### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY PATAN- 384 265

### Modified Detailed Syllabus of CBCS PROGRAMME Pattern for B. Sc.(Mathematics) Semester System

### **PROGRAM CODE : HNGU1054**

### With Effect from June: 2021

FACULTY : SCIENCE

SUBJECT : MATHEMATICS

CLASS : Bachelor of Science.

SEMESTER : III to IV

TOTAL PAGES : 01 TO 11 (WITH COURSE STRUCTURE)



### Hemchandracharya North Gujarat University, Patan-384265.

### B.Sc. (Mathematics): PROGRAMME Structure under CBCS

### With Effect from June: 2021

**Mission**: Our mission is to provide opportunities for developing basic-quality mathematical skills and achievementfor their betterment of life through scientific and technological development.

**Learning outcomes**: Four major focusing areas: Logical Reasoning & Motivation; Analysis & Problem solving;Information & Technology Proficiency.

**Vision:** To Motivate Individuals to excel in the mathematical basic knowledge-driven environment of the 21<sup>st</sup>century through curriculum and train integrally human resources through teaching. We **Focus** on quality education.

#### (1) EDUCATIONAL AIMS:

Mathematics is one of the fundamental disciplines in science. It is the basic for all the disciplines. To makeeducation more effective and learner centric, restructurisation of curriculum becomes essential. As a positive step in this direction and in order to respond to the emerging trends in the global scenario, it is decided to introduce the Choice Based Credit System (CBCS) from the academic year 2011-12 and modified it after three years. Under this system, the academic programme becomes student-oriented, relevant, interdisciplinary and flexible.

#### (2) CONDITIONS FOR ADMISSION :

A candidate who has passed the H Sec-Science Degree examination of the state or any other examinations accepted by the Syndicate as equivalent thereto shall be eligible for admission to this B ScProgramme in Mathematics on full-time basis of study.

**INTAKE** rules for admission are as per University notification from time to time.

Students are allowed to take admissions to successive semesters under carry over benefit facility as per the norm decided by the university.

#### (3) *LEARNING OUTCOMES*:

The programme leading to this degree provides the opportunities to developand demonstrate knowledge and understanding in the following areas:

• **Knowledge and understanding:** When one has completed this degree he/she will haveknowledge and understanding of the fundamental concepts, principles and techniques from a range of topic areas.



- **Cognitive skills:** When one has completed this degree he/she will be able to understand how to solvesome problems using the methods taught and develop abstract mathematical thinking.
- **Practical skills:** When one has completed this degree, he/she will be able to demonstrate theCommunicate clearly knowledge, ideas and conclusions about mathematics and improve his/her own learning and performance.

### (4) DURATION OF THE COURSE:

The CBCS pattern B. Sc. programme with multidisciplinary approach in Mathematics is offered on a full-time basis. The duration of the course is of three academic years consisting of six semesters each of 15 weeks duration.

### (5) TEACHING, LEARNING METHODS:

All relevant material is provided and taught in the course texts and through the study of set books. One will build up knowledge gradually, with sufficient in-text examples to support one's understanding. He/She will be able to assess his/her own progress and understanding by using the in-text problems and exercises at the end of each unit in form of practical using computer in computer laboratory.

### (6) COURSE OF STUDY:

The curriculum has five major components:

- 1. Principle/Core Courses (CC MAT)
- 2. Practical courses ( PC MAT)
- 3. Elective Opt. Disciplinary courses (ES MAT)
- 4. Elective Generic course
- 5. Foundation Course

There are at least 144 Credit COURSEs prescribed in the above classification as per the university norms to be studied to acquire B.Sc. Degree in Mathematics.



### $\Rightarrow$ COURSE STRUCTURE

	Cours	Credit	Teaching	Total		Examinat	ion	Total
Course	es	/course	Hrs Total	Credits	Internal	Hours	External	Marks
	-	SEME	STER-I					
Principle/Core Courses: CC-MAT-111	1	4	4	4	30	2.5	70	100
Practical/ PC MAT-111	1	2	4	2	-	5	50	50
Elective Opt. Disciplinary: ES-MAT –11 Set Theory & Functions	1	2	2	2	15	2	35	50
Elective Generic	1	2	2	2	15	2	35	50
Foundation Course	1	2	2	2	15	2	35	50
		SEN	MESTER-II					
Principle/Core Courses: CC-MAT-122	1	4	4	4	30	2.5	70	100
Practical/ PC MAT-122	1	2	4	2	-	5	50	50
Elective Opt. Disciplinary: ESMAT –21 Industrial Mathematics	1	2	2	2	15	2	35	50
Elective generic	1	2	2	2	15	2	50	50
Foundation course	1	2	2	2	15	2	35	50
	-	SEM	ESTER-III	-			•	
Principle/Core Courses: CC-MAT-301	1	3	3	3	30	2.5	70	100
Principle/Core Courses: CC-MAT-302	1	3	3	3	30	2.5	70	100
Practical /PC- MAT-301	1	1.5	3	1.5	-	5	50	50
Practical /PC -MAT-302	1	1.5	3	1.5	-	5	50	50
Elective Opt. Disciplinary: ES-MAT –31 Numerical Solution of Equations	1	2	2	2	15	2	35	50
Elective generic	1	2	2	2	15	2	35	50
Foundation course	1	2	2	2	15	2	35	50
SEMESTER-IV								
Principle/Core Courses: CC-MAT-401	1	3	3	3	30	2.5	70	100
Principle/Core Courses: CC-MAT-402	1	3	3	3	30	2.5	70	100
Practical/ PC- MAT-401		1.5	3	1.5	2 Regi	3 <sub>5</sub>	50	50
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Hemchandracharya North Gujarat University PATAN

Practical/ PC MATH-402	1	1.5	3	1.5	-	5	50	50
Elective Opt. Disciplinary: ES-MAT -41	1	2	2	2	15	2	35	50
Flective generic	1	2	2	2	15	2	35	50
Eoundation course	1	2	2	2	15	2	25	50
roundation course	1	CEA	L NECTED V	2	15	2	- 55	50
		<u>36</u> 0	1631 6K-V					r –
Principle/Core Courses: CC-MAT-501	1	3	3	3	30	2.5	70	100
Principle/Core Courses: CC-MAT-502	1	3	3	3	30	2.5	70	100
Principle/Core Courses: CC-MAT-503	1	3	3	3	30	2.5	70	100
Principle/Core Courses: CC-MAT-504	1	3	3	3	30	2.5	70	100
Practical/PC MAT-501	1	1.5	3	1.5	-	5	50	50
Practical/PC MAT-502	1	1.5	3	1.5	-	5	50	50
Practical/PC MAT-503	1	1.5	3	1.5	-	5	50	50
Practical/PC MAT-504	1	1.5	3	1.5	-	5	50	50
Elective Opt. Disciplinary: ESMAT –51 Theory of Equations	1	2	2	2	15	2	35	50
Elective generic	1	2	2	2	15	2	35	50
Foundation course	1	2	2	2	15	2	35	50
		SEM	IESTER-VI			1		
Principle/Core Courses: CC-MAT-601	1	3	3	3	30	2.5	70	100
Principle/Core Courses: CC-MAT-602	1	3	3	3	30	2.5	70	100
Principle/Core Courses: CC-MAT-603	1	3	3	3	30	2.5	70	100
Principle/Core Courses: CC-MAT-604	1	3	3	3	30	2.5	70	100
Practical/PC MAT-601	1	1.5	3	1.5	-	5	50	50
Practical/PC MAT-602	1	1.5	3	1.5	-	5	50	50
Practical/PC MAT-603	1	1.5	3	1.5	-	5	50	50
Practical/PC MAT-604	1	1.5	3	1.5	-	5	50	50
Elective Opt. Disciplinary: ES-MAT –61 Business Statistics	1	2	2	2	15	2	35	50
Elective generic	1	2	2	2	15	2	35	50
Foundation course	1	2	2	2	15	2	35	50

N.B.: Work-loaddepends on the number of students and the number of Batches/Groups ,forPractical and Cognitive-skill based Course.



Times

As the *CBCS has a high probability to be operationalized efficiently and effectively for the elevating learners*, the <u>Essential Requirements</u> for all Mathematical Practical including MATLAB / PYTYHON / SCILAB practicals of Mathematical subjects are as under:

- 1. Mathematical Laboratory inbuilt with sufficient number of Computers (as per the students enrollments and the number of practical batches) and MATLAB / PYTYHON / SCILAB SOFTWARE with basic requirements for the Practicals.
- 2. Mathematical Laboratory inbuilt with Graphs, Charts, Printer, Physical Models (two dimensional as well as three dimensional) & Virtual Models (Higher Dimensional Computerized) and basic requirements for the same.
- 3. Essential Requirement for Mathematical Computer Laboratory:

At least One full time <u>Computer Operator and one Peon for computer laboratory</u> having mathematical ability to run MATLAB / PYTYHON / SCILAB Software and related Computerized Mathematical practicals.

### B.Sc. (Mathematics) Semester-3

### CC-MAT-301: Differential Calculus

### Unit-01 Limit, continuity and partial Derivatives:

Functions of several variables, their limits and continuity, partial derivatives, differentiability and differential, chain rule, differential and derivatives of higher orders, condition for commutativity of independent variables in higher derivatives, derivatives of implicit functions.

#### Unit-02 Applications of partial derivatives:

Euler's theorem for homogeneous functions, Extrema of functions several variables, application of Lagrange's method of undetermined multiplies, Taylor's and Maclaurin's expansion for functions of two variables, Tangent and normal plane to twist curve, Tangent plane and normal to surface.

#### Unit-03 Differential Geometry:

Curvature in Cartesian co-ordinates, Curvature in Polar co-ordinates, radius of curvature of plane curve, Centre of curvature and circle of curvature of curve, evolute and involute, Singular point for plane curve, double point, all types of points(point of inflexion for plane algebraic curve)

### • Textbook:

The main book for the course (Unit I and II) is '**Differential Calculus'** by Shantinarayan, S. Chand , New Delhi.

### • Reference Book:

- 1. Advanced Calculus, D V Widder, Prentice Hall, New Delhi.
- 2. Advanced Calculus Vol : I & II, T M Apostol, Blaisdoll
- 3. Advanced Calculus, R C Buck, MacMillan
- 4. Kalan Shashtra Part I , D H Pandya and N D Suthar, University GranthNirman Board (Gujarati)
- 5. Kalan Shashtra Part II, A M Vaudya and V H Pandya, University GranthNirman Board (Gujarati)



### CC-MAT-302: Numerical Analysis

### Unit-01 Finite Differences table and theory of interpolation:

Ascending and descending differences, Symbolic operators, Difference of polynomial, factorial polynomials, Gregory-Newton's forward and backward interpolation formula.

### Unit-02 Divided Differences:

Newton's divide difference interpolation formula, Lagrange's interpolation formula for equal and unequal intervals

### Central Difference interpolation formula:

Guass' forward and backward formula, Sterling interpolation formula, Bessel's interpolation formula.

### Unit-03 Numerical differentiation and integral:

General Quadrature formula for equidistance ordinates, Trapezoidal rule, Simpson's 1/3th rule, Simpson's 3/8<sup>th</sup> rule, Picard's method, Taylor's method, Euler's method.

### • Reference books:

- 1. Numerical Analysis, Kunz, McGraw Hill.
- 2. Numerical Analysis, R. Gupta, Anmol Pub.Pvt.Ltd, New Delhi.
- 3. Numerical Analysis, P.N.ChatterjiRajson's Prakashanmandir, Meerut.
- 4. Methods in Numerical Analysis K.W.NelsonMac-Millan
- 5. Numerical Methods, Dr.V.N.Vedomurthy, Vikas Publishing House Pvt. Ltd.
- 6. Numerical Methods in Engineering and Science, Dr.B.S.Grewal, Khanna Pub.
- 7. Numerical Analysis and Computational Procedures, S.A.Mollah, New Central Book Agency, Calcutta.

