MATHEMATICS

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Hemchandracharya
North Gujarat University
PATAN

EMCHANDRAC AR A N RT JARAT UNIVERSITY
PATAN- 384 265

Modified Detailed Syllabus of CBCS PROGRAMME Pattern for B Sc Mathematics Semester System

PROGRAM CODE : HNGU1054

With Effect from June : 2015

FACULTY : SCIENCE

SUBJECT : MATHEMATICS

CLASS: Bachelor of Science.

SEMESTER : I to VI

TOTAL PAGE 01 T 27 (WITH C RSE STRUCTURE)

DATE : October 18, 2014.

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B Sc in Mathematics : PROGRAMME Structure Under CBCS

With Effect from June : 2015

M. B. Prajapati, ***Department of Mathematics,***
Hemchandracharya North Gujarat University, Patan-384265.

Mission: Our mission is to provide opportunities for developing basic-quality mathematical skills and achievement for 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 21st 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 make education 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 Sc Programme 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 develop and demonstrate knowledge and understanding in the following areas:

- **Knowledge and understanding :**When one has completed this degree he/she will have knowledge 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 solve some 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 the Communicate 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.

⇛ COURSE STRUCTURE ☒

SEMESTER-I Course	Courses	Credit /course	Teaching Hrs Total	Total Credits	Examination Internal	Hours	External	Total Marks
Principle/Core Courses: CC MAT-111	1	4	4	4	30	3	70	100
Practical/ PC MAT-111	1	2	4	2	-	-	50	50
Elective Opt. Disciplinary: ES MAT –11 Set Theory & Functions	1	2	2	2	-	-	50	50
Elective Generic	1	2	2	2	-	-	50	50
Foundation Course	1	2	2	2	15	1.5	35	50
SEMESTER-II								
Principle/Core Courses: CC MAT-122	1	4	4	4	30	3	70	100
Practical/ PC MAT-122	1	2	4	2	-	-	50	50
Elective Opt. Disciplinary: ESMAT –12 Industrial Mathematics	1	2	2	2	-	-	50	50
Elective generic	1	2	2	2	-	-	50	50
Foundation course	1	2	2	2	15	1.5	35	50
SEMESTER-III								
Principle/Core Courses: CC MAT-301	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-302	1	3	3	3	30	3	70	100
Practical/ PC MAT-301	1	1.5	3	1.5	-	-	50	50
Practical/ PC MAT-302	1	1.5	3	1.5	-	-	50	50
Elective Opt. Disciplinary: ESMAT –21 Business Mathematics-1	1	2	2	2	-	-	50	50
Elective generic	1	2	2	2	-	-	50	50
Foundation course	1	2	2	2	15	1.5	35	50
SEMESTER-IV								
Principle/Core Courses: CC MAT-401	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-402	1	3	3	3	30	3	70	100
Practical/ PC MAT-401	1	1.5	3	1.5	-	-	50	50

Practical/ PC MAT-402	1	1.5	3	1.5	-	-	50	50
Elective Opt. Disciplinary: ESMAT –22 Business Mathematics-II	1	2	2	2	-	-	50	50
Elective generic	1	2	2	2	-	-	50	50
Foundation course	1	2	2	2	15	1.5	35	50
SEMESTER-V								
Principle/Core Courses: CC MAT-501	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-502	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-503	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-504	1	3	3	3	30	3	70	100
Practical/PC MAT-501	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-502	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-503	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-504	1	1.5	3	1.5	-	-	50	50
Elective Opt. Disciplinary: ESMAT –31 Business Mathematics-III	1	2	2	2	-	-	50	50
Elective generic	1	2	2	2	-	-	50	50
Foundation course	1	2	2	2	15	1.5	35	50
SEMESTER-VI								
Principle/Core Courses: CC MAT-601	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-602	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-603	1	3	3	3	30	3	70	100
Principle/Core Courses: CC MAT-604	1	3	3	3	30	3	70	100
Practical/PC MAT-601	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-602	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-603	1	1.5	3	1.5	-	-	50	50
Practical/PC MAT-604	1	1.5	3	1.5	-	-	50	50
Elective Opt. Disciplinary: ESMAT –32 Business Mathematics-IV	1	2	2	2	-	-	50	50
Elective generic	1	2	2	2	-	-	50	50
Foundation course	1	2	2	2	15	1.5	35	50

N.B. :1. *Work-load depends on the number of students and the number of Batches/Groups , for practical and Cognitive-skill based Course.*

2. As the *CBCS has a high probability to be operationalised efficiently and effectively for the elevating learners* , the Essential Requirements for all Mathematical Practical including MATLAB 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 SOFTWARE with basic requirements for the MATLAB 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. Use also "PYTHON" Software instead of MATLAB Software.
4. ***Essential Requirement for Mathematical Computer Laboratory:***

(i) Atleast One full time Computer Operator having mathematical ability to run Matlab Software and related Computerized Mathematical Practical.

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(ii) One Peon for computer laboratory.

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Mathematics Semester : IV

Course: CC – MATH – 401 Advanced Calculus

UNIT-1 CURVATURE & RADIUS OF CURVATURE : Curvature of Plane curve, Radius of curvature of plane curve, **IMPROPER INTEGRAL:** Beta function and Gamma function, Convergence of Beta function and Gamma function Relation between them, Its Simple properties and applications, Several forms of Beta function

UNIT-2 MULTIPLE INTEGRAL: Double Integral, Integral on non rectangle regions, transformation to polar co-ordinate Change order of integration, Triple integration, transformation to polar and cylindrical co-ordinate

UNIT-3 VECTOR ANALYSIS AND LINE & SURFACE INTEGRAL : Gradient of scalar function, Divergence and Curl of a vector function, Line integral, Surface Integral , Green's ,Stoke's and Gauss's Theorem

The Main Book for the course :

1. **Integral Calculus Shantinarayan S. Chand, New Delhi (Course Book)**

Reference Books :

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 Granth Nirman Board (Gujarati)
5. Kalan Shashtra Part II, A M Vaudya and V H Pandya, University Granth Nirman Board (Gujarati)

Course: CC – MATH – 402 Advanced Linear Algebra

Unit : I : MATRICES OF A LINEAR TRANSFORMATION

Definition of a Matrx of a linear transformation, Linear Transformation associated with a matrix, the dimension of L(U,V), and its determination, Rank and Nullity of a Matrix, invertibility of system of linear equations.

UNIT : II : INNER PRODUCT SPACE LINEAR FUNCTIONAL AND DUALITY

Definition of inner product space, Norm, Orthogonality, Schwarz's & Triangular inequality, Parallelogram law, Orthonornal basis, Gram-Schmidt Orthogonalization Process (Without proof) and its examples.

LINEAR FUNCTIONAL AND DUALITY

Definition of linear functional and its examples, Definition of Dual space and Dual asis and its examples, Adjoint of a linear operator, its properties and examples

UNIT : III : EIGEN VALUES AND EIGEN VECTORS

Eigen values and eigen vectors of a linear transformation, Characteristic polynomial, Cayley – Hamilton theorem, Using C – H theorem find inverse of a matrix, minimal polynomial deductions.The main book for the course is ' **An Introduction to Linear Algebra' by V. Krishnamurthy, V P Mainra, J L Arora, Affiliated East-west Press Pvt Ltd., New Delhi**

Reference Books :

1. Linear Algebra , Ramchandra Rao, P. Bhimasankar, Tata MacGrawHill
2. Topics in Algebra, I N Herstein, Wiley Eastern Ltd
3. Linear Algebra, S K Berberion, Oxford University Press
4. Linear Algebra Problem Book, P R Holmos, Cambridge University Press
5. Linera Algebra, Sharma and Vashishtha, Krishna Prakashan, Meerut
6. Linear Algebra, Gupta K P, Pragati Prakashan, Meerut
7. Linear Algebra, G Paria, New Central book agency Ltd, Calcutta
8. Surekh Bij Ganit, I H Sheth, University Granth Nirman Board (Gujarati) kem tame

Course:PC – MATH- 401Practicals on Advanced Caculus and Linear Algebra

1. Application of double Integration (Two Practicals)
2. Application of Beta and Gamma functions (Two Practicals)
3. Application of Green's Theorem
4. Application of Stokes' theorem
5. Application of divergence theorems.
6. Applications of a linear transformation associated with given matrix.
7. Applications of a matrix associated with linear transformation
8. Verifications on Rank-Nullity theorem in matrices
9. Application of solution of system of linear systems
10. Application of a Dual Space
11. Application on Gram-Schmidt orthogonalization process
12. Application of Cayley-Hemilton theorem
13. Application of Eigen value and Eigen vectors of a linear transformation
14. Application of minimal polynomial deduction
15. Application to verify inner product space.

Course:PC – MATH- 402 PRACTICALS ON ADVANCED NUMERICAL ANALYSIS

→Application of solution of an equation by,

1. Graphical method.
2. Method of False Position.
3. Method of Bisection.
4. Method of Iteration.
5. Newton Raphson method.
6. Application of Synthetic division method.
7. Birge-Vieta method.
8. Application of Laplace Everett's interpolation formula.
9. Application of Bessel's interpolation formula.
10. Application on divided difference formula.
11. Application on Numerical differentiation.
12. Application on Numerical Integration.
13. Application on Euler's method.
14. Application on solving a system of equations using Gauss- Elimination method.
15. Application on solving a system of equations using Gauss-Jordan method.

Subject Elective Course: ESMAT-22 Business Mathematics-2

Unit-1 : Probability

Classical- Statistical (or Empirical)- Axiomatic (Modern) definition of probability, Definitions of event, equally likely, mutually exclusive and exhaustive events, Probability theorems, Statement's of Baye's theorem and its examples, Conditional probability and its examples.

Unit-2 : Probability Distribution

Definitions of a Random variable, Probability Distribution of a random variable, Binomial distribution, Poission distribution, Normal distribution, Exponential distribution and its examples.

Reference Books :

(1) Business Statistics, by Bharat Jhunjhunwala, S. Chand Prakashan.
(2) Business Statistics, by R.S. Bhardwaj
(3) Statistics (Chapter – 18 & 19) by, R.S.N.Pillai & V. Bagavathi,S. Chand & Company, New- Delhi

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Mathematics : Semester - V

CCourse: CC MATH-501 (Group Theory)

UNIT : 1 Definition of a Group and illustrations, Elementary property of a Group, Equivalent definitions of a Group, Generalized form of Associative Law, Finite Groups and their tables, Definition of a Subgroup and illustrations, Lagranges theorem and its applications.

UNIT : 2 Definition of a Permutation and illustrations, Transpositions and cycle, definition of a Normal subgroup and illustrations, Quotient group, Definition of an isomorphism of a group and its illustrations.

UNIT : 3 Properties of a cycle groups, Isomorphism of cyclic groups, Subgroup of a cycle group, Generator of a cycle group, Definition of a Homomorphism and its illustrations, Kernel of Homomorphism, Cayley's Theorem, Isomorphism of group, Groups of order four and six.

The course is covered by the Book : **I H Sheth, *Abstarct Algebra*, Prentice Hall of India (PHI) Publication.** Chapter 6(6.1 to 6.7), Chapter 7(7.1 to 7.3), Chapter 8(8.1 to 8.3), Chapter 9(9.1 to 9.3), Chapter 10(10.1 to 10.2), Chapter 11(11.1 to 11.5), Chapter 12(12.1 to 12.6)

Reference books :

1. I N Herstein, ***Topics in Algebra,*** Wiley Eastern Ltd.
2. N. Jacobson, ***Basic Algebra Vol I & II,*** Hindustan Publishing company
3. Shanti Narayan, ***A text book of Modern Algebra,*** S. Chand & Co.
4. P.B.Bhattacharya, S.K.Jain, S R Nagpal, ***Basics Abstract Algebra, (second Edition),*** Cambridge University Press.
5. N.S. Gopalkrishna, ***University Algebra,*** Wiley Eastern, New Delhi
6. Maclane Saunders and Birkhoff Garrett, ***Algebra,*** MacMillan, New York.
7. G.F.Simmons, ***Introduction to Topology and Modern Analysis,*** MacGrawHill Inc., U.S.A.

Course: CC MATH-502 Mathematical Analysis-I

Unit-1 **Number System:** The real field to be developed by ordered set approach, Equivalence of this approach and Dedikind's approach, Extended real number system, The complex number system, Euclidean spaces.

Unit-2 **Basic Topology:** Finite, Countable and Uncountable sets, Metric space, Neighborhoods in metric spaces, Limit point of a set, Open, Closed, Bounded, Compact, Perfect, Connected and Convex subsets of metric spaces.

