell-mann Okubo mass formula. Quark model flavor and color

UNIT-III

Separation Techniques:

Introduction, Chromatography, Column chromatography, Thin layer chromatography, Paper chromatography, Adsorption chromatography, Partition chromatography, Gas liquid chromatography (GLC), Ion exchange chromatography, Molecular exclusion chromatography, Affinity chromatography

Electrophoresis: Moving boundary electrophoresis, Zone electrophoresis, Low voltage electrophoresis, High voltage electrophoresis, Gel electrophoresis, Sodium dodecyl sulphate poly acrylamide gel electrophoresis (SDS-PAGE), Isoelectric focusing, Continuous flow electrophoresis.

UNIT-IV

BIOMECHANICS:

Striated Muscles, Contractile proteins, Mechanical Properties of Muscles, Contraction mechanism, Biomechanics of the Cardiovascular System, Blood pressure, Electrical activity during the heartbeat, Electrocardiography.

NEUROBIOPHYSICS:

Introduction, The Nervous System, Synapse, Membrane potential, Piezoelectricity, Voltage Clamp, Synaptic transmission, Electrical activity and visual generator potentials, Optical defects of the eye, Neural aspects of vision, Visual communications, bioluminescence, Physical Aspects of Hearing, The Ear, Elementary acoustics, Theories of hearing, Signal Transduction, Mode of transport, Signal transduction in the cell.

Reference book:

1. Introduction to Nuclear physics Theory and Experiment by R.R.ROY and B.P.Nigam
2. Introduction to Nuclear physics, H.A. Enge
3. Nuclear physics by D.C.Tayal
4. Nuclear physics by Irving Kaplan
5. Introduction to nuclear physics an introduction by S.B.Patel, New Age International Publishers

6. Khanna M. P., Introduction to particle physics, PHI
7. Leon M., Particle Physics - an introduction
8. Perkins D. H., Introduction to High Energy Physics
9. Biophysics by Vasantha Pattabhi and N. Gautham, Narosa Pub.
10. Introduction to Biophysics by Pranabkumar Banerjee, S.Chand.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN				
PROGRAM CODE	MSPHY	PROGRAM NAME		M.SC.PHYSICS
COURSE CODE	MSPHY 402 CC	SEMESTER		4
CLASSICAL MECHANICS-2 ELECTRODYNAMICS -2				
COURSE TYPE	CORE COMPULSORY	TOTAL CREDIT:	04	
TEACHING TIME (HOURS)	EXAMINATION MARKING SCHEME			
THEORY (HRS)	PRACTICAL (MARKS)	INTERNAL (MARKS)	EXTERNAL (MARKS)	TOTAL (MARKS)
4 X 15 = 60	-	30	70 (2.5 HRS)	100

UNIT - I:

Non Linear Oscillations and Chaos:

Introduction, Singular Points of Trajectories, Nonlinear Oscillations, Volter's Problem, Limit cycle, Chaos, Logistic Map, Poincare System, Strange attractors

UNIT - II:

Relativistic electrodynamics:

Relativistic Mechncs, Proper Time and Proper velocity, Relativistic energy and momentum
Relativistic kinematics, Relativistic dynamics, Relativistic electro dynamics, How field transform, The field tensor, Electro-dynamics in tensor notation, Relativistic potentials.

UNIT III

WAVE GUIDE:

Rectangular guides, Transverse magnetic waves in rectangular guides, Transverse electric waves in rectangular guides, Impossibility of TEM waves in wave guides, cylindrical coordinates, TM and TE waves in circular guide, Wave Impedance and Characteristic impedance

UNIT-IV

RADIATION:

Potential functions and the EM fields, potential functions for sinusoidal oscillations, oscillating electric dipole, power radiated by a current element, application to short antenna, assumed current distributions, radiations from a quarter wave monopole or half wave dipole, electromagnetic field close to an antenna, solution of the potential equations, far field approximation. Radiation- from moving charges and dipoles and retarded potentials

Reference Book:

1. Classical mechanics-A Text Book by Suresh Chandra, Narosa Publishing House New Delhi.
2. Classical Mechanics (2nd Edition), Herbert Goldstein, Addison - Wesley Publishing Co.
3. Classical Mechanics, V. B. Bhatia, Narosa Publishing house.
4. Classical Mechanics, G. Aruldas PHI Pvt. Ltd.
5. Classical Mechanics, J. C. Upadhyaya Himalaya Publishing House.
6. E. C. Jordan and K. G. Balman, Electromagnetic waves and radiating systems, Prentice Hall of India, New Delhi, 2008
7. Handbook of Electronics by Kumar and Gupta PragatiPrakashan
8. Introduction to Electrodynamics (2nd & 3rd Edition) J. Griffiths, Prentice Hall India Ltd.
9. R. E. Collins, Antennas and Radio wave propagation, McGraw Hill Book Company, 1987
10. D. Roddy and J. Coolen, Electronic Communication, Prentice Hall, 4th edition, 1995
11. David M. Pozar, Microwave Engineering (Third Edition), Wiley- India.
12. Introduction to Electrodynamics (2nd & 3rd Edition) J. Griffiths, Prentice Hall India Ltd.
13. Electromagnetics (2nd Edition), B. B. Laud, Wiley Eastern,

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN				
PROGRAM CODE	MSPHY	PROGRAM NAME		M.SC.PHYSICS
COURSE CODE	MSPHY 403 CC	SEMESTER		4
QUANTUM MECHANICS-3 AND SOLID STATE PHYSICS-3				
COURSE TYPE	CORE COMPULSORY	TOTAL CREDIT:	04	
TEACHING TIME (HOURS)	EXAMINATION MARKING SCHEME			
THEORY (HRS)	PRACTICAL (MARKS)	INTERNAL (MARKS)	EXTERNAL (MARKS)	TOTAL (MARKS)
4 X 15 = 60	-	30	70 (2.5 HRS)	100

UNIT - I:

RELATIVISTIC WAVE EQATIONS-1:

Generalization of the Schrodinger equation, The Klein-Gordan equation: Plane wave Solutions, Charge and Current Densities, Interaction with electromagnetic fields; Hydrogen-like atom, Non relativistic limit, Dirac s relativistic Hamiltonian, position probability density; expectation values, Dirac matrices, plane wave solutions of the Dirac equation; energy spectrum, the spin of the Dirac particle; Dirac particle in electromagnetic fields,

UNIT - II:

RELATIVISTIC WAVE EQATIONS-2:

Relativistic electron in a central potential; total angular momentum, Radial wave equation in coulomb potential, Series solutions of the radial equations:Asymptotic behavior, determination of the energy levels, Exact radial wave functions, comparison to non relativistic case, electron in magnetic field, spin magnetic moment. The spin orbit energy.

UNIT-III

OPTICAL PROCESSES AND EXCITONS:

Optical Reflectance, Kramers-Kroning Relations, Mathematical note, conductivity of collisionless electron gas, electronic interband Transitions, Excitons: frenkel excitons, Alkali Halides, Molecular Crystals, Weakly bound excitons, Exciton condensation into Electron-Hole Drops (EHD), Raman effects in crystals, Electron Spectroscopy with X-rays, Energy Loss of Fast Particles in a solid.

UNIT – IV

SOLAR CELL

Configuration of a solar PV systems, PV cell technology, Structures of solar cells-M-S solar cells, MIS solar cells, solid-liquid junction solar cells, comparison of p-n junction, Schottky junction, M-S, M-I-S solar cells.

Optoelectronic Devices:

Sources: LED: Introduction, Radiative transitions, Emission spectra, Methods of excitations, LED-Structures; Materials for choice, Definition of efficiencies,

Detectors: Introduction, Photoconductor, Photodiodes, p-i-n & p-n photodiodes, Avalanche photodiode, Phototransistor,

Reference Books :

1. A textbook of quantum mechanics P M Mathews and K V Venkatesan McGrawhill Education
2. Quantum Mechanics by L. I. Schiff, McGraw-Hill International student edition (1961).
3. Introduction to Quantum Mechanics by Powell and Crasemann Addison-Wesley (1961).
4. Quantum Mechanics by V.K. Thankappen, Wiely eastern Ltd.
5. Quantum Mechanics : Theory and applications by A. Ghatak and S. Lokanathan.
6. Quantum Mechanics by H.C.Verma
7. Quantum Mechanics by K.K. Chopra & G.C.Agarwal, Krishna Prakashan Media, (P)LTD.MEERUT
8. Introduction to Solid State Physics. Charles Kittel 7th Edition.

9. Introduction to Solid State Physics. J P Srivastava 4th Edition.
10. Solid State Physics by S.O.Pillai, New age international publishers
11. Fundamental of Solid State Physics by Saxena, Gupta and Kumar Pragati Prakashan

HEMCHANDRACHARYANORTH GUJARAT UNIVERSITY, PATAN
M.Sc. (PHYSICS): SEMESTER-IV

PROJECT WORK

- PROJECT REPORT
- PROJECT PRESENTATION
- VIVA

CHAIRMAN
Board of Studies