### PC -MAT-301: Practicals on Differential Calculus

- 1. Application of Limit and Continuity (Two Practicals)
- 2. Application of Partial Derivatives (Two Practicals)
- 3. Application of derivatives of implicit functions.
- 4. Application of Lagrange's' method of undermined multiplies
- 5. Application of Euler's theorem
- 6. Application of Tailor's and Maclaurin theorems.
- 7. Application of radius of curvature. (Three practicals for Cartesian,polar and parametric curves)
- 8. Application to find center of curvature and circle of curvature.(Two Practicals)
- 9. To determine the types of double points.(Two practicals)



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### PC -MAT-302: Practicals on Numerical Analysis

- 1. Application of Gregory-Newton forward formula.
- 2. Application of Gregory-Newton backward formula.
- 3. Application of Factorial polynomials.
- 4. Applications of Newton's divided difference formula.
- 5. Application of Lagrange's interpolation formula for unequal intervals.
- 6. Application of Gauss forward interpolation formula.
- 7. Application of Gauss backward interpolation formula.
- 8. Application of Sterling interpolation formula
- 9. Application of Bessel's interpolation formula.
- 10. Application on Numerical differentiation.
- 11. Application of Taylor's method.
- 12. Application of Picard's method.
- 13. Application on Euler's method.
- 14. Application of Trapezoidal rule.
- 15. Application of Simpson's 1/3 rule.
- 16. Application of Simpson 3/8 rule.

[Practicals should be conducted with the help of either scientific Calculator or appropriate software like Python, MATLAB, SciLab]

### Subject Elective Course

### **ES-MAT-31:** Numerical Solutions of Equations

- **Unit-01:** Applications of Graphical Method, Applications of Bisection Method, Applications of Method of False position, Applications of Method of Iteration
- **Unit-02:** Applications of Newton Raphson's method, Applications of Birge-Vieta method, Applications of Horner's Method
  - Reference books:
    - 1. Numerical Analysis (Golden Series) By N. P. Bali
    - 2. Numerical Methods, Dr.V.N. Vedomurthy, Vikas Publishing House Pvt. Ltd.
    - 3. Numerical Methods in Engineering and Science, Dr.B.S.Grewal, Khan



### હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી NAAC A (3.02) State University



ફોન:(૦૨૭*૬* ૬) ૨૩૭૦૦૦ Email : <u>regi@ngu.ac.in</u>

પો.બો.નં.–૨૧, યુનિવર્સિટી રોડ, પાટણ (ઉ.ગુ.) ૩૮૪૨૬૫ ૦૦ ફેકસ : (૦૨૭૬૬) ૨૩૧૯૧૭ in Website : www.ngu.ac.in

### <u> પરિપત્ર ક્રમાંક – ૧૬૮ / ૨૦૨૧</u>

### વિષયઃ વિજ્ઞાન વિદ્યાશાખાના સ્નાતક કક્ષાના નવા અભ્યાસક્રમો અંગે...

આ યુનિવર્સિટી સંલગ્ન સાયન્સ કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, વિજ્ઞાન વિદ્યાશાખાએ કરેલ ભલામણ અનુસાર નીચેના વિષયોના સ્નાતક કક્ષાના સામેલ પરિશિષ્ટ પ્રમાણેના નવા અભ્યાસક્રમો <u>જૂન – ૨૦૨૧ થી ક્રમશઃ</u> <u>અમલ માં આવે તે રીતે</u> એકેડેમિક કાઉન્સિલએ તેની તા. ૦૯/૦*૬*/૨૦૨૧ ની સભા ના નિર્દિષ્ટ ઠરાવો થી મંજૂર કરેલ છે. જેનો અમલ કરવા સારૂ સંબંધિતોને આ સાથે મોકલવામાં આવે છે, જેનો ચુસ્ત અમલ થવા વિનંતી છે.

ક્રમનં.	અભ્યાસક્રમ	એકેડેમિક સભાના ઠરાવક્રમાંક	સેમેસ્ટર	પાના નંબર
٩	બાયોટેકનોલોજી	२५	સેમ.−૩ થી <i>ઽ</i>	૧ થી ૩૯
ર	વનસ્પતિશાસ્ત્ર	૨૭	સેમ.–૩ અને ૪	૧ થી ૩૪
૩	ભૌતિકશાસ્ત્ર	રહ	સેમ.–૩ અને ૪	૧થી ૨૩
8	રસાયણશાસ્ત્ર	30	સેમ.–૩ અને ૪	૧ થી ૧૯

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

નોંધઃ (૧) વિદ્યાર્થીઓની જરૂરીયાત માટે પરિપત્રની એક નકલ કોલેજ ના ગ્રંથાલયમાં મૂકવાની રહેશે.

(ર) આ અભ્યાસક્રમ યુનિવર્સિટીની વેબ સાઈટ <u>www.ngu.ac.in</u> પર પણ ઉપલબ્ધ કરાવવામાં આવનાર છે.

સહી/–

અધ્યક્ષ

કુલસચિવવતી

બિડાણઃ ઉપર મુજબ

નં.—એ કે / અ× સ / ૧૪૭૫ / ૨૦૨૧ તારીખ : ૨૧ / ૦૬ / ૨૦૨૧

પ્રતિ,

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

- ર. સંલગ્ન સાયન્સ કોલેજોના આચાર્યશ્રીઓ
- ૩. ર્ડા. જગદીશ એચ. પ્રજાપતિ (ડીનશ્રી વિજ્ઞાન વિદ્યાશાખા),સરકારી સાયન્સ કોલેજ, <u>થરાદ.</u> જિ. બનાસકાંઠા
- ૪. વિજ્ઞાન વિદ્યાશાખા હેઠળના વિષયોની અભ્યાસ સમિતિઓના ચેરમેનશ્રીઓ.
- પ. પરીક્ષા નિયામકશ્રી, હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. 👘 (પાંચ નકલ)
- ۶. ઈનચાર્જ ઓફિસરશ્રી, સબસેન્ટર, ખેડબ્રહ્મા કેમ્પસ, મુ. વડાલી , જિ. સાબરકાંઠા. ( હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, <u>પાટલ.)</u>
- ૭. ગ્રંથપાલશ્રી, હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (વિદ્યાર્થીઓના ઉપયોગ સારૂ રેકર્ડ ફાઈલ માટે )
- ૮. સીસ્ટમ એનાલીસ્ટ, ક્રોમ્પ્યુટર(રીઝલ્ટ) સેન્ટર, હેમ.ઉ.ગુ. યુનિવર્સિટી,પાટણ તરફ વેબસાઈટ પર મૂકવા સારૂ. ૯. પ્રવેશ પ્રશાખા(એકેડેમિક શાખા) હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ.
- ૯. પ્રવેશ પ્રશાખા(અકડામક શાખા) હમચદ્રાંચાય ઉત્તર ગુજરાત યુાનવાસટા, પાટેણ. ૧૦. મુખ્ય હિસાબી અધિકારીશ્રી (મહેકમ), હેમ. ઉત્તર ગુજરાત યુનિવર્સિટી, પાટેણ તરફ-પિરિપત્રની ફાઈલ વ્યર્થે
- ૧૧. સિલેકટ ફાઈલે– (ર નકલ) 🚺 🚺

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# Hemchandracharya North Gujarat University PATAN



### **B.SC. BIOTECHNOLOGY SEM 3 SYLLABUS**





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### **B.Sc Semester III**

### Biotechnology

### Principles of metabolism I

### **Semester III**

### **BT-301**

### **Learning Outcomes:**

- 1. Differentiate between kinetic and potential energy.
- 2. Understand the First and Second Laws of Thermodynamics and describe how they reflect the existence and behavior of energy in the universe.
- 3. Define enthalpy, entropy, and free energy, and describe how these concepts affect the fate of chemical reactions.
- 4. Explain the energy requirements of endergonic and exergonic reactions.
- 5. Describe how oxidation and reduction are interrelated in chemical reactions.
- 6. Understand the structure of ATP and describe how ATP makes a wide variety of thermodynamically unfavorable cellular processes possible.
- 7. Describe the importance of activation energy and how it can be altered.
- 8. Explain the various ways in which enzymes increase the rate of biological reactions.
- 9. Explain how cofactors, prosthetic groups and other aspects of the chemical environment affect enzyme activity.
- 10. Define competitive inhibition, noncompetitive inhibition, and activation and explain how each relates to the active and allosteric sites.
- 11. Understand the unique catalytic nature of and properties associated with ribozymes.
- 12. Explain the relationship between anabolic and catabolic pathways in metabolism and describe the storage and release of energy in the forms of ATP and NADH.
- 13. Describe the three major ways cells regulate metabolic pathways.
- 14. Describe the mechanisms used by cells to recycle components of macromolecules and organelles for use in the synthesis of new molecules and structures.
- 15. Explain how recycling of cellular components reduces the overall energy requirements of the cell.

### Unit I Biological thermodynamics

- 1.1 Laws of thermodynamics
- 1.2 Definition of Internal energy, Enthalpy, Entropy, Gibbs's free energy and relationship among tham.
- 1.3 Relationship between free energy change, standard free energy change and equilibrium constant.
- 1.4 Additive nature of free energy change and its biological significance.
- 1.5 ATP and other energy rich compounds.

### Unit II Protein and enzymes





- 2.1 Tertiary and quaternary structure of proteins.
- 2.2 Definition of catalyst, difference between biocatalyst and inorganic catalyst.
- 2.3 Definition of appoenzyme, cofactor, coenzyme, prosthetic group, holloenyme.
- 2.4 Mechanism of action of enzyme, MM kinetics, double reciprocal plot .
- 2.5 Factors affecting enzyme-catalyzed reactions.

#### Unit III Regulation of enzyme activity

- 3.1 Regulation of enzyme by allosteric mechanism.
- 3.2 Role of covalent modification in enzyme regulation
- 3.3 Enzyme inhibition, types of enzyme inhibition.
- 3.4 Use of inhibitors as anti microbial drugs.

#### **Unit IV Signal transduction**

- 4.1 introduction to signal transduction pathways.
- 4.2 types of signaling receptors.
- 4.3 Signaling pathways: Extracellular
- 4.4 Signaling pathways: intracellular.



### **B.Sc Semester III**

### **Biotechnology**

### **Classical genetics and instrumentation**

### Semester III

### **BT-302**

### **Learning Outcomes**

- 1. Explain how Mendel's particulate mechanism differed from the blending theory of inheritance.
- 2. Define the following terms: true breeding, hybridization, monohybrid cross, P generation, F1 generation, F2 generation.
- 3. Use a Punnett square to predict the results of a monohybrid cross, stating the phenotypic and genotypic ratios of the F2 generation.
- 4. Describe Mendel's Law of Segregation and the phase of meiosis in which it is applied.
- 5. Distinguish between the following pairs of terms: dominant and recessive; heterozygous and homozygous; genotype and phenotype.
- 6. Explain how a testcross can be used to determine if an individual with the dominant phenotype is homozygous or heterozygous.
- 7. Use a Punnett square or probabilities to predict the results of a dihybrid cross and state the phenotypic and genotypic ratios of the F2 generation.
- 8. State Mendel's law of independent assortment and describe how this law can be explained by the behavior of chromosomes during meiosis
- 9. Explain the theoretical aspects of key analytical techniques and instruments used in geochemistry, including but not limited to electron microscopy, X -ray diffraction, mass spectrometry and spectroscopy (including synchrotron techniques).
- 10. Strategically plan analytical campaigns to apply to different types of samples and research objectives, including selection of the most appropriate technique/instrumentation for the students' research project.
- 11. Undertake the correct sample preparation and characterization prior to analysis by the chosen techniques or instruments.
- 12. Design an analytical work-flow to acquire data and achieve the research objectives of their project.
- 13. Process data from the chosen instruments and demonstrate understand ing of the limitations and quality of the data. Justify the approach taken to data processing.
- 14. Write a clear and concise justification and description of the analytical techniques employed, suitable for publication in a scientific journal.



### Unit 1

- 1.1 Mendel's experiments with garden pea and Mendel's law of inheritance.
- 1.2 Incomplete and co dominance.
- 1.3 Linkage and its types
- 1.4 Genetic interaction: allelic and non allelic.

#### **Unit 2 Mutaton**

- 2.1 Defination and types of mutation and molecular basis of mutation.
- 2.2 Physical and chemical mutagens
- 2.3 Use of mutation: Reversion and suppression.
- 2.4 In born error of metabolism in human.

#### Unit 3 Chromatography and electrophoresis

3.1 Chromatography: Paper chromatography, TLC, Gel filteration chromatography, Ion exchange chromatography.

3.2 Electrophoresis: Poly acrylamide Gel electrophoresis(PAGE), SDS -PAGE, agarose gel electrophoresis.

#### Unit 4 Spectroscopy

- 4.1 Overview of electromagnetic spectrum
- 4.2 Principle and applications of UV-Visible spectroscopy.
- 4.3 IR spectroscopy.
- 4.4 x ray diffraction spectroscopy.