Unit-3 **Sequences and Series:** Convergence sequence, Sub sequences, Cauchy sequences, Upper and lower limits, Special sequences and Series, Series of non negative terms, Roots and Ratio Test. Power Series with Real (Complex) terms, Interval (circle) of convergence and radius of convergence of a power series, Summation by parts, absolute convergence, addition and multiplication of series. The course is roughly covered by Chapters 1,2,3 (Omit 3.52 to 3.55) of The book entitled "Principles of Mathematical Analysis" by Walter Rudin, McGraw Hill (International Student Edition), 3rd Edition.

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NAAC Accreditation Grade- "B"

FACULTY OF SCIENCE

U.G.(B. Sc.)Programme

Subject: **BOTANY**

Under CBCS :: Semester :: Grading Pattern

Syllabus and Examination Scheme for

Semesters: III and IV

With effect from

June 2013 and December 2013

REVISED & UPGRADED

syllabus of B Sc. Semester-III & IV in BOTANY

Date: 01/08/2013

Total Pages: **1 to 30**

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

Under CBCS :: Semester :: Grading Pattern

U.G.(B. Sc.) Programme

in

Faculty of

Science

B. Sc. Semesters: III and IV

Revised & Upgraded Syllabus

in Subject

Botany

With effect from

June 2013 and December 2013

Submitted on

01/08/2013

Total Number of Pages

1 to 30

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Revised & Upgraded SYLLABUS for

B. Sc. (Semester III and IV) **programme in**

BOTANY

IN FORCE FROM

ACADEMIC YEAR

June 2013 and December 2013

Summary of the Programme

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

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Under Choice **B**ased **C**redit **S**ystem-Semester-Grading System pattern
U G (B Sc) Programme in Botany
Semester-III and IV

The 11th 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 (11th 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: CBCS in UG programme in **Botany Semester III and IV** shall be offered from the Academic year **June 2012 and December 2012** respectively.

- ✓Botany subject in the Universities/Affiliated Colleges shall offer undergraduate programme in Faculty of Science from the Academic year 2011-12.
- ✓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 weight-age 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**.

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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**
   Practical Core (Core Elective) **PC**
2. Elective Generic **EG**
   Elective Subject **ES**
3. Foundation Compulsory **FC**

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 the Programme
I	**II**	**III**	**IV**	**V**	**VI**	
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%

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** 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:

1. 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 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**.

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2. The 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.

   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, Regularity, Punctuality…	**05** marks.

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
   - ✓ 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
   - ✓ Medium answer questions
   - ✓ Long answer questions
   - ✓ Examples/ Problems, etc.

5. 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.

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%** as decided by concern Board of Studies in Botany.

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.

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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 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.

Selection of Elective (Subjective) course:

For semester-III and IV a common list of three courses is given below. Students are requested to select any one of three courses in Semester-III and then in Semester-IV one course may be selected from the rest of the two courses.

1. **Elective (Subject) Course :: ES BOT-211:: DNA-a molecule of Life**
2. **Elective (Subject) Course :: ES BOT-212 :: Water quality analysis**
3. **Elective (Subject) Course :: ES BOT-213 :: Biodiversity**

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B.Sc. three year (General) Programme with 144 credits Semester-III and IV in BOTANYw.e.f. June-2012 and December-2012 respectively						
General Pattern/Scheme of study components along with credits						
Study Components		**Ins. Hrs/ Week**	**Examination**			**Credit**
			Internal Marks	**Uni. Exam.** Marks	**Total** Marks	
Semester-III						
	Core Compulsory (CC)Course					
CC-I-3	Core Course-I (Paper-3)	3	30	70	100	**3**
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	Core Course-II (Paper-4)	3	30	70	100	**3**
	Soft-skill: Practical Core (PC)Course					
PC-I-3	Practical Core Course-I (Paper-3)	3		50	50	**1.5**
PC-I-4	Practical Core Course-I (Paper-4)	3		50	50	**1.5**
PC-II-3	Practical Core Course-II (Paper-3)	3		50	50	**1.5**
PC-II-4	Practical Core Course-II (Paper-4)	3		50	50	**1.5**
	Foundation Course (FC)					
FG-21	Compulsory English (L.L.)	2	30	70	100	**2**
	Elective Course (EC)					
EG-21	Elective (Generic) Course	2		50	50	**2**
ES-21	Elective (Subject) Course	2		50	50	**2**
		30	**150**	**650**	**800**	**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**
	Soft-skill: Practical Core (PC)Course					
PC-I-3	Practical Core Course-I (Paper-5)	3		50	50	**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	Practical Core Course-II (Paper-6)	3		50	50	**1.5**
	Foundation Course (FC)					
FG-21	Compulsory English (L.L.)	2	30	70	100	**2**
	Elective Course (EC)					
EG-21	Elective (Generic) Course	2		50	50	**2**
ES-21	Elective (Subject) Course	2		50	50	**2**
		30	**150**	**650**	**800**	**24**

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern

B.Sc. (Semester-III and IV) Programme

REVISED

Common format for Question paper

Core Complementary Course in Botany

Time: **3Hours** [w. e. f. June 2013] Total Marks: **70**

1. Long answered and medium answered/short note-typed questions from each Unit-I **20**

a. Long answered questions (Attempt any **two** from **three** each of **7** marks)

b. Medium answered or short note-typed questions (Attempt any **two** from **three** each of **3** marks)

2. Long answered and medium answered/short note-typed questions from each Unit-II **20**

a. Long answered questions (Attempt any **two** from **three** each of **7** marks)

b. Medium answered or short note-typed questions (Attempt any **two** from **three** each of **3** marks)

3. Long answered and medium answered/short note-typed questions from each Unit-III **20**

a. Long answered questions (Attempt any **two** from **three** each of **7** marks)

b. Medium answered or short note-typed questions (Attempt any **two** from **three** each of **3** marks)

4. Questions such as, MCQs, Fill in the blanks, Match the pairs, very short answered questions, etc. **10**
(Each of **1** Mark) [Total **10**, at least **three** questions from each Unit]

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Under CBCS-Semester-Grading pattern

B.Sc. (Semester-III and IV) Programme

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Common format for Question paper

Elective (Subject) Course in Botany

Time: **2Hours** [w. e. f. June 2013] Total Marks:**50**

1. Long answered and medium answered/short note-typed questions from each Unit-I **20**

a. Long answered questions (Attempt any **two** from **three** each of **7** marks)

b. Medium answered or short note-typed questions (Attempt any **two** from **three** each of **3** marks)

2. Long answered and medium answered/short note-typed questions from each Unit-II **20**

a. Long answered questions (Attempt any **two** from **three** each of **7** marks)

b. Medium answered or short note-typed questions (Attempt any **two** from **three** each of **3** marks)

3. Questions such as, MCQs, Fill in the blanks, Match the pairs, very short answered questions, etc. **10**

(Each of **1** Mark) [Total **10**, **Five** questions from each Unit]

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B. Sc. Programme : Semester-IV

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern
Core Compulsory Course in BOTANY
CC-BOT-221
w.e.f. December 2013
(*Morphology and Angiosperms, Angiosperm families, Plant Anatomy*)

Theory teaching hours: 3 Hours/week **Credits: 3.0**
Practical teaching hours: 3 Hours/week **Credits: 1.5**

Unit-I :: MORPHOLOGY and ANGIOSPERMS

[A] INFLORESCENCE AND FRUITS: Special Inflorescence: Hypanthodium, Cyathium and Verticillaster (SSC 286). **Fruits**: Definition (SSC 320), True and false fruits (SSC 320), Parts of the fruit (). **Simple fruits**: **Indehiscent**: Caryopsis (SSC 322), Samara. **Dehiscent**: Capsule: Loculicidal (SSC 321), Septicidal. **Schizocarpic**: Lomentum, Regma. **Fleshy fruits:**Drupe, Berry (SSC 323). **Aggregate:** Etaerio of barriers (SSC 325). **Composite:**Sorosis (SSC 326).

[B] ANGIOSPERMS: General characters of Angiosperms. **Sun-flower** (***Helianthus***): Classification (Bentham and Hooker, 1862-80), habit-habitat, sporophyte (external structure), reproduction (inflorescence and florets) and gametophyte (except development), embryogeny (in short).

[C] Maize (*Zea mays*): Classification (Bentham and Hooker, 1862-80), habit-habitat, sporophyte (external structure), reproduction (inflorescence and flowers) and gametophyte (except development), embryogeny (in short).

References:

SSC:**Santra S C, Chatterjee T P and Das A P** (1993, 1st edition) **College Botany Practical Vol.-II.** New Central Book Agency (P) Ltd, Kolkatta.

Practicals:
Specimen **G**: Inflorescence: Hypanthodium, Cyathium and Verticillaster.
Fruit :
Specimen **H**: Caryopsis - Maize or Wheat, Samara: *Holoptelea.*Loculicidal: Cotton, Septicidal: Castor/Mustard. Lomentum: *Acacia nilotica*, Regma: *Ricinus*
Specimen **I**: Fleshy - Drupe – Mango; Berry - Tomato or Brinjal, Etaerio of berry - *Anonasquamosa*; Sorosis – Pineapple or *Morus*

Qeustion 1: Specimens A and B
Classification and Mountings of *Helianthus* - Rayfloret and discfloret, pollen grains.
Classification and Mountings of *Zea mays* – spikelet/flower, fresh material of *Zea mays* plant with male and female inflorescence.
Permanent slides of *Helianthus*and*Zea mays* - T.S. of anther, L.S. of ovule

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Unit-II :: ANGIOSPERM FAMILIES

- Special features, merits and de-merits of classification system of Angiosperms by **Bentham and Hooker**.
- **Studies of families**: Distinguishing characters and classification as per Bentham and Hooker (1862-80) of the following families including floral formula, floral diagram and botanical names (**at least two**) of economically important plants.

Dicotyledons: **Polypetalae**: Malvaceae(SAVSS 294-302),Myrtaceae(SAVSS 372-378)
Gamopetalae: Rubiaceae(SAVSS 397-407), Apocynaceae(SAVSS 424-433)
Apetalae: Nyctaginaceae ( ), Euphorbiaceae(SAVSS 514-525)

Monocotyledons:Liliaceae(SAVSS 570-577), Palmae (Arecaceae)(SAVSS 586-592)

Reference:
SAVSS:**Sambamurty A V S S**(2005) **Taxonomy of Angiosperms.** I K International P Ltd. New Delhi.

PRACTICALS:

Question 2 (C & D): In addition to locally available plants, the following plants may be used for the study of the Families:

- Malvaceae: Jasud, Kanski, *Sida*
- Myrtaceae: Bottle brush, Nilgiri, Jamboo, Jamphal.
- Rubiaceae: *Ixora, Hemelia*, *Borreria.*
- Apocynaceae: Barmasi, Pili/Lal Karen, Chandani, *Plumeria*.
- Nyctaginaceae: Boganvel, Satodi, *Mirabilis.*
- Euphorbiaceae: Lal Patti, Castor, *Jatropha.*
- Liliaceae: Dungro, *Asparagus*, *Allium.*
- Palmae (Arecaceae): Shivjata, Khajuri, Bottle Palm, Coconut palm.

UNIT-III: PLANT ANATOMY

[A] **MERISTEMS:** Definition, Classification (on the basis of position) (JJP 31-33), Characteristics (34), **Apical Meristem**: Introduction (35-36), **Shoot apex**: Theories of apical organization-Histogen (37), Tunica-Corpus (37). **Root apex**: Theories of apical organization-Histogen (40), Korper-Kappe (42) and Quiescentcentre (42).

[B] MECHANICAL TISSUE: Introduction (PBP 402), structure and functions of mechanical tissues – Collenchyma (404-406) and Sclerenchyma: Fibers and Sclereids (409-413), Xylem (413), Phloem (415). **Mechenical tissues**: I-girdle in herbaceous stem i.e., Sunflower, in leaves i.e., *Eucalyptus* and *Pancratium*, in square stem i.e., *Nyctanthus* and in prop root i.e., *Zea mays* (418-422).

[C] CONDUCTING TISSUE: Structure and functions of xylem (JJP 76-87) and phloem (JJP 88-98) elements. **Vasscular cambium**: Definition (99), Activity of the cambium (101), Secondary growth (130-134).**Normal secondary growth** - Definition and secondary growth in sunflower stem (PBP 250-257) and sunflower root (210-215).**Anomalous secondary growth** - definition and anomalous secondary growth in *Salvadora* stem (interxylary phloem) (305-307), *Bignonia* stem (Phloem wedges in the xylem) (285-287) and*Tinospora* aerial root (203).

References:

JJP: E. John JothiPrakash (2000, 2nd revised edition) A Text Book of Plant Anatomy. Emkay Publications, Delhi.
PBP: **Pandey B P** (1982, 3rd edition) **Plant Anatomy**. S. Chand & Co. Ltd, New Delhi.

PRACTICALS:

Specimen E: Mechanical tissue:
Material: Sunflowerstem,*Eucalyptus* leaf, *Pancratium* leaf, *Nyctanthus* stem, Maize prop root.