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### **B.Sc Semester III**

### **Biotechnology : Subjective elective**

### Human endocrinology

### **Semester III**

### BT-ES-1

### **Learning Outcomes**

- 1. The student will demonstrate an understanding of the anatomy of the endocrine system.
- 2. The student will demonstrate an understanding of the basic properties of hormones.
- 3. The student will demonstrate the role of hormones in maintaining body function.
- 4. The students will demonstrate those endocrine details helpful in the clinical realm.
- 5. The student will demonstrate knowledge of the major endocrine disorders.

### Unit 1

- 1.1 Defination of hormone, organized and non organized endocrine organ or tissue of human
- 1.2 Hypothalamus and pituitary hormones.
- 1.3 Thyroid and parathyroid hormones
- 1.4 Role of thymus as endocrine gland

### Unit 2

- 2.1 Pancreas as endocrine gland.
- 2.2 Adrenal gland hormones.
- 2.3 Different non organized endocrine tissues of human body
- 2.4 Mechanism of hormone action



### **B.Sc Semester III**

### **Biotechnology : Subjective elective**

### Enzymology

### **Semester III**

### BT-ES-2

### Learning Outcomes

- 1. Describe and use the equations of enzyme kinetics.
- 2. Describe the methods used in enzyme kinetics.
- 3. Describe the principles of enzyme inhibition.
- 4. Describe the mechanisms of enzyme catalysis.
- 5. Describe the catalytic mechanisms employed by the well-characterized enzymes.
- 6. Describe the mechanisms of enzyme regulation

#### Unit 1

- 1.1 Production of industrially important enzymes
- 1.2 Applications of enzymes in industries Amylase, Lipase, Protease
- 1.3 Applications of enzymes in medical industry as therapeutics, enzyme therapy

#### Unit 2

- 2.1 Production of genetically engineered enzyme
- 2.2 Applications of enzyme in biosensor devices eg. glucometer, pollutant monitoring
- 2.3 Applications of enzymes in dairy and agriculture industry



## B.Sc Semester III Biotechnology Semester III Practicals

- 1. Quantification of protein using by Biuret test.
- 2. Quantification of protein using by Folin -Lowry assay.
- 3. Effect of Substrate concentration (Determination of Km and Vmax).
- 4. Determine temperature optima of the enzyme.
- 5. Effect of pH on enzyme activity.
- 6. Effect of enzyme concentration.
- 7. Paper Chromatography of Amino acids.
- 8. TLC Chromatography of Amino acids.
- 9. Agarose electrophoresis of DNA
- 10. Determine maximum absorption spectra of substance.





### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY

NAAC A (3.02) State University

PATAN - 384 265

**FACULTY OF SCIENCE** 

**B.Sc. BOTANY** 

Semesters: III

**SYLLABUS** 

Curriculum as per UGC Guideline

With Semester/CBCS/Grading Pattern

With effect from June - 2021 (and thereafter)

DATE: June, 2021 TOTAL PAGE: 19

### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY NAAC A (3.02) State University PATAN - 384 265.



### U.G. (B.Sc.) Programme

### **CBCS:: Semester :: Grading Pattern**

With effect from: June - 2021

### FACULTY OF SCIENCE Subject: BOTANY B. Sc. Semesters: III

Total Pages: 01 to 19



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I/c. Registrar Hemchandracharya North Gujarat University

SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)

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### **SUMMARY OF THE PROGRAMME**

### Summary of the Programme

✓	Syllabus duration	Semester pattern i.e., <b>Six</b> months
✓	No. of core compulsory (CC) course	<b>02</b> (in each semester)
✓	Credits per CC course	03
✓	Total credits for CC course	<b>06</b> /Semester
✓	Theory lectures per CC course	03 /week
$\checkmark$	Total Theory lectures for CC course	06 /week
✓	No. of Practical courses per semester	02
✓	Practical lectures	03 /week/course/batch
✓	Total Practical lectures	06 /week/ batch
✓	Credits per Practical course	1.5
✓	Total Credits of Practical course	<b>03</b> /Semester
✓	No. of Practical course (in Uni. Exam.)	<b>02</b> /Semester
✓	No. of Elective Subjective (ES) course	<b>01</b> (in each semester)
✓	Credits for ES course	<b>02</b> (in each semester)
✓	Theory lectures per ES course	02/week
✓	No. of Elective Generic (EG) course	01
✓	Credits for EG course	02
✓	Theory lectures per EG course	02/week
$\checkmark$	Examination (including Preparation)(weeks)	05
✓	No. of Days per week	06
$\checkmark$	Weeks (days) available for Teaching	<b>15</b> (90)
$\checkmark$	Duration of each lecture (minutes)	55
✓	No. of students/batch	20 (on approval of AC and Exam. unit) I/c. Registrar Hemchandracharya

SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)

### Under Choice Based Credit System-Semester-Grading System pattern

### U G (B. Sc.) Programme in Botany

### Semester - III

### Salient Features:

- CBCS in UG programme in **Botany Semester III** shall be offered from the Academic year **June 2021**.
- Botany subject in the Universities/Affiliated Colleges shall offer undergraduate programme in Faculty of Science from the Academic year 2021-22.
- A student will have to get enrolled a **Core course** depending upon his/her requirement of a degree in the said discipline of study. A student will have a choice of selecting an **Elective** as well as **Foundation** courses from a pool of courses.
- Each course shall be assigned a specific number of **Credits**.
- A Core course is the course which should compulsorily be studied by a candidate as a Core requirement so as to get degree in a said discipline of study.
- There shall be Two Core Compulsory courses (Theory) each with 3 credits in each semester and their practical's each with 1.5 credits. Thus, a credit weight-age in B.Sc. programme for each semester core course shall be of 6 credits. In short, 9 credits multiplied by 2 subjects equal to total of 18 credits.
- In addition to the Core courses, a student will have to choose Elective as well as Foundation courses from a pool of courses.
- Two courses of Elective, one each from Generic Elective and Interdisciplinary / Multidisciplinary / Subject centric electives shall have to be offered. The credit weight-age for each Elective course shall be of 02 Credits. Hence, a total credit weightage for Elective courses shall be of 4 credits.
- One **Foundation** (English Language L.L.) course shall have to be offered. The credit weight-age for Foundation course shall be of **02 credits**.
- Each course shall have a unique Course code. The Core courses, Elective courses and the Foundation courses shall be abbreviated respectively as **CC**, **PC**, **EG**, **ES** and **FC**.
  - Core Compulsory CC
     Practical Core (Core Elective) PC
  - 2. Elective Generic **EG** Elective Subject **ES**
  - 3. Foundation Compulsory FC

I/c. Registrar Hemchandracharya North Gujarat University

SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)

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- Each Academic year shall consist of **two** semesters, each of **15weeks** of teaching equivalent to 90 working days. The Odd semester period shall be from **July to November** and the Even semester period shall be from **December to April**.
- The course with 4 credits shall be of 60 hrs (15 weeks x 4 credits) duration. The course with 3 credits shall be of 45 hrs (15 weeks x 3 credits) duration. The course with 2 credits shall be of 30 hrs (15 weeks x 2 credits) duration.
- A general framework for Bachelor of Science (B.Sc.) programme shall be as follows:

Semester wise credits						Total credits of
Ι	II	III	IV	V	VI	the Programme
24	24	24	24	24	24	144

• The semester wise weight age of core, elective and foundation courses shall be as follows:

Academic vear	Corecompulsory Courses	Elective	Foundation	
Academic year	core compulsory courses	courses	courses	
Semester I & II	65-75%	15-20%	10-15%	
Semester III & IV	65-75%	15-20%	10-15%	
Semester V & VI	65-75%	15-20%	10-15%	

### • Attendance:

The Attendance Rules as per the norms of Hemchandracharya North Gujarat University.

### • Medium of Instruction:

- The Medium of Instruction shall be of **Gujarati** and/or **English medium**.
- Student is free to write answers either in **Gujarati** and/or **English** language.

### • Language of Question paper:

Question paper should be drawn in **Gujarati** language and its **English** version should be given.

### • Evaluation Methods:

Academic performance in various courses *i.e.* core, discipline electives, generic electives and skill enhancement courses are to be considered as parameters for assessing the achievement of students in botany. A number of appropriate assessment methods of Hemohandracharya botany will be used to determine the extent to which students demonstrate desired learning outcomes. Following assessment methodology should be adopted;

- 1. The oral and written examinations (Scheduled and surprise tests).
- 2. Closed-book and open-book tests.
- 3. Problem-solving exercises.
- 4. Practical assignments and laboratory reports.
- 5. Observation of practical skills.
- 6. Individual and group project reports.
- 7. Efficient delivery using seminar presentations.
- 8. Viva voce interviews are majorly adopted assessment methods for this curriculum.
- 9. The computerized adaptive testing, literature surveys and evaluations, peers and selfassessment, outputs form individual and collaborative work are also other important approaches for assessment purposes.
- 10. A student shall be evaluated through Comprehensive Continuous Assessment (CCA)/ (Internal Evaluation) as well as the End of Semester examination (External Evaluation). The weight-age of CCA shall be 30%, whereas the weightage of the Semester end examination shall be 70%. There will be no internal evaluation in practical courses.
- 11. In Semester assessment (CCA)/ (Internal Evaluation) is spread through the duration of the course and is to be done by the Teacher teaching the course. BoS of the subjects will decide various criteria and their weight-age for CCA. The assessment is to be done by various means including:
  - ✓ Written Tests
  - ✓ MCQs based Tests/Quiz
  - ✓ Presentations/Seminars
  - ✓ Project work/Field work
  - ✓ Group discussions/Group activities
  - ✓ Assignments, etc.
- 12. The distribution of **Internal Evaluation** is given as per criteria given below for **30** marks:

Written Test...20 marks,Assignments/MCQs/Very Short questions...05 marks and Attendance andRegularity, Punctuality...05 marks.

SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)

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I/c. Registrar Hemchandracharya

- 13. The **End of Semester examination (External Evaluation)** shall have an assessment based upon following perspective with respect to all the courses:
  - a. Evaluation with respect to Knowledge
  - b. Evaluation with respect to Understanding
  - c. Evaluation with respect to Skill
  - d. Evaluation with respect to Application
  - e. Higher Order Thinking Skills
- 14. With respect to all the above components, there shall be following types of Questions from each unit of the course.
  - a. MCQs/Fill in the blanks/ Match the pairs, etc
  - b. Short answer questions
  - c. Medium answer questions
  - d. Long answer questions
  - e. Examples/ Problems, etc.
- 15. The End of Semester Examination will be conducted by the University. A certified journal of the respective practical course **must be produced** at the time of practical examination by the student.
- 16. It will be compulsory for a candidate to obtain passing percentage in both Internal as well as External Evaluation. The passing marks for each course shall be 40% as decided by concern Board of Studies in Botany.
- 17. Promotion, Re-Admission and Time for Completion of Course, Procedure for Awarding Grades, Provision for Appeal, etc. as decided by the Hemchandracharya North Gujarat University.

### STUDY TOUR:

Botanical excursion/study tour may be arranged (by the concern faculty with prior permission of **HoD and/or Principal**) within state and/or outside the state to explore/study plant diversity in its natural habitats.

### SUBMISSION:

Instead of submission of Herbarium sheets and/or specimens at the time of final (Uni.) practical examination student may submit photographs/ drawings/ charts/ models or CD having such photographs/drawings of plant species to conserve plant species in their natural habitats and to avoid any damage to plant species and its natural habitat.

#### ELECTIVE (SUBJECTIVE) COURSE:

For semester-III list of course is given below.

1. Elective (Subject) Course :: ES BOT-301:: Plant Diversity and Human Welfare

### **SELECTION OF ELECTIVE (GENERIC) COURSE:**

• For semester-III and IV a separate consists of courses is offered by university. Students may select **any one** of them from offered courses in Semester-III and Semester-IV separately.