Specimen E: For Secondary growth:
Material: *Salvadora*stem, *Bignonia s*tem, *Tinospora* aerial root, Sunflower root and stem.

Specimen F:
Permanent slide: Shoot apex, Root apex.
Permanent slide: Sun flower stem, *Eucalyptus* leaf, *Pancratium* leaf, *Nyctanthus* stem, Maize prop root.
Permanent slide: *Salvadora* stem, *Bignonia* stem, *Tinospora* aerial root, Sunflower root and stem.

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B. Sc.Semester-IV Practical Examination, March/April-20

Botany Practical::PC BOT-221

[Based on: **CC-BOT-221**]

(*Morphology and Angiosperms, Angiosperm families, Plant Anatomy*)

[In force from **December 2013**]

Date: / /20 **Place:**

Time:**4 Hours**] [Maximum Marks: **50**

1. **a.** આપેલ નમૂનો **A** ઓળખો, યોગ્ય કારણો આપી વર્ગીકરણ કરો (કુળ સુધી) અને તેમાં જોવા મળતી રચનાકીય લાક્ષણિકતાઓ જણાવો.
   [Identify, classify giving suitable reasons (up to family) and describe the structural peculiarities observed in the given specimen **A**.] **5**
   b. આપેલ નમૂના **B**માંથી _____ ખુલ્લુ કરો/સ્થાપન કરો.
   [Expose/Mount _____from the given specimen **B**.] **4**

2. નમૂનાઓ **C** અને **D** ને તપાસો અને કારણો આપી તેને તેમના યોગ્ય કૂળમાં મૂકો. નામનિર્દેશન વાળી આકૃતિ દોરો અને તેઓના પુષ્પસૂત્ર અને પુષ્પાકૃતિ આપો.
   [Refer the specimens **C** and **D** and place them in to their respective families giving reasons. Draw the labeled diagrams, and give their floral formula and floral diagram] **12**

3. યાંત્રિક પેશી માટે નમૂના **E**નું અકાયમી અભિરંજીત આસ્થાપન તૈયાર કરો. નામનિર્દેશિત આકૃતિ દોરો અને તમારી સ્લાઈડ પરિક્ષકને બતાવો.
   [Make a temporary stained preparation of specimen **E** for Mechanical tissue. Draw a labeled diagram and show your slide to the examiner.] **8**

   અથવા / **OR**

   દ્વિતિય વૃધ્ધિ માટે નમૂના **E**નું અકાયમી અભિરંજીત આસ્થાપન તૈયાર કરો. નામનિર્દેશિત આકૃતિ દોરો અને તમારી સ્લાઈડ પરિક્ષકને બતાવો.
   [Make a temporary stained preparation of specimen **E**for Secondary growth.Draw a labeled diagram and show your slide to the examiner.]

4. **a.** ઓળખો અને સ્લાઈડ **F** માં જોવા મળતી અંતઃસ્થ રચનાકીય લાક્ષણિકતાઓ વર્ણવો.
   [Identify and describe the anatomical structure observed in slide **F**.] **4**
   b. આપેલા નમૂનાઓને ઓળખો અને તેમાં જોવા મળતી બાહ્યાકારવિદ્યાકીય લાક્ષણિકતાઓ આકૃતિસહ વર્ણવો.
   [Identify and describe with diagram the external morphology observed in given specimens] **9**
   નમૂનો **G**: પુષ્પવિન્યાસ [Specimen **G**: **Inflorescence**]
   નમૂનો **H**: ફળો (સાદા) [Specimen **H**: **Fruits** (simple)]
   નમૂનો **I**: ફળો (સમૂહ અને સંયુક્ત) [Specimen **I**: **Fruits** (Aggregate and compound)]

5. **a.** સબમીશન અને *મૌખિક પ્રશ્નોત્તરી*. [Submission and *viva-voce*.] **5**
   b. પ્રયોગપોથી [Journal]. **3**

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
Under CBCS-Semester-Grading pattern

Core Compulsory Course in BOTANY

CC-BOT-222

w.e.f. December 2013

(*Angiosperm Embryology, Biochemistry, Plant Physiology*)

Theory teaching hours: 3 Hours/week **Credits: 3.0**
Practical teaching hours: 3 Hours/week **Credits: 1.5**

Unit-I :: ANGIOSPERM EMBRYOLOGY

[A] MICROSPORANGIUM (Anther): Structure and development of a typical anther (B&B16, 17). Anther wall: Structure and functions of various layers of mature anther wall (17-28), Microsporogenesis (28-32). Male gametophyte: Structure of Microspore (Pollen grain) (35), Formation of Male gametes in microspore (35-48).

[B] MEGASPORANGIUM (Ovule): Types of Ovules (65-66). Structure of Ovule:(67-72). Definition of Megasporogenesis (75),Female gametophyte-Development of Embryo sac-*Polygonum* type (86-88), Mature embryo sac-Structure (91) and functions of its various components (92-100).

[C] FERTILIZATION AND EMBRYO DEVELOPMENT: **Fertilization**: Definition (126) and double fertilization (145). **Embryo development** in *Capsella* (Dicot) (218-219) and Types of Endosperm: Nuclear, Cellular and Helobial (180-190), Functions of endosperm (198-199).

Reference:

B&B: **Bhojwani S S&Bhatnagar S P** (2001, 4th revised edition, reprint) **The Embryology of Angiosperms**. Vikas Publishing House Pvt. Ltd., New Delhi.

PRACTICALS:

Question 3 (C):
Embryo: Study of Embryo with endosperm haustoria from *Cucumis* and various developing stages of Embryo from Mustard and make temporary slide with proper stains.
Question 4 (D):
Mocrosporogenesis: Study of Anther Through Aceto-carmine/Aceto-orcene squash technique in following plants: *Aloe, Convolvulus* and Onion.
Question 6: E & F
Permanent slide/Chart/Microphotograph etc.: Microsporogenesis, Megasporogenesis, Types and Structure of Ovule, Structure of Mature Embryo sac and Endosperm.

Unit-II :: BIO-CHEMISTRY

[A] CARBOHYDRATES: Definition, classification and nomenclature (M&G 54). Monosaccharides: Physical properties of Monosaccharide (M&G 59-60/SHS 156-157), structure of Glucose (56/SHS 161-162) and Fructose (58). Disaccharides: Definition, structure (62) and properties ofSucrose (63) and Maltose (64/SHS 163-164). Polysaccharides: Definition, structure (64) and properties of cellulose (64) and Starch (65/SHS 166-168). Biological significance of Carbohydrates (SHS 169-170)

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[B] **LIPIDS**: Definition, biological functions of lipids (M&G 111/SHS 190), alcohols, fatty acids: saturated and unsaturated (117-118). Classification of lipids: Simple, Compound and Derived lipids (112). **Simple lipids**-Structure and function of Triglycerides (113) and Wax (114).

[C] **AMINO ACIDS AND PROTEINS**: **Amino acids**: Structure (JJL 61), electro-chemical properties (62) and classification of Amino acids [on the basis of composition of the side chain] (63-65), peptide bond (72), formation of dipeptide and polypeptide molecule (72-73). **Proteins**:General (Physical) properties: Colour and test (96), shape and size (96), Denaturation (99), amphoteric nature (100), Solubility (101) and structural level of organization of Proteins (79-87).Biological significance of Proteins (SHS 93-94).

References:

M&G: **Mukherji S** and**Ghosh A K** (2005, Revised) **Plant Physiology**. New Central Book Agency Pvt Ltd, Kolkatta.
JJL :Jain **J L** (1999, Reprint) **Fundamentals of Biochemistry**. S Chand & CO Ltd, New Delhi.
SHS: **Srivastava H S** (2010-11, 5th revised edition). **Elements of Biochemistry**.Rastogi Publications, Meerut.

PRACTICALS:

Question 1(A): To determine Isoelectric point of Casein (Protein).
Estimation of Free Fatty acids by titration method.

Question 2(B): **Bio-Molecules:** Tests for detection of Carbohydrates: The following tests are to be performed to detect the nature of carbohydrates available in the supplied sample (Glucose, Fructose, Maltose, Sucrose and Starch).
1. Molisch's test, 2. Benedict's test, 3.Barfoed's test, 4.Seliwanoff's test, 5. Iodine test, 6. Cobalt chloride test.
Tests for detection of Lipids i.e., Fats and oils: Micro-chemical tests on sections of Plant materials- Sudan III stain, Solubility test.
Tests for detection of Proteins: Biuret test, Xanthoprotic test. (SHS 321-323).

Unit-III :: PLANT PHYSIOLOGY

[A] **ABSORPTION OF WATER BY LAND PLANTS**: Organ of water absorption (M&G 163) and path of water movement through root (167), Factors affecting absorption of water : External (167-168) and Internal factors (168).

[B] **ASCENT OF SAP**: Definition (M&G 248), Mechanism of Ascent of sap: Vital-force theories (249-250), Root-pressure theory (250-251), Cohesion-tension theory (251).

[C] **WATER LOSS**: Guttation (D&W 74-76), Transpiration: Introduction (M&G 189), types of transpiration (189), evaporation and transpiration (189), structure of stomata (189-190).Stomatal mechanism of opening and closing: Photosynthesis in guard cells (190), Starch-sugarhypothesis (190-192), Modern concept (192-193), factors affecting stomatal movement (D&W 81-86), significance of transpiration (M&G 200-201).

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References:
M&G: Mukherji S andGhosh A K (2005, Revised) **Plant Physiology**. New Central Book Agency Pvt Ltd, Kolkatta.
D&W: Devlin R M and Witham F H (1986, First Indian Edition) **Plant Physiology** (Fourth Ediiton). CBS Publishers & Distributors, New Delhi.

PRACTICALS:

Question 1(A):
The following Physiological experiments are to be performed by the students:

1. To show the phenomenon of Ascent of sap.
2. To show unequal transpiration from the leaf surfaces using Cobalt chloride paper.
3. To show four leaf experiment for process of transpiration.

Question 6 (G and H):
The following Physiological experiments are to be demonstrated to the students:

1. Demonstration of Path of water through xylem by Ringing experiment.
2. Demonstration of transpiration by Bell-jar method.
3. Demonstration the rate of transpiration between upper and lower epidermis of leaf using Garreau's apparatus.
4. Demonstration of rate of transpiration using Ganong's potometer.
5. Demonstration of rate of transpiration using Farmer's potometer.
6. To determine the amount of water absorbed and transpired by a plant.

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Hemchandracharya North Gujarat University, Patan

B. Sc.Semester-IV Practical Examination, March/April-20

Botany Practical::PC BOT-222

[Based on: **CC-BOT-222**]

(*Angiosperm Embryology, Biochemistry, Plant Physiology*)

[In force from **December 2013**]

Date: / /20 **Place:**

Time:**4 Hours**] [Maximum Marks: **50**

1. તમને આપવામાં આવેલ દેહધર્મવિદ્યા/જૈવ-રાસાયણિક પ્રયોગ **A** કરો. તમારા અવલોકનોની કોઠામાં નોંધ કરો. જરૂરી જણાય તો આલેખ દોરો. તમારા પરિણામ અને તારણ પરિક્ષકને બતાવો.

[Perform Physiological/Biochemical experiment **A** assigned to you. Tabulate your observations and result. Draw graph if necessary. Show your result and conclusion to the examiner.] **10**

2. આપેલ નમૂના **B** માંથી જૈવ-અણુની પરખ માટેની કસોટીઓ કરો. તમારા પરિણામ પરિક્ષકને બતાવો.

[Performtests for detection of organic molecule given in sample **B.** Show your result to the examiner.] **8**

3. આપેલ નમૂના **C** માંથી **ભ્રૂણ/ભ્રૂણપોષ ચૂષક સહિત ભ્રૂણ**ખૂલ્લું કરી અને આસ્થાપન તૈયાર કરો. જરૂર જણાય તો અભિરંજીત કરો. પરીક્ષકને તમારી તૈયાર કરેલી સ્લાઈડ બતાવો.

[Expose and Mount **Embryo/Embryo with endosperm haustoria** from the given material **C**. Stain if necessary. Show your prepared slide to the examiner.] **7**

4. આપેલ નમૂના **D** માંથી ડાયડ/ટેટ્રાડ/પોષકસ્તર (ટેપેટમ) ખૂલ્લા કરો અને આસ્થાપન તૈયાર કરો. જરૂર જણાય તો અભિરંજીત કરો. પરીક્ષકને તમારી તૈયાર કરેલી સ્લાઈડ બતાવો.

[Expose and Mount **Diad / Tetrad / Tapetum**from the given material **D**.Stain if necessary. Show your prepared slide to the examiner.] **5**

5. **a.** ભ્રૂણવિદ્યાની સ્લાઈડ/ચાર્ટ/માઈક્રોફોટોગ્રાફ **E** અને **F** ઓળખો અને વર્ણવો.