### AIMS:

- 1. To transform curriculum into outcome-oriented scenario.
- 2. To develop the curriculum for fostering discovery-learning.
- 3. To equip the students in solving the practical problems pertinent to India.
- 4. To adopt recent pedagogical trends in education including e-learning, flipped class, hybrid learning and MOOCs.
- 5. To mold responsible citizen for nation-building and transforming the country towards the future.
- 6. To provide an environment that ensures cognitive development of students in a holistic manner. A dialogue about plants and its significance is fostered in this framework, rather than didactic monologues on mere theoretical aspects.
- 7. To provide the latest subject matter, both theoretical as well as practical, such a way to foster their core competency and discovery learning. A botany graduate as envisioned in this framework would be sufficiently competent in the field to undertake further discipline-specific studies, as well as to begin domain-related employment.
- 8. To mould a responsible citizen who is aware of most basic domain-independent knowledge, including critical thinking and communication.
- 9. To enable the graduate prepare for national as well as international competitive examinations, especially UGC-CSIR NET and UPSC Civil Services Examination.



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SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)

### SEM-III: CC-BOT-301: MYCOLOGY AND PHYTOPATHOLOGY

### LEARNING OUTCOME:

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

- Identify true fungi and demonstrate the principles and application of plant pathology in the control of plant disease.
- Demonstrate skills in laboratory, field and glasshouse work related to mycology and plant pathology.
- Develop an understanding of microbes, fungi and lichens and appreciate their adaptive strategies.
- Identify the common plant diseases according to geographical locations and device control measures.

### SEM-III: CC-BOT-302: ARCHEGONIATE

### **LEARNING OUTCOME:**

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

- Demonstrate an understanding of archegoniatae, Bryophytes, Pteridophytes and Gymnosperms.
- Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.
- Understanding of plant evolution and their transition to land habitat.
- Demonstrate proficiency in the experimental techniques and methods of appropriate analysis of Bryophytes, Pteridophytes, Gymnosperms.

### ES-BOT-301: Plant Diversity and Human Welfare

**LEARNING OUTCOME:** On completion of the course, the students will be able to:

- Develop understanding of the concept and scope of plant biodiversity.
- Identify the causes and implications of loss of biodiversity.
- Apply skills to manage plant biodiversity.
- Utilize various strategies for the conservation of biodiversity.
- Conceptualize the role of plants in human welfare with special reference to India.



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#### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN B.Sc. Programme with 144 credits CBCS-Semester-Grading Pattern

w.e.f.June-2021 General Pattern/Scheme of study components along with credits for Science faculty. HEMCHANDRACHARYA NORTH GUIARAT UNIVERSITY, PATAN B.Sc. three year (General) Programme with 144 credits Semester-III and IV in BOTANY w.e.f. June-2021 General Pattern/Scheme of study components along with credits Ins. Examination Hrs/ Credit **Study Components** Internal Uni. Total Week Marks Exam. Marks Marks Semester-III **Core Compulsory (CC) Course** CC-I-3 3 70 100 3 Core Course-I (Paper-3) 30 CC-I-4 Core Course-I (Paper-4) 3 30 70 100 3 CC-II-3 Core Course-II (Paper-3) 3 30 70 100 3 CC-II-4 3 Core Course-II (Paper-4) 30 70 100 3 Soft-skill: Practical Core (PC) Course PC-I-3 3 Practical Core Course-I (Paper-3) 50 50 1.5 PC-I-4 Practical Core Course-I (Paper-4) 3 50 50 1.5 PC-II-3 3 Practical Core Course-II (Paper-3) 50 50 1.5 PC-II-4 Practical Core Course-II (Paper-4) 3 50 50 1.5 Foundation Course (FC) FG-21 2 50 2 Compulsory English (L.L.) 15 35 **Elective Course (EC)** EG-21 Elective (Generic) Course 2 2 15 35 50 ES-21 Elective (Subject) Course 2 15 35 50 2 30 165 585 750 24 Semester-IV **Core Compulsory (CC) Course** CC-I-5 Core Course-I (Paper-5) 3 30 70 100 3 CC-I-6 70 3 30 100 3 Core Course-I (Paper-6) CC-II-5 Core Course-II (Paper-5) 3 30 70 100 3 CC-II-6 Core Course-II (Paper-6) 3 3 30 70 100 Soft-skill: Practical Core (PC) Course PC-I-3 3 50 50 Practical Core Course-I (Paper-5) 1.5 PC-I-4 Practical Core Course-I (Paper-6) 3 50 50 1.5 PC-II-3 Practical Core Course-II (Paper-5) 3 50 50 1.5 PC-II-4 3 Practical Core Course-II (Paper-6) 50 50 1.5 Foundation Course (FC) FG-21 Compulsory English (L.L.) 2 15 35 50 2 **Elective Course (EC)** EG-21 Elective (Generic) Course 2 15 35 50 2 ES-21 2 2 Elective (Subject) Course 15 35 50 30 24 165 585 750



### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

### **B.Sc Programme (CBCS - Semester - Grading Pattern)**

### **B. Sc.:: BOTANY :: SEMESTER END EXAMINATION**

### Format for Questions paper Core Compulsory Course in Botany

### (B.Sc. Sem. - III)

### (W.E.F. JUNE - 2021)

### The university examination paper consists of four questions.

- ➢ First question is of 20 marks and will be from Unit − I.
- Second question is of 20 marks and will be from Unit II.
- > Third question is of 20 marks and will be from Unit III.
- ➢ Fourth question is of 10 marks and will be from Unit − I TO IV.

### Time: 2.5 Hrs

### Total Marks: 70

- 1. Long answered and medium answered/short note-typed questions from Unit-I18a. Long answered questions (Attempt any two from three each of 5 marks)
  - b. Medium answered or short note-typed questions (Attempt any two from three each of 4 marks)
- 2. Long answered and medium answered/short note-typed questions from Unit-II 17
  - a. Long answered questions (Attempt any two from three each of 5marks)
  - b. Medium answered or short note-typed questions (Attempt any two from three, 4+3 marks)
- 3. Long answered and medium answered/short note-typed questions from Unit-III
  a. Long answered questions (Attempt any two from three each of 5 marks)
  - b. Medium answered or short note-typed questions (Attempt any two from three , 4+3 marks)
- 4. a. Answer the following questions (any six out of eight)
  (Objective type short questions)
  b. Answer the following questions (any 5 out of seven)
  (MCQs)

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SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)

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### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN B.Sc. Programme (CBCS - Semester - Grading Pattern)

### **B. Sc.:: BOTANY :: SEMESTER END EXAMINATION**

### Format for Questions paper Elective Course in Botany

### (B.Sc. Sem - III)

### (W.E.F. JUNE - 2021)

### The university examination paper consists of three questions.

- ▶ First question is of 12 marks and will be from Unit I.
- Second question is of 12 marks and will be from Unit II.
- > Third question is of 11 marks and will be from Unit I & II.

### Time: 2 Hrs

### Total Marks: 35

Q.1 (a) Attempt any one out of two.	06 Marks
(b) Attempt any two out of three.	06 Marks
Q.2 (a) Attempt any one out of two.	06 Marks
(b) Attempt any two out of three.	06 Marks
0.3 (a) Attempt any three out of five (SO).	06 Marks
(b) Attempt any five out of eight	OF Morika
(b) Attempt any five out of eight.	U5 Marks



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SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)

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### B. Sc. Semester-III Botany :: CC-BOT-301 Mycology and Phytopathology (Credits: Theory-3, Practical-1.5) Theory Lectures: 54

### Unit 1: Fungi-1

(18 lectures)

- General characteristics; Affinities with plants. Thallus organization; Cell wall composition; Nutrition; Classification (Ainsworth).
- **Phycomycetes**: Zygomycetidae: Characteristic features. Thallus organisation; Reproduction; Life cycle and classification with reference to *Rhizopus*.
- **Ascomycetes**: General characteristics (asexual and sexual fruiting bodies); Life cycle and classification with reference to *Claviceps*.
- **Basidiomycetes**: General characteristics; Life cycle and Classification with reference to *Agaricus*.

### Unit 2: Fungi-2

- Allied Fungi: General characteristics; Status of Slime molds, Classification; Occurrence; Types of plasmodia; Types of fruiting bodies.
- Lichens: Occurrence; General characteristics; Classification; Study of thallus (morphological and anatomical), Reproduction; Economic importance.
- Mycorrhiza: Ectomycorrhiza, Endomycorrhiza and their significance.
- Applied Mycology: Application of fungi in food industry (Flavour & texture, Fermentation, Baking, Organic acids, Enzymes, Mycoproteins); Medicines (Pharmaceutical preparations); Agriculture (Bio fertilizers).

### Unit 3: Phytopathology

- Terms and concepts; General symptoms.
- Geographical distribution of diseases. Host-Pathogen relationships.

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- Pathogen, Symptoms, Dissemination, Disease cycle and control measures of following plant diseases:
  - Bacterial diseases Citrus canker.
  - Fungal diseases –

White rust of crucifers.Image: Crucifers.Black rust of wheat.I/c. Reg

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SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)

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(18 lectures)

(18 lectures)

### **B. Sc. Semester-III**

### Botany :: PC-BOT-301

### Mycology and Phytopathology

### Practicals:

- 1. *Rhizopus*: study of asexual stage from temporary mounts and sexual structures through permanent slides/photographs/charts.
- 2. *Claviceps*: study of asexual stage from temporary mounts. Study of Sexual stage from permanent slides/photographs/charts.
- 3. *Agaricus*: Specimens of button stage and full grown mushroom; sectioning of gills of *Agaricus*. Permanent slides/photographs/charts.
- 4. *Lichens*: Study of growth forms of lichens (crustose, foliose and fruticose) on different substrates. Study of thallus and reproductive structure (apothecium) through Permanent slides/photographs/charts/specimen.
- 5. Mycorrhizae: Ectomycorrhiza and Endomycorrhiza (Photographs).
- 6. **Phytopathology**: Study of Plant diseases: Citrus Canker, White rust of crucifers and Black rust of wheat.

### Suggested Readings

- 1. Agrios, G.N. (1997) Plant Pathology, 4th edition, Academic Press, U.K.
- 2. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley & Sons (Asia) Singapore. 4th edition.
- 3. Webster, J. and Weber, R. (2007). Introduction to Fungi, Cambridge University Press, Cambridge. 3rd edition.
- 4. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi and Their Allies, Macmillan Publishers India Ltd.
- 5. Sharma, P.D. (2011). Plant Pathology, Rastogi Publication, Meerut, India.



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### B. Sc. Semester-III Botany :: CC-BOT-302 Archegoniate (Credits: Theory-3, Practical-1.5) Theory Lectures: 54

### **Unit 1: Bryophytes**

(18 lectures)

(18 lectures)

lectures)

(18)

- General characteristics of Bryophytes; Adaptations to land habit; Classification (Rothmaler); Alternation of generations.
- Classification (up to family), morphology, anatomy and reproduction of *Marchantia*.
- Classification (up to family), morphology, anatomy and reproduction of *Funaria*.
- Vegetative reproduction and economic importance of bryophytes.

### **Unit 2: Pteridophytes**

- General characteristics of Pteridophytes; Classification (Smith); Economic importance of Pteridophytes.
- Classification (up to family), morphology, anatomy and reproduction of *Equisetum* (Developmental details not to be included).
- Classification (up to family), morphology, anatomy and reproduction of *Nephrolepis* (Developmental details not to be included).
- Heterospory and seed habit.

### Unit 3: Gymnosperms

General characteristics, classification of Gymnosperms (Sporne, 1965).

- Affinities with Pteridophytes and Angiosperms.
- Morphology, anatomy (leaflets and coralloid root) and reproduction of *Cycas* (Developmental details not to be included).
- Economic importance of Gymnosperms.



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SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)

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### B. Sc. Semester-III Botany :: PC-BOT-302 Archegoniate

### <u>Practical</u>

- 1. *Marchantia* Morphology of thallus, whole mount of rhizoids & scales, vertical section of thallus through Gemma cup, whole mount of Gemmae (temporary slides), vertical section of Antheridiophore, Archegoniophore, longitudinal section of Sporophyte (all permanent slides).
- 2. *Funaria* Morphology, whole mount of leaf, antheridial and archegonial heads, operculum, peristome, annulus, spores (temporary slides); permanent slides showing antheridial and archegonial heads; longitudinal section of capsule and protonema.
- 3. *Equisetum* Morphology, transverse section of internode, longitudinal section of strobilus, transverse section of strobilus, whole mount of spores (wet and dry) (temporary slide), transverse section of rhizome (permanent slide).
- 4. *Nephrolepis* Morphology, vertical section of sporophyll, whole mount of sporangium, whole mount of spores (temporary slides), transverse section of rachis, whole mount of prothallus with sex organs and young sporophyte (permanent slide).
- 5. *Cycas* Morphology (coralloid roots, bulbil, leaf, microsporophyll, megasporophyll), vertical section of leaflet, whole mount of spores (temporary slides), vertical section of microsporophyll, longitudinal section of ovule (permanent slide).

### Suggested Readings

Vashistha, P.C., Sinha, A.K., Kumar, A. (2010). Pteridophyta. S. Chand. Delhi, India.

- Bhatnagar, S.P. & Moitra, A. (1996). Gymnosperms. New Age International (P) Ltd Publishers, New Delhi, India.
- Parihar, N.S. (1991). An introduction to Embryophyta: Vol. I. Bryophyta. Central Book Depot. Allahabad.

Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005). Biology. Tata McGraw Hill, Delhi.

Vanderpoorten, A. & Goffinet, B. (2009) Introduction to Bryophytes. Cambridge University Press.

SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)

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### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN **CBCS - Semester - Grading Pattern** B. Sc.:: BOTANY :: SEMESTER-III **ES-BOT-301 :: Plant Diversity and Human Welfare**

(Credits: Theory-2) Theory Lectures: 30 (Effective from June-2021)

### **Unit 1: Plant Diversity**

- Plant diversity and its scope- Genetic diversity, Species diversity and Ecosystem • diversity.
- Values and uses of Biodiversity: Ethical and aesthetic values, uses of plants (Food value), Uses of microbes.
- Loss of Biodiversity: Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agrobiodiversity.
- Conservation of diversity, In situ and ex situ conservation, Sustainable development.

### Unit 2: Human Welfare

- Importance of forestry their utilization and commercial aspects ٠
- Avenue trees of India
- Ornamental plants of India.
- Alcoholic beverages through ages. Fruits and nuts: Important fruit crops their • commercial importance. Wood and its uses.

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I/c. Registrar

(15 lectures)





### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN CBCS - Semester - Grading Pattern B. Sc. :: BOTANY Practical :: SEMESTER-III PC-BOT-301 (Effective from June-2021)

Da	ate: Place:	
Ti	me: 5 Hrs Total M	arks: 50
	<b>Instructions</b> : Strictly follow the instructions given by examiner(s).	
1.	Identify and classify with giving reasons up to family of given specimen <b>A</b> .	08
2.	Identify and describe with structural peculiarities observed in the given specimen Draw the labelled diagram.	B. 08
3.	Expose the pathogen from the given plant material <b>C</b> and prepare temporary slide. Make a labelled diagram and show your preparation to the examiner.	08
	OR	
3.	Make a temporary slide of the reproductive organ from the given specimen <b>C</b> . Draw the labelled diagram of it and show your slide to the examiner.	08
4.	Identify and describe as per given instructions:	16
	1) Specimen – <b>D</b> : Permanent slide/charts (Unit – I Fungi)	
	2) Specimen – E: Permanent slide/charts (Unit – II Lichens/Mycorrhiza)	
	3) Specimen – F: Permanent slide/charts (Plant pathology)	
	4) Specimen – <b>G</b> : Permanent slide/charts (Unit – I, II and III)	
5.	a. <i>Viva-voce</i>	05
	b. Journal	05
	Uc. Registrar Hemchandracharya	3

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### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN **CBCS - Semester - Grading Pattern** B. Sc. :: BOTANY Practical :: SEMESTER-III **PC BOT-302** (Effective from June-2021)

Da	te:		Place:
Ti	me: 5	Hrs	Total Marks: 50
	Ins	<b>tructions</b> : Strictly follow the instructions given by examiner(s).	
1.	Iden	tify and classify giving reasons up to family of given specimen <b>A</b> .	08
2.	Iden Drav	tify and describe structural peculiarities observed in the given specin v the labelled diagram.	nen <b>B</b> . 08
3.	Mak	e a temporary slide of the reproductive organ from the given specime	n <b>C</b> .
	Drav	w the labelled diagram of it and show your slide to the examiner.	08
4.	Ident	ify and describe as per given instructions:	16
	1)	Specimen – <b>D</b> : Permanent slide/charts (Bryophyta)	
	2)	Specimen – E: Permanent slide/charts (Pteridophyta)	
	3)	Specimen – F: Permanent slide/charts/specimen (Gymnosperm)	
	4)	Specimen – <b>G</b> : Permanent slide/charts (Unit – I, II and III)	

5. a	1.	Viva-voce	05
b	).	Journal	05

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SYLLABUS OF B.Sc. SEM III BOTANY SUBJECT (effect from June 2021)



# HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY NAAC A (3.02) State University PATAN-384265

Faculty of Science

B.Sc. Chemistry

Syllabus

Semester-III & IV

W.E.F June-2021 (and thereafter)

### CURRICULUM

Hemchandracharya

North Gujarat University,

Patan.

B.Sc. (Chemistry)

(WEF June: 2021)



### General Information of B.Sc Chemistry Semester III & IV Syllabus According To CBCS Pattern

**1.** The medium of instruction, question papers as well as answers in examinations will be Gujarati /English. Students are permitted to write answers in English or Gujarati language.

**2.** Passing standard: 40% as per the revised rules and regulation of Hemchandracharya North Gujarat University, Patan (AK/A×S/6179/2021, Date 29/01/2021).

**3.** Viva voice will be pertaining to practicals.

**4.** The result sheet of all semesters will contain the name of elective papers selected by the candidate. The grade and the credit secured.

**5.** The proposed new courses in chemistry for under graduate classes are reassigned in accordance to semester/CBCS/Grading system with new educational policy. The new course is based on model curriculum of the university grants commission.

#### Its objectives are as under:

- A. To meet the growing demand of specialization and Advanced courses in applied Science.
- B. To help the colleges to update and modernize their laboratories.
- C. To redesign the courses with special emphasis on local requirements, environment and to link the courses, with requirements of the industries and research.

**6.** There will be two papers of chemistry are core compulsory and one paper of subject elective in theory and five hours for practical in the University Examination. The pattern will be as follow.

**7.** This syllabus is to be completed by assigning three periods of one hour each for each paper of theory and two practicals of three hours each per week & the number of students in practical batch should not exceed twenty.

**8.** The number of students in practical batch in University Examination should not exceed twenty four between two examiners.

**9.** For semester III the papers; CCCH-301, CCCH-302 are core compulsory. Furthermore, students will have to choice any one of SECH-301A & SECH-301B and Practicals LCCH-301 & LCCH-302.

**10.** For semester IV the papers; CCCH-401, CCCH-402 are core compulsory. Furthermore, students will have to choice any one of SECH-401A & SECH-401B and Practicals LCCH-401 & LCCH-402.



### CHEMISTRY B.Sc. Semester: III

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN						
Programme code :		-	Programme Name :	B.Sc.		
Faculty :	SCIENCE		Semester :	III		
Subject :			CHEMISTRY			
Effective from :	JUNE - 2021					

Sr.	Paper Code	Name of Paper	Credit
1	CC CH - 301	CORE COMPULSORY- CHEMISTRY - I	3
2	СС СН - 302	CORE COMPULSORY- CHEMISTRY - II	3
	SE CH - 301 A	SUBJECT ELECTIVE - ENVIRONMENTAL POLLUTION	2
3	SE CH - 301 B	SUBJECT ELECTIVE - CERAMICS	2
4	FC	FOUNDATION COURSE - ENGLISH	2
5	GEC	GENERIC ELECTIVE COURSE	2
6	LC CH - 301	LABORATORY COURSE - I	1.5
7	LC CH - 302	LABORATORY COURSE - II	1.5
8		TWO PAPERS OF SECOND CORE SUBJECT	6
9		TWO PRACTICALS OF SECOND CORE SUBJECT	3
		Total	24



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### Hemchandracharya North Gujarat University, Patan B.Sc. Semester - III Chemistry (CC CH : 301)

### **Unit : I WAVE MECHANICS:**

- Black Body Radiation & Quantum Theory.
- Photo electric effect: Wave particle duality of radiation.
- Compton Effect.
- Basic postulates of quantum Mechanics.
- Operator: Definition, Algebra of operators, Addition, Multiplication, Commutative properties, Linear operator, Commutative operators, Laplacian operator
- Free particle System.
- Particle in one dimension box.

### **Unit : II ACID- BASE PROPERTIES :**

- Proton acids Bases and Lewis acids- Bases.
- Scale of acidity Basicity.
- Factors effecting on acidity and basicity of compounds.
  - Resonance effect (Drawing resonance structures and the conditions for resonance).
  - Inductive effect
  - > Hybridization.
  - Steric effects.
  - Effects by hydrogen bonding.

#### Unit: III IONIC EQUILIBRIUM

• Only introduction

Electrolysis, Ionic equilibrium, Resistance, Conductance, Specific Conductance, equivalent Conductance, Molar conductance and equivalent conductance at infinite dilution.

- Transport number: Determination of transport number (i) Hittorf's Method
  - (ii) Moving Boundary Method.
- Numerical.
- Types of Condctometric titration
  - Acid Base titration:
    - 1) Strong acid Vs Strong base,
    - 2) Strong acid Vs Weak base,
    - 3) Weak acid Vs Strong base,
    - 4) Weak acid Vs Weak base,
    - 5) Strong acid + Weak acid Vs Strong base.



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(16 Hrs.)

(16 Hrs.)

(16 Hrs.)

• Hydrolysis of salt:

Classification of salt

- 1) To determine pH equation by hydrolysis of strong acid & weak base Salt.
- 2) To determine pH equation by hydrolysis of weak acid & strong base salt.
- 3) To determine pH equation by hydrolysis of weak acid & weak base salt.
- Numerical.

**Note:** The nomenclature of Inorganic and organic compounds should be done as per Recommendation of 2004 IUPAC Draft.



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### Hemchandracharya North Gujarat University, Patan **B.Sc. Semester - III** Chemistry (CC CH : 302)

#### **Unit : I CHEMISTRY OF NOBLE GASES :**

- Introduction
- Discovery of Noble gases: Occurrence, Isolation of Non- radioactive of Noble gases.
- Electronic configuration of Noble gases.
- Compound of Noble gases.
  - 1) Non real compounds prepared by different methods.
  - 2) True compounds:  $XeF_2$ ,  $XeF_4$ ,  $XeF_6$ ,  $XeOF_2$ ,  $XeO_2F_2$ ,  $XeOF_4$ ,  $XeO_3$ ,  $XeO_4$

### **Unit : II ELECTROPHILLIC AROMATIC SUBSTITUTION :**

- Introduction.
- Effect of substituent groups.
- Determination of orientation.
- Classification of substituent groups.
- Orientation in disubstitued benzenes.
- Use of Orientation in synthesis.
- Mechanism of Nitration, Sulphonation, Friedel crafts alkylation and Halogenation.
- Electrophilic aromatic substitution (Two steps).
- Theory of Reactivity & Orientation.
- Electron release via resonance.

### **Unit: III THERMODYNAMICS :**

- Clapeyron equation and its Applications for various phase equilibrium.
- Integrated form of Clapeyron Clauses equation, and its Applications for various phase equilibrium.
- Traouton's Law.
- Craft equation.
- Boiling point elevation.
- Freezing point depression.
- Partial molar Properties. Gibbs duhem equation of Free energy, Entropy, Enthalpy Concept of chemical potential Gibbs duhem equation., Duhem margules equation. Variation of chemical potential with temperature and pressure.
- Roult's law of ideal solution, Vapour pressure of Ideal solutions & Thermodynamics of Ideal solutions.
- Numerical

Note: The nomenclature of Inorganic and organic compounds should be done as per recommendation of 2004 IUPAC Draft. m



I/c. Registrar Hemchandracharya North Gujarat University PATAN

### (16 Hrs.)

(16 Hrs.)

(16 Hrs.)