[Identify and describe the embryology slide/chart/micro photograph **E** and **F**.] **6**

b. પ્રયોગો **G** અને **H** એ કઈ દેહધાર્મિક ક્રિયા દર્શાવે છે**?** વર્ણવો.

[Which Physiological process do experiments **G** and **H** demonstrate? Describe.] **6**

6. **a.** સબમીશન અને *મૌખિક પ્રશ્નોત્તરી.* [Submission and *viva-voce*.] **5**

b. પ્રયોગપોથી [Journal]. **3**

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Under CBCS - Semester - Grading Pattern

B.Sc. :: SEMESTER-III & IV:: BOTANY

Elective Course (Subject) :: ES BOT-211

DNA-a molecule of Life

(in force from June 2012)

Teaching Hours per Week: 2 **Credits-2**

Unit-I :: STRUCTURE OF DNA

1. Introduction, definition, Brief History of DNA
2. Double Helical Structure of DNA and its Components
3. Form of DNA and its unusual structure
4. Physical properties of DNA and DNA denaturation

Unit-II :: FUNCTIONS OF DNA

1. DNA as a genetic material
2. DNA Replication is semiconservative
3. DNA Transcription
4. Applications of DNA in Modern techniques

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Under CBCS - Semester - Grading Pattern

B.Sc. :: SEMESTER-III & IV:: BOTANY

Elective Course (Subject) :: ES BOT-212

Water quality analysis

(in force from June 2012)

Teaching Hours per Week: 2 **Credits-2**

Unit-I

1. Introduction(1-6) – Definition, Types, demand, Sources
2. General impurities in water(7-9)
3. Classification of water on the basis of hardness, Incrustation and Corrosion(10-12)
4. Morphometry, Sampling of liquid system(27-29)

Unit-II

1. Physical Parameters – movement, colour, odour, temperature, transparency, turbidity (55-76)
2. Electrical conductance, Total dissolved solids, Dissolved Oxygen (77-109)
3. Biochemical Oxygen demand, Chemical Oxygen demand(110-120)
4. Bacteriological parameters – Most probable number (MPN), Fecal coliform count, *E.coli* count.(215-223)

REFERENCE:

Trivedi P R and Gurdeepraj(2005)**Environmental water and soil analysis.**Akashdeep Publishing House, New Delhi.

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Under CBCS - Semester - Grading Pattern

B.Sc. :: SEMESTER-III & IV:: BOTANY

Elective Course (Subject) :: ES BOT-213

Biodiversity

(in force from June 2012)

Teaching Hours per Week: 2 **Credits-2**

Unit-I

1. Introduction – Definition: genetic, species and ecosystem diversity
2. Bio-geographical classification of India
3. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
4. Biodiversity at global, national and local levels

Unit-II

1. India as a mega-diversity nation, Hot-spots of biodiversity
2. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts
3. Endangered and endemic species of India and Gujarat
4. Conservation of biodiversity: *in-situ* and *ex-situ* conservation of biodiversity

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THE END of Revised & Upgraded syllabus of

B Sc. Semester-III & IV in BOTANY

(In force from June-2013 **&** December-2013 **respectively)**

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ZOOLOGY

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY PATAN - 384 265
NAAC'B' (CGPA) Accredited (State University)

UNDERGRADUATE PROGRAMME
CBCS :: Semester :: Grading Pattern
With effect from: June 2012 (In continuation)

Faculty:Science

Subject:Zoology

SYLLABUS

SEMESTER – III & IV

Total Number of Pages: 1 to 20

Submitted on
Date: 07/04/2012

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

The 11th Five Year plan of India proposed various measures for academic reforms in higher education. To meet the challenges of the chang ing time and make the higher education in Indian Universities compatible with the universities in developed nations, the UGC (11th 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 consider ed 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 the 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. zoology subject in the Univ ersity/Affiliated Colleges shall offer undergraduate programme in faculty of science from the Academic year 2011 -2012
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 studen t 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 coursed (Theory) each with 3 credits and their practical's each with 1.5 credits. Thus, accredit weightage in Semester III and IV of B.Sc Programme for each core c ourse shall be of 4.5 credits. In short, 4.5 credits multiplied by 4 cores compulsory coursed equal to total of 18 credits.
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 weightage 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 an d the foundation courses shall be abbreviated respectively as CC, PC, EG, ES and FC.

1. Core Compulsory -CC
2. Practical core -PC
3. Elective Generic -EG
   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 × 3 cred its) duration. The course with 3 credits shall be of 45 hrs (15 weeks × 3 credits) duration. The course with 2 credits shall be of 30 hrs (15 weeks × 2 credits) duration.

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

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

The semester wise weightage of core, selective 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%

Attendance:

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

Medium Instruction:

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

Language of Question Paper:

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

Evaluation Methods:

1. 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%, 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)/ (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:

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- ► Internal Test-20 marks
- ► Assignments/Seminar/MCQ exam,etc. - 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 point. 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
   - ► Higher Order Thinking Skills
4. With respect to the entire above component, there shall be followin g types of Questions from each unit of the course.
   - ► MCQs/Fill in the blanks/ Match the pairs, etc.
   - ► Short answer questions
   - ► Medium answer questions
   - ► Long answer questions
   - ► Examples/Problems, etc
5. The End of semester Examination (Theory) will be conduct ed by the University. A certified journal of the respective of the respective core compulsory course shall be produced at the time of practical examination. In practical exam there will be two practical (each from PC-301 & PC-302) each of 50 marks (40 marks for practical+10 marks for Viva). Number of student in a practical exam will be 20 to 24 and examiners will be 2.
6. It will be compulsory for a candidate to obtain passing percentage in both Internal as well as External Evaluation. The passing marks for ea ch 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.
8. Students, who opt zoology as core compulsory subject, should visit National Parks, Sanctuaries, reserve forests etc. within the state and/or outside the state. They should suppose to submit tour report at the time of examination.

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B.Sc.Programme with 144 credits
CBCS-Semester-Grading Pattern
w.e.f. June-2011

General Pattern/Scheme of study component along with credits for Science faculty.

Particals	Course	Study component	Instruction Hrs/ week	Examination			Credit
				Internal	Uni. Exam.	Total	
B.Sc. Sem.-III	Semester-III Core Compulsory(CC) Course						
	CC-I-3	Core Course-I (paper-3)	3	30	70	100	3
	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	Core Course-II(Paper-4)	3	30	70	100	3
		Practical Core(PC) Course					
	PC-I-3	Practical Core Course-I (paper-3)	3		50	50	1.5
	PC-I-4	Practical Core Course-I (Paper-4)	3		50	50	1.5
	PC-II-3	Practical Core Course-II (Paper-3)	3		50	50	1.5
	PC-II-4	Practical Core Course-II (Paper-4)	3		50	50	1.5
	Foundation Course (FC)						
	FC-3	Foundation(Generic) Course-III Compulsory English (L.L)	2	30	70	100	2
		Elective Course (E)					
	EG-3	Elective (Generic) Course-III	2		50	50	2
	ES-3	Elective (Subject) Course-III	2		50	50	2
			30	150	650	800	24
B.Sc. Sem.-IV		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					
	PC-I-5	Practical Core Course-I (paper-5)	3		50	50	1.5

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	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**
		Foundation Course (FC)					
	FC-3	**Foundation(Generic) Course-IV Compulsory English (L.L)**	**2**	**30**	**70**	**100**	**2**
		Elective Course (E)					
	EG-3	**Elective (Generic) Course-IV**	**2**		**50**	**50**	**2**
	ES-3	**Elective (Subject) Course-IV**	**2**		**50**	**50**	**2**
			30	**150**	**650**	**800**	**24**

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B.Sc. Programme (CBCS-Semester-Grading pattern)
Semester end Examination
Format for Question paper Elective Courses (Subject) in Zoology

There will be three questions. First and Second question will be from each respective Units and Third will contain questions from both units. The details of paper format as under.

(Times: 2 hours) (Total Marks: 50)

1. a. Answer the following (Any two out o f three)	8
b. Attempt any two of following (out of three)	6
c. Attempt any three (out of five)	6.
(Short answer or objective t ype questions)	
2. a. Answer the following (Any two out of three)	8
b. Attempt any two of following (out of three)	6
c. Attempt any three (out of five)	6
(Short answer or objective type questions)	
3. Answer the following (Any ten out of twelve)	10
(MCQ type or objective type)	

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B.Sc. Programme (CBCS-Semester-Grading pattern)
Semester end Examination
Format for Question paper Core Compulsory Courses in Zoology

There will be five questions. Total marks of the each core compulsory course will be 70. Each question will carry equal marks. Format of paper will be as under. In case of Q-5 only one of the style can be adopted.

Time: 3 hours **Total marks: 70**

1. a. Answer the following (Either one out of two or two out of three) 8
   b. Attempt any one (out of two) 3
   c. Attempt any three of following (three out of five) 3

2. a. Answer the following (one out of two or two out of three) 8
   b. Attempt any one (out of two) 3
   c. Attempt any three of following (three out of five) 3

3. a. Answer the following (one out of two or two out of three) 8
   b. Attempt any one (out of two) 3
   c. Attempt any three of following (three out of five) 3

4. a. Answer the following (one out of two or two out of three) 8
   b. Attempt any one (out of two) 3
   c. Attempt any three of following (three out of five) 3

5. Answer the following (Any seven out of ten) 14
   (Very short answer; fill in the blanks or objective type question)
   (At least two question from each unit)

OR

5. a. Attempt the following (two out of three) 10
   b. Attempt the any two (out of three) 04

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B.Sc. Semester-III
ZOOLOGY
Course-IV

CC Z 302 (APPLIED ZOOLOGY)

Credit: 3
Internal evaluation: 30 marks [5 – Attendance + 5 – Assignment/Seminar etc. + 20 Test]
External evaluation: 70 marks

UNIT-I POULTRY SCIENCE AND DAIRY INDUSTRY

-Introduction; Reproductive system of Hen; Formation and structure of egg; Types of Poultry house; Types of Poultry appliances; Poultry diseases; Poultry product; Primary knowledge of dairy industry

UNIT-II FISHERIES OF GUJARAT

-Classification of Fishes; Boats and Nets (Gears); Pomphret fishery; Pearl fishery; Prawn fishery

UNIT-III ENTOMOLOGY

-What is an Insect? Types of Mouthparts; Types of Metamorphosis; Types of damage and controlling measures of selected crop pests

-Lac culture

UNIT-IV BIOSTATITICS

-**BIOSTATITICS**: Frequency distribution; Mean; Median and Mode; class; graph/figure.

LABORATORY COURSE-IV

PC Z 202 (Applied Zoology)

Credit: 1.5

- Structure of egg of hen through model or boiled egg.
- To study reproductive system of hen through Model
- Different types of poultry house through models
- Different types of brooders and feeders through models
- Different types of Boats through models
- Different types of Nets through sample nets
- Life cycle of cockroach
- Life cycle of housefly
- Life cycle of butterfly
- Life cycle of Mosquito
- Important insect pests through specimens
- Temporary mounting of Insect mouthparts
- Calculation of examples related to Frequency distribution
- Calculation of examples related to Mean
- Calculation of examples related to Median
- Calculation of examples related to Mode

B.Sc. Semester-IV
ZOOLOGY
Course-V
CC Z 401 (CHORDATA)

Credit: 3
Internal evaluation: 30 marks [5 – Attendance + 5 – Assignment/Seminar etc. + 20 Test]
External evaluation: 70 marks

UNIT-I TAXONOMY

- General and diagnostic characters of Anamniotes and advancement over Non-chordata
- Origin of Chordata
- General body Plan of Vertebrata
- Classification of Anamniotes up to orders (Urochordata, Cephalochordata, Cyclostomata; Chondrichthyes, Osteichthyes; Amphibia)

UNIT-II ANATOMY

- **Amphioxus**: External morphology; Digestive system; Nervous system
- BONY FISH : Digestive system; Arterial system and Reproductive system
- **FROG**: Skeletal system: Vertebral Column; Appendicular skeleton (Girdles and bones of Forelimbs and Hind limbs); Venous System ; Nervous system

UNIT-III GENERAL TOPICS

- Migration in Fishes
- Types of Scales and Fins in fishes
- Parental care in Amphibians
- Identification of Poisonous and Non-poisonous Snake and Biting mechanism of poisonous snake; First Aid
- Beak and Feet in Birds
- Dentition in Mammals

UNIT-IV ECONOMIC VERTEBRATA

- Introduction of Types of Fisheries
- Preservation of fishes
- Byproducts of fish Industry
- Economic importance of Herpets
- Usefulness of Birds

- Economic Importance of Mammals

LABORATORY COURSE – V

PC Z 401 (Applied Zoology)