**REF**:

### > Inorganic Chemistry:

1. Quantum Chemistry by R.K.Prasad, Revised III<sup>rd</sup> Edition, Page – 3,5,7,34-37,41,65-68.

2. Concise Inorganic Chemistry J.D.Lee, 4<sup>th</sup> Edition, ELBS publication.

### > Organic Chemistry

- 1. Organic Chemistry by Morrison and Boyd.4<sup>th</sup> ed. Pearson Education-2003
- 2. Organic Chemistry by Pine, Hendriction, Cram and Hammond 4<sup>th</sup> ed. By P.S.Kalsi.
- 3. Advance Organic Chemistry by Jerry March.
- 4. Advance Organic Chemistry by Arun Bahal and B.S.Bahal.
- 5. Organic Chemistry Vol. I & II by S.M.Mukherji, S.P.Sing, R.P.Kapoor.
- Reaction mechanism and Reagents in Organic Chemistry by Gurdeep R Chatwal 4<sup>th</sup> ed. Himalaya public House.
- 7. Text book of Organic Chemistry by Arun Bahal, B.S.Baha, S.Chand.
- 8. Organic Spectroscopy by P.S.Kalsi.
- 9. Organic Chemistry by I.R.Finar.

### > Physical Chemistry

- 1. Advance Physical Chemistry by Gurdeep Raj
- 2. Physical Chemistry (Question and Answers) by R.N.Madan, G.D.Tully, S. Chand.
- 3. Principal of Physical Chemistry by Puri, Sharma, Pathania.
- 4. Chemical Thermodynamics by R.P.Rastogy and R.R.Mishra.
- 5. Essential of Physical Chemistry by B.S.Bahal, Arun Bahal, G.D.Tully.
- 6. Physical Chemistry by P.W.Atkins, 5<sup>th</sup> ed., Oxferd 1994 7<sup>th</sup> ed. 2002
- 7. Physical Chemistry by R.A.Alberty and R.J.Silbey, John Willey, 1995.
- 8. Physical Chemistry by G.H.Barrow, 5<sup>th</sup> ed., Mac Graw Hill, 1998, 6<sup>th</sup> Ed.
- 9. Physical Chemistry by W.J.Moore, 4<sup>th</sup> ed., Orient Longmans, 1969.



### Hemchandracharya North Gujarat University, Patan B.Sc. Semester - III Chemistry (SE CH : 301 A) ENVIRONMENTAL POLLUTION (Subject Elective)

#### Unit: I AIR POLLUTION AND WATER POLLUTION

(16 Hrs.)

- Introduction
- Classification of pollutant
- Types of pollution What is air pollution
- Source of air pollution
- Acid Rain
- Emissions of major industrial air pollutant
- What is water pollution
- Types of water pollution- Physical & Chemicals, Biological and Physiological
- Source of Water Pollution

### Unit: II SOIL, NOISE, THERMAL AND RADIO POLLUTION (16 Hrs.)

- What is soil pollution
- Sources of soil pollution
- Effect of Morden Agro-Technology on Soil
- What is Noise Pollution
- What is Thermal Pollution
- What is Radio Active Pollution
- Prevention of Pollution

### **REF:-**

1. Industrial Chemistry by B. K. Sharma.



### Hemchandracharya North Gujarat University, Patan B.Sc. Semester - III Chemistry (SE CH : 301 B) CERAMICS (Subject Elective)

### Unit: I CERAMICS :

#### (16 Hrs.)

- Introduction of Ceramics , History Definition and Industrial uses of Ceramics Modern Ceramics – Hi-tech ceramics – Sub–division in Ceramics.
- Ceramics bodies,
- Procedures of body preparation,
- Quality testing of raw material,
- Grinding, Sieving and Demagnetizing,
- Filter pressing,
- Dearing pug mill,
- Slip casting & Slip Parameters,
- Finishing & Glazing & Firing,
- Type of kiln

#### Unit: II CERAMIC PROPERTY MEASUREMENTS & REFRACTORIES : (16 Hrs.)

- Common physical test in ceramics.
- Moisture measurement,
- Grit content,
- Specific density,
- Water of plasticity (WOP),
- Viscosity,
- Dry shrinkage,
- Porosity,
- Water absorption,
- Fired shrinkage,
- Loss of ignition(LOI) & Module of rapture (MOR),
- Crazing test.
- Classification of Refractories,
- Properties and application of Refrectories,
- Manufacturing process of silica bricks.

#### **REF**:

- 1. Industrial ceramics -Felix singer and Sonja S.Singer
- 2. Ceramic technology and processing Alan G. king
- 3. Source book of Ceramics, part-1 S.Kumar
- 4. Source book of Ceramics, part-2 S.Kumar



### Hemchandracharya North Gujarat University, Patan B.Sc. Semester - III Laboratory Course – I & II (Chemistry)

### Lab Course: I Inorganic Chemistry :

Inorganic qualitative analysis of mixture containing 4 radicals (Any Six) (Except  $PO_4^{-3}$ ,  $BO_3^{-3}$ ,  $ASO_4^{-3}$ ,  $ASO_3^{-3}$ ,  $O^{-2}$ )

### Lab Course: II Analytical Chemistry :

#### Volumetric Analysis of Cu, Zn, Ni and Water (Any Three)

- 1. To determine the amount of Zn by EDTA method.
- 2. To determine the amount of Cu by iodometry method.
- 3. To determine the hardness of water by EDTA method.
- 4. To determine the amount of  $Ni^{+2}$  by back titration method.

### Estimations of Glucose, Aniline, and Carboxylic acid: (Any Two)

- 1. To determine the amount of Aniline by brominating method.
- 2. To determine the no. of -COOH groups present in a given unknown organic acid.
- 3. To determine the amount of Glucose by oxidation method.

### **Chromatography:** (Any Two groups)

To determine the Rf values of 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> groups ions by paper chromatography.

### University Exam Pattern for B.Sc. Sem - III : (Two Days per Batch)

Name of Practical	Day	Marks	
Lab. Course – I Inorganic Qualitative	First day (5 hours)	40 + 5 (viva) = 45	
Lab. Course – II Analytical Chemistry	Second day (5 hours)	40 + 5 (viva) = 45	
	Journal	10	
	Total	100	

#### **REF:-**

- 1. Advanced practical chemistry, Jagdamba singh, Pragati prakashan
- 2. A Manual of practical Engineering Chemistry, Dr.M.S.Sudha Jain, S.Chand & Company Ltd.
- 3. Vogel's Qualitative inorganic Analysis, 7<sup>th</sup> Edition, G.svehla.

### Hemchandracharya North Gujarat University PATAN-384 265

NAAC 'A' (CGPA) Accredited (State University)

### U.G. (B. Sc.) Programme CBCS :: Semester :: Grading Pattern

With effect from: June 2021

Faculty Science

Subject PHYSICS

### **NEW SYLLABUS / SCHEME**

**B.Sc. Semesters III & IV** 



m

### Choice Based Credit System-Semester-Grading System In Under Graduate B Sc Programme

### **B** Sc Semester 3 and 4

The 11<sup>th</sup> Five Year plan of India proposed various measures for academic reforms in higher education. Keeping in view the challenges of the changed times and make the higher education in Indian Universities compatible with the universities in developed nations, the UGC (11<sup>th</sup> Plan, March 2009) and later on the Association of Indian Universities (AIU) stressed on the following recommendations:

- Semester System
- \* Choice Based Credit System.
- Curriculum Development
- Examination Reforms
- \* Administrative Reforms

All the above recommendations for reforms have been reviewed in by representatives of various universities in the Gujarat State and considered for implementation with the aim of transforming Higher Education-**a transformation where students change from being passive recipients of knowledge to becoming active participants of the knowledge imbibing process**. The education system in the State thus changes from a teacher-centric to **learner- centric** mode. It should aim at all-round integral development of students' personality so that they become good citizens of the new world order.

### Salient Features of CBCS in UG Programme:

- 1. Physics subject in the Universities/Affiliated Colleges shall offer undergraduate programme in Faculty of Science from the Academic year 2021-22.
- 2. A student will have to get enrolled a **Core course** depending upon his/her requirement of a degree in the said discipline of study. A student will have a choice of selecting an **Elective** as well as **Foundation** courses from a pool of courses.
- 3. Each course shall be assigned a specific number of **Credits**.
- 4. A Core course is the course which should compulsorily be studied by a candidate as a Core requirement so as to get degree in a said discipline of study.
- 5. There shall be four Core Compulsory courses (Theory) each with 3 credits and their practical's each with 1.5 credits. Thus, a credit weight-age in Sem-III & IV of B Sc programme for each core course shall be of 4.5 credits. In short, 4.5 credits multiplied by 4 core compulsory courses equal to total of 18 credits.



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- 6. In addition to the Core courses, a student will have to choose Elective as well as Foundation courses from a pool of courses.
- 7. Two courses of Elective, one each from Generic Elective and Interdisciplinary / Multidisciplinary
   / Subject centric electives shall have to be offered. The credit weight-age for

**Subject centric electives** shall have to be offered. The credit weight-age for each Elective course shall be of **02 Credits**. Hence, a total credit weight-age for Elective courses shall be of **4 credits**.

8. One **Foundation** (English Language) course shall have to be offered. The credit weight-age for Foundation course shall be of **02 credits**.

Each course shall have a unique Course code. The Core courses, Elective courses and the Foundation courses shall be abbreviated respectively as **CC**, **PC**, **EG**, **ES and FC**.

- 1. Core Compulsory CC and Practical Core PC
- 2. Core Compulsory CC and Practical Core PC
- 3. Elective Generic EG and Elective Subject ES
- 4. Foundation Compulsory- FC

Each Academic year shall consist of **two** semesters, each of **15 weeks** of teaching equivalent to 90 working days. The Odd semester period shall be from **July to November** and the Even semester period shall be from **December to April**.

The course with **4 credits** shall be of **60 hrs** (**15 weeks x 4 credits**) duration. The course with **3 credits** shall be of **45 hrs** (15 weeks x 3 credits) duration. The course with **2 credits** shall be of **30 hrs** (15 weeks x 2 credits) duration.

A general framework for Bachelor of Science (B Sc) Programme shall be as follows:

Semester wise credits						Total credits of the	
Ι	II	ΠΙ	IV	V	VI	Programme	
24	24	24	24	24	24	144	

The semester wise weight-age of core, elective and foundation courses shall be as follows:

Academic Year	Core Compulsory Courses	Elective courses	Foundation courses
Semester I & II	65-75%	15-20%	10-15%
Semester III & IV	65-75%	15-20%	10-15%
Semester V & VI	65-75%	15-20%	10 -15%
1:00-	3		m



#### Attendance:

The Attendance Rules as per the norms of Hemchandracharya North Gujarat University.

#### **Medium of Instruction:**

The Medium of Instruction shall be of **Gujarati medium**. Student is free to write answers either in **Gujarati** or **English** language.

#### Language of Question paper:

Question paper should be drawn in Gujarati language and its English version should be given.

#### **Evaluation Methods:**

 A student shall be evaluated through Comprehensive Continuous Assessment (CCA) or (Internal Evaluation) as well as the End of Semester examination (External Evaluation). The weight-age of CCA or IA shall be 30%, where as the weight-age of the Semester end examination shall be 70%.

There will be no internal evaluation in Practical Courses as well as in elective courses.

- 2. The Semester assessment (CCA) or (Internal Evaluation) is spread through the duration of the course and is to be done by the Teacher teaching the course. The assessment is to be done by various means including:
  - ✓ Internal Test 20 Marks
  - Assignments 05 Marks
  - ✓ Attendance 05 Marks

The performance of student in each course is evaluated in terms of percentage of marks with a provision for conversion to grade points. Evaluation for each course shall be done by continuous internal assessment as well as semester end exam and will be consolidated at the end of the course.

- 3. The **End of Semester examination** (**External Evaluation**) shall have an assessment based upon following perspective with respect to all the courses:
  - ✓ Evaluation with respect to Knowledge
  - Evaluation with respect to Understanding
  - Evaluation with respect to Skill
  - Evaluation with respect to Application



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- ✓ Higher Order Thinking Skills
- 4. With respect to all the above components, there shall be following types of Questions from each unit of the course.
  - ✓ MCQs/Fill in the blanks/ Match the pairs, etc
  - Short answer questions /Defenation
     Medium answer questions
     Long answer questions

  - ✓ Examples/ Problems, etc
- 5. The End of Semester Examination (Theory) will be conducted by the University. A Certified Journal of the respective core compulsory course shall be produced at the time of practical examination and it must compulsory. In Practical Exam there will be two practicals (each from PC-301 & PC-302) each of 50 marks (35-marks for practical + 15 marks for Viva) and duration of each practical will be 3 hours. Numbers of student in a practical exam will be 20 to 24 and Numbers of examiners will be 2.