Credit: 1.5

*** Classification of following Anamniotes up to orders**

Urochordata: Ascidia; Botryllus, Doliolum, Salpa, Oikopleura

Cephalochordata: Amphioxus

Cyclostoma: Petromyzon; hag fish

Chondrichthys: Sphyrina, Electirc ray, Sting ray, Chimera

Osteichthys: Acipenser, Eel, Cat fish, Rohu, Hippocampus, Exocoetus,Echeneis, Sole fish, Protopterus

Amphibia: Ichthyophis, Salamander, Necturus, Bufo, Hyla, Alytus

*** Dissection** (Demonstration only):

Any Edible Bony Fish: External characters; Digestive system; Arterial system; Reproductive system

Toad: External characters, Venous system, Nervous system

- To study types of scales through Permanent slides.
- To study types of different types of fins from preserved specimens
- To study the parental care in Ichthyophis, Salamandar, Hyla, Alytes, *Pipa americana*
- Identification of Poisonous and Nonpoisonous Snakes.
- Modification of beaks in birds
- Modification of feet in birds
- Dentition in Rabbit, Horse, Dog, Cat, Man
- Byproduct of fishes through specimens

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Practical Examination

B.Sc. Sem. IV Zoology

PC Z 401 (Chordata)

Time: Total Marks: 50

Date:

1. **Identify the tagged organ/ organ system from the dissected animal, draw its labeled diagram and show it to examiner.** **10**
2. **Identify/Prepare a temporary mounting of _____from the dissected animal / from the given slide. Draw a labeled diagram and show it to examiner.** **05**
3. **Identify the given snake and justify its poisonous or non-poisonous nature** **05**
4. **Do as directed:** **15**
    1. **Identify and classify it up to order with proper reasons.**
    2. **Identify and classify it up to order with proper reasons.**
    3. **Identify and describe its adaptations (beak & feet)**
    4. **Identify and comment on its usefulness in the life of animal. (Dentition)**
    5. **Identify and describe (Parental care, fish byproduct, fins)**
5. **Viva** **10**
6. **Journal** **05**

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B.Sc. Semester-IV
ZOOLOGY
Course-VI

CC Z 402 (HISTOLOGY AND PHYSIOLOG Y)

Credit: 3
Internal evaluation: 30 marks [5 – Attendance + 5 – Assignment/Seminar etc. + 20 Test]
External evaluation: 70 marks

UNIT-I HISTOLOGY and TOOLS

- Introduction of Histology
- Type of Tissues (Structure and their functions): Epithelial tissue, Muscular tissue, Connective tissues (Connective tissue proper, Skeletal tissue, Vascular tissue, Nervous tissues
- Structure and Types of Microtome
- Process of Microtomy

UNIT-II HISTOLOGY

Structure and functions of following Mammalian Organs:
Digestive organs: Stomach and Intestine;
Digestive glands: Liver and Pancreas;
Excretory organ: Kidney;
Respiratory organ: Lung;
Gonads: Testis; Ovary

UNIT-III PHYSIOLOGY

Digestion: - Digestion and absorption of Food stuffs : Protein, Carbohydrates, Lipids, Nucleic acids
Respiration: Structure of Respiratory system; Mechanism of breathing and its regulation

UNIY-IV PHYSIOLOLGY OF BLOOD

Blood groups;
Structure and function of Hemoglobin;
Blood Circulation and Blood Pressure;
Conduction and regulation of Heartbeat,
Cardiac Cycle and ECG;
Transport of gases

LABORATORY COURSE-VI
PC Z 402 (Histology and Physiology)

Credit: 1.5

- To study different types of Tissue thro ugh Permanent Slides: Epithelial tissue; Areolar connective tissue; blood as a tissue; cardiac muscle, skeletal muscle
- To study structure of Microtome
- To study the process of Microtomy
- Preparation of Permenant mounting of Mammalian Kidney, Testis and Stomach.
- Histological structure of mammalian organs through Permanent slides: Stomach; Intestine; Liver; pancreas; Kidney; Lung; Testis; Ovary
- The effect of salivary amylase on Carbohydrate
- The principle and function of Sphygmomanometer
- Determination of blood groups with the help of Antisera
- Measurement of Haemoglobin in Human blood
- Differential count of WBCs
- Total counting of WBCs in human b lood
- Preparation of Haemin crystals. (Demonstration)

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Practical Examination
B.Sc. Sem. VI Zoology
PC Z 402 (Histology and Physiology)

Time: [Total Marks: 50
Date:

1. Perform an experiment that prove partial digestion of carbohydrate occur s in the mouth(buccal cavity). 08

2. Prepare a temporary mounting of given histological slide & Identify, show it to examiner and justify. 05

3. Determine your own blood group and check the total amount of WBC in the blood. 10

OR

3. Determine gram/percentage of haemoglobin and check the percentage of different type of WBC in the blood.

4. Do as directed: (Specimens) 12

a. Identify and explain its structure/compositi on. (Tissue, Heart)

b. Identify and describe its principle & function.
(Microtome/Sphygmomanometer)

c. Identify and describe its importance.
(haemin crystal, haemocytometer, haemoglobinometer, Antisera)

d. Identify and draw a labeled diagram. (T.S. of Organs)

5. Viva voce 10

6. Journal 05

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CHEMISTRY

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Semester - 3

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN			
Programme code :	—	**Programme Name :**	B.Sc.
Faculty :	SCIENCE	**Semesters :**	IV
Subject :	CHEMISTRY		
Effective from :	જૂન–૨૦૧૩ થી		

Sr.	Paper Code	Name of Paper	Credit
1	CC CH-401	CORE COMPULSORY-CHEMISTRY-I	3
2	CC CH-402	CORE COMPULSORY-CHEMISTRY-II	3
3 OR	SE CH-401A	SUBJECT ELECTIVE; NAME REACTIONS	2
3	SE CH-401B	SUBJECT ELECTIVE; GREEN CHEMISTRY	2
4	LC CH 401	LABORATORY COURSE-I	1.5
5	LC CH 402	LABORATORY COURSE-II	1.5

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Semester - 3

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B.Sc. Semester: III & IV
Chemistry Syllabus
(Effective from june-2013)

This syllabus is to be completed by assigning three period of one hour each for core course, Two period of one hour each for subject Elective course. and two practicals of three hours each per week.

The number of students in a practical batch should not exceed twenty five.

PATTERN OF EXAMINATION :

There will be two papers for core compulsory and one paper for subject elective theory and five hours/day for two days per batch practicals in the university examination. The pattern will be as follows.

written	Examination	Marks External	Marks Internal
Core course-I	3 hours	70	30
Core course-II	3 hours	70	30
Subject elective course	2 hours	50	…….
Laboratory course-I	5 hours	50	……
Laboratory course-II	5 hours	50	……

Theory Examination Pattern:

Que. No : 1	(A) : Write any Two out of Three Questions (B) : Write any One out of Two Questions	14 Marks 06 Marks
Que. No : 2	(A) : Write any Two out of Three Questions (B) : Write any One out of Two Questions	14 Marks 06 Marks
Que. No : 3	(A) : Write any Two out of Three Questions (B) : Write any One out of Two Questions	14 Marks 06 Marks
Que. No : 4	Write any Ten out of Twelve (Four questions to be asked from each unit) Short question/MCQ/Short numerical/Diagram	10 Marks

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Total Marks: 70

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B.Sc.

Semester : IV જૂન–૨૦૧૩ થી

Chemistry (CC CH – 401)

Unit:–I

(A) Application of CFT :

- Application of C.F.T.
  1) For determination of color of complex.
  2) Use of C.F.S.E. value.
- Limitation of C.F.T.
- Isomerism in complexes.

(B) Magnetic properties of Co-Ordination Compound :

- Type of magnetic behavior.
- Method of determining magnetic susceptibility.
- Spin only formula.
- Magnatic properties for 3rd metal complexes.

Unit:–II

(A) Heterocyclic Compound :

- Introduction.
- Nomenclature.
- Molecular orbital picture and aromatic characteristics of Pyrrole, Furan, Thiophene and Pyridine.
- Methods of synthesis for Pyrrole, Furan, Thiophene and Pyridine.
- Chemical reactions for Pyrrole, Furan and Thiophene.
- Electrophilic and Nucleophilic substitution reactions of pyridine.
- Basicity of Pyridine, Piperidine and pyrrole.

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(B) Carbohydrades : જૂન–૨૦૧૩ થી

- Introduction
- Definition.
- Classification of Mono Sacharides.
- Nomenclature.
- Reactions of Glucose and Fructose.
  (Methylation, Acetylation, Oxidation with Br_2 water and Conc.HNO_3 , Reaction with HCN, NH_2OH, Osazone formation and Epimerisation.)
- Lengthening of carbon chain of aldoses.
- Shortening of carbon chain of aldoses.

Unit:–III Ionic Equilibrium:

- Only Introduction.
  Electrolysis, Ionic Equilibrium, Resistance, Conductance, Specific conductance, Equivalent Conductance, Molar Conductance, Equivalent Conductance at Infinite Dilution.
- Type of Conductrometric 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.
- Transport number.
  Determination of Transport Number.
  1) Hittorf's Method.
  2) Moving Boundary Method.
- Hydrolysis of Salt.
  Classification of Salt.
  1) Strong Acid & Strong Base.
  2) Strong Acid & Weak Base.
  3) Weak Acid & Strong Base.
  4) Weak Acid & Weak Base.
- Numericals.

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Semester : IV જૂન–૨૦૧૩ થી

Chemistry (CC CH – 402)

Unit:–I Boron Hydride :

- Introduction.
- Classification of hydrides.
- Preparation, properties structure and use of Diborone.
- Bridge bonding in B_2H_6 (M.O. and sp^3approach.).
- Structure of higher Borones : B_4H_{10}, B_5H_9, B_5H_{11}, B_6H_{10}, $B_{10}H_{14}$.

Unit:–II Ultraviolet Spectroscopy :

- Type of electronic transitions.
- Effect of conjugation.
- Concept of Chromophore and Auxochrome.
- Bathochromic, Hypsochromic, Hyperchromic, and Hypochromic shifts.
- Woodward –fisher rules.
- Problems of conjugated enes, enones and aromatic ketones, aldehydes, acids and esters using empirical rules.

Unit:–III Electro Chemistry:

- Introduction of terms.
- Oxidation, Reduction, Redox, Anode, Cathode, Electrode, Half Cell, Oxidation & Reduction Potential.
- Electrochemical cell (Galvanic Cell) & Representation cell.
- Electrochemical Series and its Significance. **02/07/2013**

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- Nernst Equation of Cell EMF and single electrode potential. જૂન–૨૦૧૩ થી
- Describe the Electrode.
    1) Metal-Metal ion Electrode.
    2) Standard Hydrogen Electrode.
    3) Calomel Electrode.
    4) Weston standard Electrode.
    5) Glass Electrode.
    6) Quienhydron Electrode.
- Application of cell potential.
    1) Equilibrium constant.
    2) Free energy.
    3) pH.
- Numerical.

REF:-

❖ **Inorganic Chemistry**

1. Advance Inorganic chemistry – Satya Prakash . G.D.Tuli, S.K.Basu, R.D.Madan, S.Chand Voll-II.
2. Advance Inorganic chemistry – Satya Prakash, S.Chand Voll-I. Page No-819-828.

❖ **Organic Chemistry**

1. Organic Chemistry by Morrison and Boyd.4th ed. Pearson Education-2003
2. Organic Chemistry by pine, Hendriction, Cram and Hammond 4th 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.
6. Reaction mechanism and Reagents in Organic Chemistry by Gurdeep R.Chatwal 4th ed. Himalaya public House.
7. Text book of Organic Chemistry by Arun Bahal, B.S.Bhal, S.Chand.
8. Spectroscopy of Organic Compounds 6th ed. by P.S.Kalsi. જૂન–૨૦૧૩ થી

9. Organic Chemistry by I.R.Finar.
10. Organic Spectroscopy by Williams and Kemp.
11. Spectroscopic Methods in Organic Chemistry by Dudley H.Williams and Ian Fleming.

❖ **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.Misra.
5. Essentials of Physical Chemistry by B.S.Bahal, Arun Bahal, G.D.Tully.
6. Physical Chemistry by P.W.Atkins, 5th ed. , Oxferd, 1994, 7th ed. ,2002
7. Physical Chemistry by R.A.Alberty and R.J.Silbey, John Wiley, 1995.
8. Physical Chemistry by G.H.Barrow, 5th ed.Mac Graw Hill,1998,6th ed.
9. Physical Chemistry by W.J.Moore, 4th ed. , Orient Longmans, 1969.

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Semester : IV જૂન–૨૦૧૩ થી

Chemistry (SE CH – 401A)

SUBJECT ELECTIVE PAPER

(Name Reactions)

Unit:–I Mechanism and Synthetic applications of following Name Reactions :

- Arndt- Eistert Reaction.
- Hofmann Rearrangment.
- Aldol Condensation.
- Diels - Alder Reaction.