Marking Scheme of B Sc sem 3 and 4 Physics Practical for each one

1.	Understanding – Approach – Attitude for Experiment	- 10
2.	Observation table with Reading, Unit	- 10
3.	Calculation with proper formula and Graph	- 08
4.	Accuracy	- 02
5.	Viva (Ques related experiment and about basic physics)	- 15
6.	Certified Journal	- 05
	Tota	al - 50

- 6. It will be compulsory for a candidate to obtain passing percentage in both Internal as well as External Evaluation. The passing marks for each course shall be 40%, or as decided by concern Board of Studies of the Subject.
- 7. Promotion, Re-Admission and Time for Completion of Course, Procedure for Awarding Grades, Provision for Appeal, etc. as decided by the Hemchandracharya North Gujarat University, Patan.



### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN B.Sc. Programme with 144 credits CBCS-Semester-Grading Pattern

w.e.f. June-2021							
Gene	ral Pattern	/ Scheme of study components alon	g with crea	dits for Science faculty.			
Part/ Class	Course	Study Components	Instruction Hrs/ Week	Internal	Uni. Exam	Total	Credit
		Semester-III					
		Core Compulsory (CC) Course					
	CC-I-3	Core Course-I (Paper-3)	3	30	70	100	3
	<b>CC-I- 4</b>	Core Course-I (Paper-4)	3	30	70	100	3
	CC-II-3	Core Course-II (Paper-3)	3	30	70	100	3
	CC-II-4	Core Course-II (Paper-4)	3	30	70	100	3
III		Practical Core (PC) Course					
	PC-I-3	Practical Core Course-I (Paper-3)	3		50	50	1.5
en	PC-I- 4	Practical Core Course-I (Paper-4)	3		50	50	1.5
S.	PC-II-3	Practical Core Course-II (Paper-3)	3		50	50	1.5
Sc	PC-II-4	Practical Core Course-II (Paper-4)	3		50	50	1.5
B.		Foundation Course (FC)					
	FC-3	Foundation (Generic) Course – III Compulsory English (L.L.)	2	15	35	50	2
		Elective Course (E)					
	EG-3	Elective (Generic) Course –III	2	15	35	50	2
	ES-3	Elective (Subject) Course –III	2	15	35	50	2
			30	165	585	750	24
		Semester-IV					
		Core Compulsory (CC)Course					
	CC-I- 5	Core Course-I (Paper-5)	3	30	70	100	3
	CC-I- 6	Core Course-I (Paper-6)	3	30	70	100	3
	CC-II-5	Core Course-II (Paper-5)	3	30	70	100	3
	CC-II-6	Core Course-II (Paper-6)	3	30	70	100	3
		Practical Core (PC) Course					
Ė	PC-I- 5	Practical Core Course-I (Paper-5)	3		50	50	1.5
Se	PC-I- 6	Practical Core Course-I (Paper-6)	3		50	50	1.5
ં	PC-II-5	Practical Core Course-II (Paper-5)	3		50	50	1.5
	PC-II-6	Practical Core Course-II (Paper-6)	3		50	50	1.5
<b>H</b>		Foundation Course (FC)					
	FC-4	Foundation (Generic) Course – IV	_	1.7	25	50	2
	-	Compulsory English (L.L.)	2	15	55	50	2
		Elective Course (E)					



Elective (Generic) Course -IV

Elective (**Subject**) Course –IV

EG-4

ES-4

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165

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30

### Hemchandracharya North Gujarat University, Patan B.Sc. Programme for semester 3 & 4 (CBCS-Semester-Grading pattern) Semester end Examination Format for Question paper Elective Courses (Subject) in Physics w.e.f. June-2021

There will be three questions. First question will be from Unit - I, Second question from Unit-II, and Third question will be from both the Units. All the questions are detailed as under.

	ſ	Time: 2Hrs	Fotal Marks: 35
1	(a)	Attempt Any One out of Two (Theory questions)	06 Marks
	(b)	Attempt any two Out of Three (Theory type <b>or</b> Application/Example/Problem)	06 Marks
2	(a)	Attempt Any One out of Two (Theory questions)	06 Marks
	(b)	Attempt any two Out of Three (Theory type <b>or</b> Application/Example/Problem)	06 Marks
3	(a)	Attempt any three out of Five (Short or objective type ques	tions) 06 Marks
	(b)	Attempt any Five Out of Eight (Objective / MCQ)	05 Marks



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### Hemchandracharya North Gujarat University, Patan B.Sc. Programme for semester 3 & 4 (CBCS-Semester-Grading pattern) Semester end Examination Format for Question paper Core Compulsory Courses in Physics w.e.f. June-2021

There will be four questions. All questions are of 18, 17, 18, 17 marks each.First question will be from Unit - I,Second question will be from Unit-II,Third question will be from Unit-III,Forth question will be from all three Units.Detailed about all the questions is as under.

	Tim	e: 2.5 Hrs	Total Marks: 70
1	(a)	Answer any One out of Two (Long Theory type questions)	07 Marks
	(b)	Answer any Two Out of Three (Short Note/Application/Example/Problem)	10 Marks
2	(a)	Answer any One out of Two (Long Theory type questions)	08 Marks
	(b)	Answer any Two Out of Three (Short Note/Application/Example/Problem)	10 Marks
3	(a)	Answer any One out of Two (Long Theory type questions)	07 Marks
	(b)	Answer any Two Out of Three (Short Note/Application/Example/Problem)	10 Marks
4	(a)	Answer the following (Any Six out of Eight) (Short answer or objective type questions)	12 Marks
	(b)	Answer the following (Any Five out of Seven) (Very Short answer or MCQ type questions)	06 Marks



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### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN CBCS SEMESTER GRADING PATTERN B. Sc. SEMESTER III (PHYSICS SYLLABUS Effective from June - 2021)

### CC - PHYSICS - 301

### UNIT I THERMODYNAMICS AND SOUND

### Heat and Thermodynamics:

Characteristic functions, Enthalpy(11.1), The Helmholtz and Gibb's function(11.2), Two Mathematical Theorems(11.3), Maxwell's equation(11.4), The T dS equations (11.5), Internal-Energy equation(11.6), Heat capacity equation, The Thermal Exapansivity (11.9), Compressibility(11.10), Joule-Kelvin effect (Porous plug Experiment) (12.1) Liquification of Gases by Joule-Kelvin Effect (12.2) *Related Examples, Problems, MCQ & Short Questions* 

**Basic Reference:** Heat and Thermodynamics by Mark W. Zeemansky (5<sup>th</sup> Edition)

### **Kinetic Theory of Gases:**

Maxewell's Distribution Law of Velocities, Deduction of Maxewell-Boltzmann law, Determination of the values of constants 'a' and 'b' (6.5), Experimental Test of Maxwell's Law (6.6) *Related Examples, Problems, MCQ & Short Questions* 

#### **Basic Reference :**

Thermodynamics and Statistical Physics by Singhal – Agarwal - Prakash Pragati Prakashan, Meerut.

**Sound :** Microphones (20.1), Carbon Microphone(20.2), Condenser Microphone(20.3), Loudspeaker-(i)Fixed coil or moving iron type loudspeaker and (ii) Moving coil type loudspeaker(20.8) Recording of sound : Miller Phonodiek(21.1) *Related MCQ & Short Questions* 

### **Basic Reference :**

A Textbook of oscillations, waves and acoustics by Dr M Ghosh and D Bhattacharya (S Chand)

#### **Other References:**

- 1. University Physics by Sears, Zeemansky and Young. (6<sup>th</sup> Edi) Narosa publication, New Delhi.
- 2. Heat Thermodynamics and Statistical Physics by Brijlal, Dr. Subrahmanyam, P.S. Hemne S. Chand.
- 3. Waves and Oscillations by N Subrahmanyam, Brijlal.

### UNIT II ATOMIC PHYSICS

(A) Atomic Spectra: Franck -Hertz Experiment(2.16), Critical Potentials (2.17), Shortcoming of Bohr's Theory(2.19), Sommerfield extension of Bohr theory (2.20), Limitations of Sommerfield Model Related Examples, Problems, MCQ & Short Questions

Basic Reference: Atomic and Molecular Physics by Raj Kumar (Campus Books)



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### (B) Atomic Spectra :

Orbital and Magnetic Dipole Moment (4.1), Larmor Precession (4.2), Space quantization(4.3), electron spin (4.4), Vector model of atom (4.5), Spectroscopic terms and their notations(4.6), Stern Gerlach Experiment(4.7), Pauli's Exclusion Principle(4.8). Zeeman Effect-Normal Zeeman Effect and anomalous Zeeman Effect(12.1), Explanation of Normal Zeeman Effect(12.2), Explanation of Anomalous Zeeman Effect(12.3), Paschan Back effect (12.4). Stark Effect of Hydrogen (13.1) Weak field and strong field of stark effect in Hydrogen (13.2, 13.3)

#### Related Examples, Problems, MCQ & Short Questions

Basic Reference: Atomic & Molecular sprctra by Rajkumar Kedarnath Prakashan Meerut.

#### **Other Reference:**

- 1. Spectroscopy Vol-1 by Walker & Straw
- 2. Atomic Physics by J.B. Rajam (5<sup>th</sup> Edition 1960) S. Chand & Co.
- 3. Physics of Atoms and Molecules by B.H.Brandsden & C.J.Joachagh, Pearson Education.
- 4. Modern Physics by Kenneth Krane, Jon wiley &sons
- 5 Elements of Spectroscopy S L Gupta, V Kumar & R C Sharma (24<sup>th</sup> Edition) Pragati Prakashan
- 6. Molecular Structure and Spectroscopy G Aruldhas, Prentice Hall of India Private Limited

### UNIT III SOLID STATE PHYSICS

### **Crystal Structure:**

Crystalline and Amorphous Solid(1.1), Crystal Lattice and Crystal structure(1.2), translational Symmetry, Space, Unit Cell and Primitive Cell(1.3), Symmetry Elements in Crystals(1.4-1.4.1 to 1.4.6), The Seven crystal Systems(1.5), Coordination Number(1.5.1), Some important crystal structure(1.6), Simple Cubic Structure(1.6.1), Body Centered Cubic (BCC) Structure(1.6.2), Face Centered Cubic (FCC) Structure(1.6.3), Wigner-Seitz Cells (1.7), Miller Indices (1.8), The inter planar spacing of crystal planes (1.11). *Related Examples, Problems, MCQ & Short Questions* 

Basic Reference: Solid State Physics By Ajay Kumar Saxena (Macmillan India Limited)

### **Atomic Cohesion and Crystal Binding**

Cohesion of Atoms(2.1), Primary Bonds(2.2), The Covalent Bond(2.2.1), The Metalic Bond(2.2.2), The Ionic Bond(2.2.3), Mixed Bond(2.2.4), Secondary Bonds(2.3), The Van-der wall's Bond (2.3.1), The Hydrogen Bond(2.3.2), The Cohesive Energy(2.4), Ionic Crystal-Medalang Energy (2.4.1), Noble Gas Crystal (2.4.2), Atomic Radius and Lattice Constant (2.5), Elastic Constants of Crystals(2.6), Elastic Stress(2.6.1), Elastic Energy Density (2.7.1), Application to Cubic Crystal (2.7.2). *Related Examples, Problems, MCQ & Short Questions* 

Basic Reference : Elements of Solid State Physics (2003) by J. P. Shrivastav, PHI

#### **Other Reference :**

- 1. Introduction to solid state Physics By C.Kittle (John Willey)
- 2. Fundamental of solid state Physics By Saxena, Gupta, Saxena (pragati Prakashan)
- 3. Solid State Physics By Ajay Kumar Saxena (Macmillan India Limited)
- 4 Solid State Physics by S O Pillai



### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN CBCS SEMESTER GRADING PATTERN B. Sc. SEMESTER III (PHYSICS SYLLABUS : Effective from June - 2021)

### CC - PHYSICS – 302

### UNIT I ELECTROSTATICS AND MAGNETOSTATICS

### (a) Electrostatics in Dielectric :

Introduction to polar and non polar dielectrics, Gaseous Non Polar Dielectrics (2.11), Gaseous Polar Dielectrics (2.12), Non Polar Liquids (2.13), Solid Dielectrics Electrets(2.14), Methods of Electrostatics Images (3.11 i to v),

### (b) Magnetostatics :

The Magnetic Potential (4.9 - a & b) Magnetic Vector Potential due to small Current Loop(4.12), An Alternative method for finding the Vector Potential A and the field B due to Current Loop(4.13), Magnetization(4.15), Magnetic Field Vector (4.16), Magnetic susceptibility and Permeability (4.17), Boundary Conditions(4.18), Uniformly Magnetized Sphere in External Magnetic Field (4.19), A comparison of Static Electric and Magnetic Field (4.20)

### (c) Practical Applications of Electromagnetic Induction :

Use of earth inductor – measurement of Horizontal Component H of the Earth Magnetic Field (12.3-1), Measurement of Vertical Component V of the Earth Magnetic Field using a search coil (12.4). *Related Examples, Problems, MCQ & Short Questions* 

#### **Basic Reference:**

1. Electromagnetics by B.B. Laud, New Age Publisher (For chapt. a & b)

2. Electricity and Magnetism by K.K. Tewari, S.Chand. (For Chapt. c)

### **Other Reference:**

- 1. Electricity and Magnetism by Mahajan and Rangwala, THM
- 2. Electricity and Magnetism Berkeley Phy Vol.-II by Edward M Purcell, McGraw-Hill Publi
- 3. Electricity and Magnetism by D. C. Tayal, Himalaya Publishing House

### UNIT II OPTICS

**Diffraction:** Distinction between Interference and diffraction (17.6), Fresnel and Fraun hoffer types of diffraction(17.7), Fraun hoffer diffraction at a double slit (18.4), Fraunhoffer diffraction at double slit (Calculus method)(18.4.1), Distinct between single slit and double slit diffraction pattern (18.4.2), Fraunhoffer diffraction at N slit(18.6 & 18.6.1), Plane Diffraction Gratting (18.7), Theory of plane transmission gratting (18.7.1), Dispersive power of Grating (18.7.7) *Related Examples, Problems, MCQ & Short Questions* 



### **Resolving Power:**

Resolving Power of Optical Instrument(19.5), Resolving Power of a telescope(19.7), Relation between magnifying power and resolving power of a telescope(19.7.1). *Related Examples, Problems, MCQ & Short Questions* 

### **Polarization:**

Introduction(20.1), Polarization by double refraction(20.5.5), Double refraction(20.8.3), Huygens' explanation of double refraction(20.9 & 20.9.1), Types of Polarized light(20.15),, Retarders or Wave plate (Quarter wave plate) (20.17.1), (Half wave plate)(20.17.2), Production of Elliptically polarized light(20.18), Detection of Elliptically polarized light(20.18.1). *Related Examples, Problems, MCQ & Short Questions* 

#### **Basic Reference:**

A text book of OPTICS by Dr. N.Subrahmanyam, Brijlal, Dr, M, N, Avadhanulu - S Chand Other Reference:

- 1. A Text book of light by D.N.Vasudev Atmaram & sons, New Delhi .
- 2. Fundamentals of Optics by F A Jenkine and H E White Tata McGraw Hill Book Co. Ltd.
- 3. Optics by Ajoy Ghatak Tata McGraw Hill Book Co. Ltd
- 4. Principles of Optics by B.K. Mathur

### **UNIT III ELECTRONICS**

**Basic Transistors:** (Review of Construction of Transistor) Transistor Current Component(4.18), Detailed Transistor Leakage Currents (4.18-1) (Collector to Base and Collector to Emitter Leakage Current), C-B configuration static (Input and Output)characteristics)(4.09-1), Load Line(4.21), Operating Point(4.22) *Related Examples, Problems, MCQ & Short Questions* 

### **Transistor Biasing and Stabilization:**

Bias Stabilization (Operating Point stabilization) (8.7, 8.7.1 & 8.7.2), Stability factor (8.8), Stabilization by Collector Base Resistance (8.9) Stabilization by potential divider and Emitter resistor (8.10) *Related Examples, Problems, MCQ & Short Questions* 

### **Basic Transistor Amplifier:**

Transistor as four pole (9.2), h-parameters with h-parameters equivalent circuit (9.5 complete), Ground Emitter Circuit – Mathematical analysis using h-parameters only (9.6), Comparative study of three types of Amplifiers(9.9). *Related Examples, Problems, MCQ & Short Questions* 

#### **Basic Reference:**

1. Hand book of Electronics by Gupta & Kumar 30<sup>th</sup> Revised Edition, 2002 Pragati Prakashan

2. Electronics and Radio Engineering by M.L.Gupta (9th Edition-2002) DhanRaj & Sons. (For Ch-(9))

### **Other Reference :**

- 1. Electronic Devices and Circuits by A. Mottershead prentice- Hall of India
- 2. Integrated Electronics by Milliman & Halkias
- 3. Basic Electronics and Linear Circuits by N. N. Bharagava, D.C.Kulshreshtha, S.C. Gupta.



### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN CBCS SEMESTER GRADING PATTERN B. Sc. SEMESTER III (PHYSICS SYLLABUS : Effective from June - 2021)

### Elective Subjective :: PHYSICS : ES - 03 ENERGY TECHNOLOGY

### UNIT I

### Introduction:

What is energy ?, Energy Science and Technology, Energy, mass and environment, Some well known forms of energy, Energy Resources and forms of energy, Energy demand, Energy Routes for Conventional energy resources, National energy strategies, and energy plan, Energy management, Cost comparission of energy resources and conversion, Energy Conservation opportunities.

### **Environmental aspects of energy:**

Introduction, Polution from use of energy, Conbustation Products of Fossil Fuels, Particulate Matter, Electrostatic Precipitator(ESP), Fabric Filter and Baghhouse.

### **UNIT-II** Geothermal Energy:

Introduction, Applications, Utilization of Geothermal Energy, Geothermal Energy Resources, Hydro Geothermal Resources, Hot Dry Rock Geothermal Resources. Merits and demerits of Petro-Geothermalenergy Power Plant, Geothermal Electrical Power Plants, Classification and types of Geotermal Power plants,

### Wind Energy:

Introduction, Applications of Wind Energy and Historical Background, Merits and limitations of Wind energy Conversion, Nature and Origion of Wind, Wind Energy Quantom, Variables in Wind Energy Conversion systems, Wind power density, Power in wind Stream, Wind turbine Efficiency. Types of wind Turbine-Generator Units, Characteristics of wind turbine generator, Mono-blade HAWT, Twin-blade HAWT

### **References:**

- (1) Energy Technology by S.Rao and Dr. B.B. Parulekar, Khanna Pub.-1995 1st edition
- (2) Solar Energy conversion, An introductory course By A. E. Dikon and J. D. Loslie
- (3) Principles of Energy Conversion By Archie W. Cupl Jr.



### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN CBCS SEMESTER GRADING PATTERN B. Sc. SEMESTER III (PHYSICS SYLLABUS : Effective from June - 2021)

### **Elective Subjective ::** PHYSICS : ES - 04

### VACUUM PUMPS, PRESSURE GUAGES AND INSTRUMENTS

### **UNIT I Vacuum Pumps, Pressure Guages:**

Exhaust Pumps and their characteristics(15.1), Rotary Oil Pumps(15.2), Molecular Pump(15.3), Diffusion Pump(15.4), Other methods of Producing Low Pressures(15.5), Pressure Gauges - McLeod Guage, Pirani Guage, Thermocouple Guage, Ionization Gauge,(15.7).

### **Errors in measurement:**

Errors of observations, Types of errors, Normal law of errors, Average, standard and probable errors, Percentage error.

### **UNIT-II Optical Instruments:**

Travelling Microscope, Cathetometer, and Optical bench.

Objective and Eyepiece, Kellner's Eyepiece, Huygens Eyepiece, Ramsden Eyepiece, Comparission of Ramsden Eyepiece and Huygens Eyepiece, Gauss Eyepiece, Telescopes, Refracting Astronomical Telescope, Reflecting Telescope, Newton's Telescope, Other reflecting Telescopes.

### **Electrical Instruments:**

Moving coil Galvanometer, Ballistic Galvanometer, Calibration of Ballistic Galvanometer using different methods, Multimeters, Digital multimeter, Earphone and Headphone. Basic Reference

- 1. An Advanced Course in Practical Physics by D.Chattopadhyay, P.C. Rakshit, B.SAHA, New Central Book Ltd.
- 2. A text book of OPTICS by Dr. N, Subrahmanyam, Brijlal, Dr, M,N, Avadhanulu S.Chand.(Ch-10.8 to 10.16)
- 3. Mechanics by D.S.Mathur S.Chand.(For Vacuum pumps)



### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN CBCS SEMESTER GRADING PATTERN B. Sc. SEMESTER III (PHYSICS PRACTICAL SYLLABUS : Effective from June - 2021) (PC – PHY - 301) LABORATORY EXPERIMENT

- 1) To Find out Viscosity co- efficient of liquid using co-axial viscometer. સમઅક્ષીય વિસ્કોમીટર ની મદદથી પ્રવાહીનો શ્યાનતા ગુણાંક શોધવો.
- 2) To determine young modulus 'Y' for metal rod using Kund 's tube . કુંડ ની નળીની મદદથી ધાતુના સળિયા નો યંગ મોડ્યુલસ શોધવો.
- 3) To find out the value of e/k using power transistor (PNP →CK 100 or NPN→SL -100). ulaz ટ્રાન્ઝીસ્ટર ની મદદથી e/k નું મૂલ્ય શોધવું. (PNP→CK 100 or NPN→SL -100)
- 4) To Determine Self Inductance of inductor by Anderson Bridge. એન્ડરસનબ્રીજ વડે આત્મપ્રેરક્ત્વ મેળવો.
- 5) To determination of  $(l_0)$ , 'r' and 'a' for resonance pendulum. અનુનાદ લોલક માટે ' $l_0$ ', 'r' અને 'a' મેળવવો.
- To Determine Unknown Wave Length of Light 'λ' using Hartzmann Formula. હાર્ટમેનની રીત વડે અજ્ઞાત પ્રકાશની તરંગલંબાઈ શોધવી.
- 7) To Find out The Refractive Index of Ordinary and Extra Ordinary Rays using Dual Refraction From Calcite Prism. કેલ્સાઈટ પ્રીઝમ(સ્ફટિક)થી દ્વિ વક્રીભવનની ઘટનાનો ઉપયોગ કરી સામાન્ય અને અસામાન્ય કિરણોના વક્રીભવનાંક શોધવા.
- 8) To Find out The Wave Length of Light using Newton's Rings. ન્યુટનના વલયોની મદદથી પ્રકાશની તરંગલંબાઈ શોધવી.

જગતની સૌ કેડીઓમાં સ્નેહ સહુથી વડી



### HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN CBCS SEMESTER GRADING PATTERN B. Sc. SEMESTER III (PHYSICS PRACTICAL SYLLABUS : Effective from June - 2021) (PC – PHY - 302) LABORATORY EXPERIMENT

- 1) To determine the Absolute Value of Capacity using B.G or S.G B.G ની મદદથી વીજ સંગ્રાહકની નિરપેક્ષ ક્ષમતા શોધવી.
- Obtain the Characteristics of UJT and Determination of R<sub>BB</sub>, V<sub>d</sub> & η UJT નીલાક્ષણીકતાઓ મેળવો અને R<sub>BB</sub>,V<sub>D</sub> તેમજη દર્શાવો.
- 3) To Verify De Morgen's Theorems using IC-7400. IC-7400 ની મદદથી દ-મોર્ગનના પ્રમેય ચકાસો.
- Absorption Co-Efficient of Liquid using Photocell. ફોટોસેલની મદદથી પ્રવાહીનો શોષણઆંક શોધવો.
- 5) Obtain the Characteristics of PNP Common Base Transistor. PNP કોમન બેઝ ટ્રાન્ઝીસ્ટરની લાક્ષણીકતાઓ મેળવો.
- 6) A Study of Characteristics of JFET & Determination of  $\mu$ ,  $r_d$ ,  $g_m$  JFET-Il લાક્ષણીકતાઓ મેળવો અને  $\mu$ ,  $r_d$ ,  $g_m$  દર્શાવો.
- 7) Construction of AND, OR, NOT Gates Using NAND & NOR Universal Gates. યુનિવર્સલ NAND અને NOR ગેટની મદદથી AND, OR અને NOT ગેટ બનાવો.
- 8) Numerical Analysis (Minimum Class Method) સંખ્યાત્મક પૃથ્થકરણ(લઘુત્તમ વર્ગની રીત)

ભૂલો ભલે બીજુ બધુ માબાપને ભુલશો નહિ



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