Unit:–II Mechanism and Synthetic applications of following Name Reactions :

- Dieckmann Condensation.
- Mannich Reaction.
- Clemmensen Reduction.
- Dakin Oxidation .

REF:-

1. Name Reaction by Prof.G.S.Kapadia, Uni.Granth Nirman Board.
2. Name Reaction by Jie Jack Li, Springer International Edition.
3. Reaction Mechanism and Reagents in Organic Chemistry by G.R.Chatwal.

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B.Sc. Semester : IV જૂન–૨૦૧૩ થી

Chemistry (SE CH – 401B)

SUBJECT ELECTIVE PAPER

(Green Chemistry)

UNIT : I

Basics of Green Chemistry

- The need for green chemistry
- Eco-efficiency- environmental protection laws
- Challenges --pollution control and pollution
- Green methods, green products, recycling of waste
- Twelve principles of green chemistry
- Inception of green chemistry--awards for green chemistry
- International organizations promoting green chemistry.

UNIT : II.

Designing Green Synthesis

- Choice of starting materials, choice of reagents, choice of catalysts
- Bio catalysts, polymer supported catalysts, choice of solvents
- Synthesis involving basic principles of green chemistry
- Examples –adipic acid, catechol, methyl methacrylate, urethane, aromatic amines (4-aminodiphenylamine), benzyl bromide, acetaldehyde, citral, ibuprofen, paracetamol,

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REF : જૂન–૨૦૧૩ થી

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1. V.K. Ahluwalia & M.R. Kidwai: New Trends in Green Chemistry, Anamalaya Publishers (2005).
2. V. Kumar, An Introduction to Green Chemistry, Vishal Publishing CO. Jalandhar, 2007.
3. Sanghi A Shrivastav Green Chemistry

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Semester: IV જૂન–૨૦૧૩ થી

Laboratory Course-I (Chemistry)

Section: A Inorganic Chemistry (4 hours per practical)

- Inorganic qualitative analysis: (Any 7 Mixture out of 10)
  Mixture Containing 4 Radicals
  (Except PO_4^{-3},BO_3^{-3},ASO_4^{-3},ASO_3^{-3},O^{-2})

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Semester: IV

Laboratory Course-II (Chemistry)

Analytical Chemistry (4 hours per practical)

A. Volumetric Analysis of Cu, Zn, Ni **(**Any Three)

1. To determine the amount of Zn by EDTA Method.
2. To determine the amount of Ni by EDTA Method.
3. To determine the amount of Cu by Iodometry Method.
4. To determine the amount of Cu by EDTA titration.

B. Estimation of Glucose/Aniline/Phenol (Any Two)

1. To determine the amount of Aniline by Brominating Method.
2. To determine the amount of Phenol by Brominating Method.
3. To determine the amount of Glucose by oxidation Method.

C. Paper Chromatography 1st & 3rd Group Radicals

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❖ **University Exam Pattern:** (Two Days per Batch). જૂન–૨૦૧૩ થી

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Name of Practical	Day	Marks
Laboratory Course-I Inorganic Qualitative Analysis	One day (5 hours)	40+5(viva) = 45
Laboratory Course-II Analytical Chemistry	One day (5 hours)	40+5(viva) = 45
	Journal	10
	Total	100

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BIO-
TECHNOLOGY

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B.Sc. Biotechnology
Semester- 3 and 4
(With Effect from June 2012)

			Exam			
		Instruction hrs week	**Internal**	**Uni. Exam**	**Total**	Credit
Semester-III						
Core Compulsory Course (CCC)						
CCC-I-3	Core Course-I (Paper-3) (Biotechnology)	3	30	70	100	3
CCC-I-4	Core Course-I (Paper-4) (Biotechnology)	3	30	70	100	3
CCC-II-3	Core Course-II (Paper-3)	3	30	70	100	3
CCC-II-4	Core Course-II I(Paper-4)	3	30	70	100	3
Practical Core Course (PCC)						
PCC-I-3	Practical Core Course-I (Paper-3) (Biotechnology)	3		50	50	1.5
PCC-I-4	Practical Core Course-I (Paper-4) (Biotechnology)	3		50	50	1.5
PCC-II-3	Practical Core Course-II (Paper-3)	3		50	50	1.5
PCC-II-4	Practical Core Course-II (Paper-4)	3		50	50	1.5
Foundation Course (FC)						
FCG-3	Foundation (Compulsory) course (Generic) - English (L.L.)	2	15	35	50	2
Elective Course (EC)						
ECG-3	Elective (Generic) Course -I	2		50	50	2
ECS-3	Elective (Subject) Course –I (Biotechnology)	2		50	50	2
		30	**135**	**615**	**750**	**24**
		Instruction hrs/weed	**Internal exam**	**Uni. Exam**	**Total**	Credit

Semester-IV						
Core Compulsory Course (CCC)						
CCC-I-5	Core Course-I (Paper-5) (Biotechnology)	3	30	70	100	3
CCC-I-6	Core Course-I (Paper-6) (Biotechnology)	3	30	70	100	3
CCC-II-5	Core Course-II (Paper-5)	3	30	70	100	3
CCC-II-6	Core Course- II(Paper-6	3	30	70	100	3
Practical Core Course (PCC)						
PCC-I-5	Practical Core Course-I (Paper-5) (Biotechnology)	3		50	50	1.5
PCC-I-6	Practical Core Course-I (Paper-6) (Biotechnology)	3		50	50	1.5
PCC-II-5	Practical Core Course-II (Paper-)	3		50	50	1.5
PCC-II-6	Practical Core Course-II (Paper-6)	3		50	50	1.5
Foundation Course (FC)						
FCG-4	Foundation (Compulsory) course (Generic) - English (L.L.)	2	15	35	50	2
Elective Course (EC)						
ECG-4	Elective (Generic) Course - I	2		50	50	2
ECS-4	Elective (Subject) Course - I	2		50	50	2
		30	**135**	**615**	**750**	**24**

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B.Sc. Biotechnology

Semester- 4

B.Sc. Biotechnology
Semester- 4
Core compulsory Course I (Paper 5)
Paper: Cellular metabolism -II

Unit-1 Lipid and amino acid metabolism

1. Lipid metabolism.: Lipid oxidation (Beta Oxidation)
2. Fatty acid biosynthesis
3. Amino acid metabolism: Oxidation, transamination, Deamination,
4. Urea cycle

Unit-2 Nucleotide metabolism and Oxidative phosphorylation

1. Catabolism of nucleotides :
2. Overview of biosynthesis of nucleotides of nucleotides :
3. Oxidative phosphorylation: ETC of mitochondria, electron carriers, complexes of ETC,
4. ATP generation coupled to electron transport

Unit-3 Nucleotide metabolism and Oxidative phosphorylation

1. Photophosphorylation in bacteria,
2. Photophosphorylation in plant
3. Carbohydrate synthesis coupled to photophosphorilation. C3 cycle.
4. C4 cycle

Unit-4 Membrane transport & signal transduction

1. Membrane transport: Diffusion, Active Passive transport
2. Introduction to signal transduction pathways
3. Types of signaling receptors
4. Signaling pathways: epinephrine, insulin

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B.Sc. Biotechnology
Semester- 4
Core compulsory Course-I (Paper 6) :
Paper: Fundamentals of Microbiology

Unit-1 Introduction to Microorganisms

1. **Bacteria:** Major Characteristics of microorganism. Taxonomic group, General methods of classifying bacterial. Nomenclature, Introduction to Bergey's manual.
2. **Fungi:** General characteristics and Economic importance of fungi.
3. **Algae & Protozoa :** Biological and economical importance
4. **Virus:** General characteristics, structure and Classification of Bacteriophage. Lytic cycle and lysogenic cycle.

Unit-2 Microbial physiology

1. **Types of bacteria** based on Carbon , energy, electron sources and pH, temperature, and O_2 requirement
2. **Culture media** and its types, Methods of **isolation** of bacterial
3. Reproduction in bacteria, Bacterial **growth curve**.
4. Methods **Measurement** of bacterial growth

Unit-3 Control of microbial growth

1. Introduction of terms: Sterilization, Disinfection, Antiseptic, Germicide, Chemotherapy, Antibiotic etc.
2. **Physical agent:** Mode of action and application of Temperature. Radiation and Filtration.
3. **Chemical agent**: Mode of action and application of Phenol, alcoholic and halogen compounds.
4. **Chemical agent :** Mode of action and application of Heavy metal and Gaseous agent

Unit-4 Microbial Diseases and prevention

1. Overview on Origin of **Chemotherapy.**
2. **Antibiotics:** Class of antibiotics based on mode of action, Antifungal & Antiviral antibiotic
3. **Introduction of terms:** infection, pathogen, virulence, carrier, nosocomial and opportunistic infections, sepsis, septicemia, septic shock, virulence factors etc.
4. **Microbial pathogenesis:** Representative diseases to be studied in detail are **Bacteria:** cholera, typhoid, tuberculosis, **Viruses :** AIDS. **Fungi**: mycoses. **Protozoa:** amoebiasis,

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B.Sc. Biotechnology
Semester- 4
(PCC-I-5 & PCC-I-6 (Paper 5 and 6))
Practical

Microbiology

1. Introduction to culture media , and growth on solid media and in liquid media
2. Introduction to Isolation techniques - Streak plate, pour plate, spread plate
3. Standard plate technique
4. Isolation of Yeast,
5. Isolation of Mold
6. Study the effect of Environment on growth –Temperature, -
7. Study the effect of Environment on growth – pH,
8. Study the effect of Chemicals ,
9. Study the effect of Heavy metal,
10. Study the effect of Antibiotics
11. Study of Biochemical test

    Test for carbohydrate: Sugar fermentation, M-R, VP, Citrate utilization, TSI, Starch

    Test for Nitrogen substrate: Indol, H_2S, Urea, Protein, Phynylalanine, Ammonia

    Growth on specific media: EMB, Mac Conky;' agar, Catalase test
12. Study of pure culture: *E. coli,* Bacillus, *Proteus vulgaris.*
13. Isolation of Bacteriophage

Estimation of biomolecules

14. Lipid estimation
15. Amino acid estimation
16. Quantification of DNA.
17. Urea estimation by DAM

Mendelian genetics

18. Genetic problems based on Mendelian genetics.

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B.Sc. Biotechnology
Elective Course(EC)
Biotechnology(Subjective)
Semester- 4
Paper: introduction of System specific Diseases of human

Unit -1 : General

1. **Respiratory Tract infection** : Rhinitis (common cold), Pertussis, Tuberculosis, Pneumonia
2. **Urogenital Tract infection** : Vulvovaginitis, Gonorrhea, Syphilis
3. **Infection of Digestive Glands and Peritoneum** : hepatitis, Yellow fever (liver)
4. **Eyes and ears infection** : Conjunctivitis/scleritis, Otitis media

Unit -2

1. **Gastrointestinal Tract infections** : Shigellosis (dysentery) Cholera, Salmonellosis, Amebosis
2. **Infections of Nervous System** : Meningitis, Tetanus, Botulism
3. **Infections of Hematopoietic and Lymphoreticular System** : Plague, HIV infection, Malaria
4. **Infections of Skin and Subcutaneous** Connective Tissue : Smallpox, Herpes, Measles

Elective Course(EC)
Biotechnology(Subjective)
Semester- 4

Paper: Plant Hormones

Unit -1 Plant hormones-I

1. Definition, General Functions, Types of Plant Hormones :
2. Auxins
3. Gibberellins
4. Cytokinins (= Kinins),

Unit -2 Growth Inhibitors

1. Abscisic Acid
2. Morphactins
3. Oligosaccharins and Other Natural Growth Hormones In Plants
4. Plant Hormones Versus Animal Hormones

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PHYSICS

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

U.G. (B. Sc.) Programme

CBCS :: Semester :: Grading Pattern

With effect from: June 2013 (In Continuation)

Faculty

Science

Subject

PHYSICS

REVISED SYLLABUS/SCHEME

B.Sc. Semesters- III & IV

Total Pages: **1 to 23**

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

The 11th 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 (11th 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 2011-12.
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**.
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 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**
   Practical Core -**PC**
2. Elective Generic - **EG**
   Elective Subject - **ES**
3. 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 Programme
I	II	III	IV	V	VI	
24	24	24	24	24	24	**144**

The semester wise weightage 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%

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:

1. 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%, 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**)/ (**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 - 20Marks
   - ✓ Assignments - 05Marks
   - ✓ Attendance - 05Marks

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.

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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
   - ✓ 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
   - ✓ 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. In Practical Exam there will be two practicals (each from PC-301 & PC-302) each of 50 marks (35-marks for practical+15marks for Viva) and duration of each practical will be 4 hours (3 hours for Practical+ 1 hour for Viva). Numbers of student in a practical exam will be20 to 24 and examiners will be 2.

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.

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B.Sc. Programme with 144 credits
CBCS-Semester-Grading Pattern
w.e.f. June-2011

General Pattern/Scheme of study components along with credits for Science faculty.

Part/Class	Course	Study Components	Instruction Hrs/ Week	Examination			Credit
				Internal	Uni. Exam	Total	
B. Sc. Sem –III		**Semester-III**					
		Core Compulsory (CC) Course					
	CC-I- 3	Core Course-I (Paper-3)	3	30	70	100	3
	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	Core Course-II (Paper-4)	3	30	70	100	3
		Practical Core (PC) Course					
	PC-I- 3	Practical Core Course-I (Paper-3)	3		50	50	1.5
	PC-I- 4	Practical Core Course-I (Paper-4)	3		50	50	1.5
	PC-II-3	Practical Core Course-II (Paper-3)	3		50	50	1.5
	PC-II-4	Practical Core Course-II (Paper-4)	3		50	50	1.5
		Foundation Course (FC)					
	FC-3	Foundation **(Generic)** Course – III Compulsory English (L.L.)	2	30	70	100	2
		Elective Course (E)					
	EG-3	Elective (**Generic**) Course –III	2		50	50	2
	ES-3	Elective (**Subject**) Course –III	2		50	50	2
			30	**150**	**650**	**800**	**24**
B. Sc. Sem-IV		**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					
	PC-I- 5	Practical Core Course-I (Paper-5)	3		50	50	1.5
	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
		Foundation Course (FC)					
	FC-4	Foundation **(Generic)** Course – IV Compulsory English (L.L.)	2	30	70	100	2
		Elective Course (E)					
	EG-4	Elective (**Generic**) Course –IV	2		50	50	2
	ES-4	Elective (**Subject**) Course –IV	2		50	50	2
			30	**150**	**650**	**800**	**24**

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B.Sc. Programme (CBCS-Semester-Grading pattern)

Semester end Examination

Format for Question paper Elective Courses (Subject) in Physics

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.

Time: 2Hrs **Total Marks: 50**

1 (a) Answer the following (Any two out of three) 08 Marks
(Theory questions)

(b) Attempt any two of following (Out of three) 06 Marks
(Theorytype **or** Application/Example/Problem)

(c) Attempt any three (Out of five) 06 Marks
(Short answer or objective type questions)

2 (a) Answer the following (Any two out of three) 08 Marks
(Theory questions)

(b) Attempt any two of following (Out of three) 06 Marks
(Theorytype **or** Application/Example/Problem)

(c) Attempt any three (Out of five) 06 Marks
(Short answer or objective type questions)

3 Answer the following (Any ten out of twelve) 10 Marks

(M.C.Q. Type **or** objective type)

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Semester end Examination

Format for Question paper Core Compulsory Courses in Physics

There will be four questions. First three questions are of 20 marks each and forth question is of 10 marks. First question will be from Unit - I, Second question from Unit-II, Third question from Unit-III, Forth question will be from all three Units. All the questions are detailed as under.

Time: 3Hrs **Total Marks: 70**

1	(a) Answer the following (Any two out of three) (Theory questions)	12 Marks
	(b) Attempt any four (Out of five) (Short answer/ objective/ MCQ type questions)	04 Marks
	(c) Attempt any one (Out of two) (Application/Example/Problem)	04 Marks
2	(a) Answer the following (Any two out of three) (Theory questions)	12 Marks
	(b) Attempt any four (Out of five) (Short answer/ objective/ MCQ type questions)	04 Marks
	(c) Attempt any one (Out of two) (Application/Example/Problem)	04 Marks
3	(a) Answer the following (Any two out of three) (Theory questions)	12 Marks
	(b) Attempt any four (Out of five) (Short answer/ objective/ MCQ type questions)	04 Marks
	(c) Attempt any one (Out of two) (Application/Example/Problem)	04 Marks
4	Answer the following (Any five out of Eight) (Short answer or objective type questions)	10 Marks

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CBCS - Semester - Grading Pattern

B.Sc. Semester-IV

PHYSICS SYLLABUS

CC: PHY-401

UNIT-I

Atomic Cohesion and Crystal Binding:

Cohesion of Atoms(2.1), Primary Bonds (2.2), The Covalent Bond (2.2.1), The Metallic Bond (2.2.2), The Ionic Bond (2.2.3), Mixed Bond (2.2.4), Secondary Bonds(2.3), The Vander wall's Bond (2.3.1), The Hydrogen Bond (2.3.2), The Cohesive Energy(2.4), Ionic Crystal (2.4.1), Noble Gas Crystal (2.4.2), Atomic Radi.Vs Lattice constants (2.5), Elastic constants of crystals (2.6), Elastic Stress (2.6.1), Elastic strain(2.6.2), Dilation(2.6.3), Elastic Compliance and Stiffness constant (2.7), Elastic Energy density (2.7.1), Application to Cubic crystal (2.7.2), Bulk Modulus and compressibility (2.7.3).

Basic Reference :

Elements of Solid State Physics. (2003) by J. P.Srivastava, PHI.

Other References

1. Introduction to Solid State Physics by C.Kittel, Wiley Estarn. Delhi
2. Solid State Physics by Saxena, Pragati Prakasion.
3. Solid State Physics by C. M. Kachhawa

UNIT-II

Physical Interpretation and Condition on 'Ψ':

Conservation of Probability (2.6), Expectation values, Ehrenfest's Theorem (2.7), Admissibility Condition on the Wave function (2.8)

Stationary States and Energy Spectra

Stationary states : The time Independent Schrödinger Equation (2.9), A particle in a square well potential (2.10), Bound States in a square well (E > 0) (2.11), The square well: Non localized states (E > 0) (2.12).

Basic Reference:

A Text Book of Quantum Mechanics by Mathews and K.Venkatesan Tata Mc-Graw Hill Publication

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), Resolving Power of a Plane transmission grating (19.12).

Basic Reference :

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

Other References:

1. Quantum Mechanics by John L. Powell and Bernd Crasemann
2. Quantum Mechanics by Ghatak and Loknath
3. Quantum Mechanics by Schiff
4. A Text book of Light by D.N.Vasudeva - S. Chand & Co.
5. Fundamentals of Optics by Jonkin's and White
6. Optics by Ajoy Ghatak
7. Principles of Optics by B.K. Mathur

UNIT-III

The Basic concepts of Plasma:

Introduction (1.1), Composition and Characteristics of a Plasma (1.2), Collisions (1.3), Elastic collisions (1.3.1), Inelastic collisions (1.3.2), Surface Phenomena (1.4), Transport Phenomena (1.5), Diffusion and Mobility (1.6), Viscosity, Conductivity (1.7), Recombination (1.8), Ohm's law (1.9), Gas Discharge (1.10), Composition of various natural and Man-made Plasma (1.11), Plasma diagnostics (1.12), Plasma waves and Instabilities Confinement of Plasma (1.13), Space Plasma (1.14).

Basic Reference:

Elements of Plasma Physics by S.N.Goswami New Central book Agency (P) Ltd., Calcutta.

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 plates(20.17), 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).

Basic Reference :

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

Other References:

1. Introduction to Plasma Physics and Controlled Fusion Vol.-1 by F.F.Chen.
2. Plasma Physics by S.N.Sen
3. A Text book of Light by D.N.Vasudeva - S. Chand & Co.
4. Fundamentals of Optics by Jonkin's and White
5. Optics by Ajoy Ghatak
6. Principles of Optics by B.K. Mathur

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PHYSICS SYLLABUS

CC: PHY-402

UNIT-I

Digital Electronics:

Introduction (21.1), Number systems used in Digital Electronics (21.2), Decimal, Binary, Hexadecimal and Octal (21.2.1 to 21.2.4), Binary Codes-(A) BCD, (B) Gray, (C) Excess-3 Codes (21.4), Arithmetic Circuits – Exclusive - OR Gate (21.9), Applications of X-OR Gate: (i) Binary to Gray Code Converter (ii) A Parity Checker (iii) The Half Adder (iv) The Full Adder (v) Parallel Adder (vi)Half subtractor, (vii)Full subtractor.

Basic Reference :

Hand book of Electronics by Gupta & Kumar 30th Revised Edition, 2002 Pragati Prakashan, Meerut.

A.C. Bridges:

A.C. Bridges (17.5), Maxwell's Bridge (17.6.1), Schering Bridge (17.7.3)

Basic reference:

Electricity and Magnetism By K.K.Tewari (S.Chand & Company Ltd.)

Programming in – C:

Overview of C : History of C (1.1), Importance of C (1.2), Sample Program: Printing a Message (1.3), Basic Structure of C Programs (1.8), Programming Style (1.9), Executing a C Program (1.10).

Basic Reference :

Programming in ANSI C by E.Balaguruswami (THM) (3rd Edition)

UNIT-II

Detectors:

Introduction (1.1.1), Detectors for Nuclear Particles (1.1.3), (i) Proportional Counter (ii) Semiconductor detectors,

Radioactivity:

(Review of Radioactive decay laws, half life,mean life time etc.) Radioactive growth and decay (2.6) Ideal equilibrium (2.7) Transient equilibrium and secular equilibrium (2.8) Radioactive series (2.9)

The Q- Equation:

Introduction (3.1), Types of Nuclear Reactions (3.2), The Balance of Mass and Energy in Nuclear Reactions (3.3), The Q-Equation (3.4), Solution of the Q-Equation (3.5).

Basic reference:
Nuclear Physics by S.B.Patel (New age International (p) Ltd. Publishers)

Other References:
1. Elements of Nuclear Physics by M.L.Pandya & R.P.S.Yadav Kedarnath Ramnath Meerut
2. Nuclear Physics by Kaplan

UNIT-III

Modern Physics:

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).

Basic Reference:
Atomic & Molecular spectra by Rajkumar Kedarnath Prakashan Meerut

Other Reference:
1. Spectroscopy Vol.-I by Walker & Straw
2. Atomic Physics by J.B.Rajam (5^{th} Edition-1960) S. Chand & Co.
3. Physics of Atoms and Molecules by B.H.Bransden & C.J. Joachagh, Pearson Education.

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B.Sc. Semester-IV

PHYSICS SYLLABUS

PC: PHY-401

LABORATORY EXPERIMENTS

1. Resonance pendulum. Determination of 'lo' , 'r' & 'a'
2. Study of X-ray diffraction (Powder) Pattern.
3. Decay of Temperature when body is allowed to cool.(thermocouple)
4. To study elliptically polarized light using photocell and quarter wave plate.
5. To determine λ using Hartzmann formula
6. Activation energy of a semiconductor
7. Absorption co-efficient of liquid using photocell.

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B.Sc. Semester-IV

PHYSICS SYLLABUS

PC: PHY-402

LABORATORY EXPERIMENTS

1. Study of B.G. : To determine current sensitivity, volt sensitivity, figure of merit and Rg of B.G.
2. High resistance by equal deflection method.
3. Low resistance by Carry foster bridg.
4. To determine low value of 'C' using Schering bridge.
5. Characteristics of UJT & Determination of R_{BB}, V_D & η
6. Characteristics of a Photodiode
7. To verify Demorgan's Theorems using IC-7400.

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
CBCS - Semester - Grading Pattern
List of Elective (Subject) Courses For IIIrd and IVth Sem.
(in force from June 2011)
Credits-2

1. VACUUM PUMPS, PRESSURE GUAGES AND INSTRUMENTS

2. ASTRO/ SPACE PHYSICS

3. ENERGY TECHNOLOGY

DETAIL SYLLABUS

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
CBCS - Semester - Grading Pattern
B. Sc. :: PHYSICS :: SEMESTER-III & IV
ES PHY-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.

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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)

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B. Sc. :: PHYSICS :: SEMESTER-III & IV
ES PHY-05
(in force from June 2011)

ASTRO/ SPACE PHYSICS

UNIT-I

Sun and Solar Radiation:
Introduction, Astronomical background, General description of the sun, Solar structure, Sun's outer layers, Composition, Visible features on the sun, More about sun's outer atmosphere, Temperature of the corona, Solar activity and Sunspot cycles.

UNIT-II

Cosmic rays and High energy astrophysics

An introduction to cosmic rays and high energy astrophysics: primary cosmic radiation, energy spectrum of primary cosmic rays, secondary cosmic rays, effect of geomagnetic field on cosmic rays, time variation of cosmic rays, photons in primary cosmic rays, origin of cosmic rays, basic facts about cosmic rays, region of confinement

Basic Reference:
An Introductory Course on Space Science and Earth's Environment
by S.S.Degaonker (Gujarat University Publication, Ahmedabad)

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CBCS - Semester - Grading Pattern
B. Sc. :: PHYSICS :: SEMESTER-III & IV
ES PHY-06
(in force from June 2011)

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.

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HOME-

SCIENCE

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Subject : Food Microbiology and Preservation

Paper No – 401

CC – 7

Objectives:

8. To provide the knowledge about principles, objectives, importance and meth ods of food preservation.
9. To aware the students about common used in the food methods for testing food adaptation.
10. To provide information about general and food microbiology.
11. To impact knowledge about pathogenic Non – pathogenic and useful micro organism.
12. To introduce the students about common causes of food spoilage.

Unit – 1

a) History of Microbiology – Discovery of Micro scope, to termination process, Antibiotics, Immunity etc. types of micro scope – compound and simple.
b) Anatomy of various micro – organism – typical microbial cell.
c) Classification of Microorganism and characteristics of micro organism.

Unit – 2

a) Cultural Media – classification of cultural media, according to growth of bacteria.
b) Methods of Bacterial inoculation – staining, common stain used in Microbiology, classification of staining method – simple, flagella, granule, spore, acid fast.

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c) Factors affecting on Microbial Growth, Growth curve, Sterilization – Definition, Methods of sterilization.

Unit – 3

a) Disinfection – Common disinfectant, factors affecting on disinfectant, properties of disinfectant.
b) Water Microbiology – Introduction Micro organisms present in water, Harmful effect of Micro – organisms present in water. Test for checking quality of water, milk micro biology – Introduction, common micro organism present in milk, Harmful effect of mi9cro organism present in milk.
c) Fermentation of milk – cheese, card, panir, etc. Micro organism of food industry, fermentation of Alcoholic beverages and cereals bread, idli, dhokla, dosa, khaman etc.

Unit – 4

a) Definition, Principles and importance of food preservation – Cause of food spoilage and their control, classification of food basis on their life perishable, non perishable and semi perishable.
b) Types of food storage and its importance long and short term storage, commercial effect of various methods on nutrient.
c) Classification of methods of food preservation. Bactericidal methods use of high temperature, radiation, bacteriostatic methods dehydration, use of law temperature, chemical, sugar, oil, acids etc.
d) Preservation by pickling, bottling and canning pective substance – introduction, classification, sources of pectin substance. Test for pective substance, theory of gel formation.

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Practicals

1) Identification of insects spoiling grains.
2) Application of various preservation methods. Jam, Jelly, Ketchep, Sauce, Squashes, Pickles, Chatney, Sun drying, Oven drying.
3) Test for detecting food adulteration.
4) Use of Microscope.
5) Simple staining.
6) Gram staining.
7) Spore staining.
8) Preparation of cultural media.
9) To study the methods of bacterial inoculation.
10) To study the methods of termination (Milk, Cereal).

References:

1) Foods – Facts and Principles.
   By M Shakuntala Manay.
   M shadaksharaswamy
   New age international (P) limited publishing's. Formally wiley esterm limited – New Delhi.
2) Food science
   By Sumati R. Mudambi
   Shalini M. Rao
3) Microbiology
   By Michael J. Pelczar, Jr.
   E.C.S. Chan
   Noel R. Krieg
   Tata Mc Graw – Hill Edition.
4) Textbook of Microbiology – 6th edition
   By R Anantha narayan
   CKJ Paniker
   Orient Longman Limited

Subject : Family Clothing

Paper No – 402

CC – 8

Objectives:

1) To impact knowledge regarding need selection & planning for clothes of various age group of children.
2) To provide knowledge regarding clothing for adult men & women

Theory

Unit I : Clothing for family.

Need, Selection criteria.

Word rob planning for family clothing.

Unit II: Children Garment.

Need.

Selection of materials for various age group.

Different layout (Drafting) for children clothing.

Unit III: Clothing for Teenager.

Need.

Selection criteria.

Clothing related to casual, occasional and formal wears.

Unit IV: Clothing for adult men & women.

Need.

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Selection criteria.

Clothing related to casual, occasional and formal wears.

Practical

1) Drafting, cutting & stitching of any two garment of children.
2) Drafting, cutting & stitching of any two garment of teenager.
3) Drafting, cutting & stitching of any two garment of adult individual.

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Subject : Growth and Development of Childhood Period (G.D.C – 403)

Paper No – HD

CC – 9

Objectives:

3) To give knowledge about growth and development of early and late childhood to students.
4) To understand the students about different observation techniques for to measure behavior of child.

Unit – 1

a) – Behaviour characteristics of early years.
   – Development tasks of early years.
b) – Physical and motor development.
   – Physical growth cycle, Body size, Body proportions, Bones, Muscular and Fat, teeth.
   – Principles and sequence of motor development motor skill, some common motor skill of early years, function of motor skills.
c) – Social Development.
   – Meaning of social development.
   – Social Expectations.
   – Importance of Early social experiences.
   – The pattern of social development.
   – Social development of early childhood.

Unit – 2

a) – Emotional Development.

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– Pattern of emotional development.

– Conditions responsible for emotional development.

– Characteristics of children's emotions.

– Common emotional patterns.

– Hazards of emotional development.

b) – Mental and moral development.

– Definition of insurgence.

– Factor affecting to intelligence.

– Meaning of mental age and chronicle age.

– Different aspects of intelligence such as concept development, imagination, memory, creativity in early years.

– Meaning and pattern of moral development , meaning & techniques of discipline.

c) – Speech Development.

– Meaning of speech, A tool for communication, A factor affecting to speech.

– Pattern of speech in early years.

– Problems of speech in early years.

Unit – 3

a) – Behavioural characteristics of late children.

b) – Developmental tasks of late childhood.

c) – Physical, Motor and Social developments of early years.

d) – Mental, Emotional and personality developments of early years.

Unit – 4

a) – Play development.

– Meaning, Characteristics and types of play and its importance.

b) – Creativity and Interests of childhood.

– Meaning and value of creativity.

– Hazards of creativity.

– Some common childhood interests.

c) – Child guidance and counseling.

– Some common problems of childhood.

– Problem identifications techniques and its use and administration.

Practical

- Anthropometric measurement of 3 – 5 years child.
- To plan activities of physical development for early and late childhood and observe them.
- To plan activities of motor and creative development of early and late childhood and observe them.
- To plan activities of socio – emotional activities and observe them.
- To study the different interests of early and late childhood.
- To study the different problems of early and late childhood.
- To prepare and collect the different types of play materials for child and helps to needy children.

References

- Hurlock E.B.; 1978; child development; 6th Edition; Mc Graw – Hill International Editions.
- Bigner J.J.; 1994; Individual and family development; A life – span Interdisciplinary Approach; Prentice Hall.
- Helen bee; 1995; Developing child; 7th Edition; Harper Collins college publishers.
- Fogel Anal and Melson gail F.; 1988; Child Development; Individual, Family and Society; West publishing company.

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Subject : Household

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Subject : Household Equipments.

Paper No – HE (404)

CA – 10

Objectives:

1. To understand the students and innovative technology in household equipments.
2. To understand the students about market of the household equipments.
3. To enable the students about conservation of time and energy saving .

Contents

Unit – 1 Household equipments:-

Importance, Classification – According to time area of house and function.

Selection of household equipments.

Unit – 2 Kitchen appliances – Manal

- Electrical

Importance, Operation and maintena nce.

Unit – 3 Household equipment – Material and finishes used in different appliances.

Cleaning equipments – Vaccum cleaner washing machine.

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Unit – 4 Equipments used as a heating.

Appliances – Cooking range – gas and electric oven, microwave oven.

Types of fuel used for domestic work.

Practical

1. Market survey for household appliances.
2. Use of different kitchen appliances (available in laboratory).
3. Identification of different finishes.
4. Scrapbook (collection of different) innovative equipments.

References

- Pitt, Picket and Thie – Household equipments.
- m>jrl. Aes. AacayR – g<h]pkr`onl Ao5q.
- DaR. neha xah – g<h]pkr`onl glta.

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Subject : Disaster Management.

Paper No – DM (405)

ES – 4

Objectives:

1. To obtain knowledge above natural and ma nmade disaster.
2. To obtain knowledge regarding managerial tectics.

Unit – 1 Basic view on disaster management.

Criteria kept in mind while managing disaster.

Necessity of disaster management.

Unit – 2 Disaster – meaning.

Types of disaster.

Natural disaster – earth quake, flood cyclone.

Accidental and its remedies.

Unit – 3 Manmade disaster.

Pollution – Water, Air.

Sound and soil.

Solution and its remedies.

Unit – 4 Fier, reasons and its remedies.

Human rights.

Family welfare programme

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Subject : Schemes and programme for family and child welfare.

Paper No – SF (406)

EG – 3

Objectives:

To enable the students to.

1. Gain knowledge on the schemes of the central and state government for family and child welfare.
2. Get relevant information about services for women aged and the family provided by nongovernmental organizations at the state, national and international level.

Unit – 1 Central and state government schemes for women.

Maternal and child health services.

Antenatal and post natal care.

Family planning services.

Unit – 2 Services and Agencies for women.

Rescue homes, short stay homes.

Mahila daksha samiti, protective homes for women and girls.

SEWA, CHETNA, SNOT womens university, mahila samkhaya, etc.

Unit – 3 Family welfare service.

Family counseling.

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Day care centers for children and aged.

Family courts.

Economics and other supportive services for families in distance.

Unit – 4 Overview of family and child welfare services.

Five years plans, allocation of funds, thrust ar eas.

Gaps in the existing services and programmes.

Need for development of innovative programmes.

References

- Laxmi Devi: 1998; Child and family welfare: Anmol Publications Pvt. Ltd. New Delhi.
- Desai (Ed.) (1994): Family and Interventions – A course compendium, Bombay, Tata Institute of Social Services.
- Govt. of India, Ministry of welfare, Annual report 1993 – 94, units I, II, III, VII.
- Chaudhary Paul D. (1975); Child welfare/ Development, Delhi: Atma Ram Publications.

Subject : Legislation and the policy issues in female and child welfare

Paper No – LFC (406)

EG – 4

Objectives:

To enable the students to

1. Gain knowledge about the laws relating to female and children.
2. Gain perspectives on various policies relating to children, youth, women and the aged.
3. Help to identify gaps in the existing policies on female and child welfare.
4. Get awareness about measures required to implement the policies effectively.

Theory

Unit – 1 Overview of legislation on different aspects of child and family welfare.

Background leading to the development of legislation and polices in family and child welfare.

Constitutional provisions for protection and welfare of children.

National policy for children, youth, women and agencies.

Unit – 2 Laws relating to children.

Juvenile Justice Act 1986.

Child labour (Probation and Regulation) act 1986.

Hindu law of adoption.

Guardianship and wards act.

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Unit – 3 Laws relating to marriage.

Personal laws (Hindu, Muslim).

Special marriage act, child marriage restrain act.

Issues relating to child marriage.

Widow marriage.

Unit – 4 Laws relating to family.

Divorce, maintenance, custody of children, succession, family courts act.

Implications for family and child welfare.

Legal provisions against rapist, implications for victims of rape.

Laws relating to dowry and implications for women.

References

- Chaudhary Paul D. (1975) child welfare / Development, Delhi: Atma Ram Publications.
- Gangrade K.D. (1978); Social legislation in India, (vol I and II). New Delhi: concept, unit I & II.
- Govt of India, Profile of the child in India; policies and programme, New Delhi: ministry of social welfare. 1980: unit II, III.
- Jain, S.C. (1986): The law relating to marriage and divorce, Delhi: Surjee Book Depo, units VI & VII (entmo work).
- Mathew, P.D (1983): The right of wife, children and parents of maintenance, New Delhi: Indian Social Institute.
- Laxmi Devi: 1998; child and family welfare; Anma Publication Pvt. Ltd.

Subject : Costumes of India

Paper No – CI (407)

FE – 4

Objectives:

To enable the students to

5. Identify the special features in the traditional clothing.
6. Examine the influences of traditional costumes to the change in clothing practices.
7. Study the present day costumes.

Theory

Unit – 1 Costumes of Men & Women.

Detail of costumes, jewelry and accessories of Men and Women of different status.

Special features.

Unit – 2 Traditional dances costumes.

Bharat natyam, Manipur, oddissi, kathak, kathakali.

Unit – 3 Marriage costumes of different states.

Costumes of separate occasions. Eg. Pregnancy, religious occasion, death etc.

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Unit – 4 Tribal costumes of India.

References

- Armstrong, Heles Joseph : Pattermarking for fashin design, Harper Collins Publication, New York, 1987, VII 712 p.
- Gurey, G.S. : Indian Costumes, The popular Book Dept., Mumbai.
- Roshan Alkaji : Costumes of India.
- Dar : Costumes of India and Pakistan.
- Koher, C: A History of costume, Dover pub. Inc., New York, 1963.

Subject : Textile Testing

Paper No – TT (407)

FE – 4

Objectives:

To acquaint students with the knowledge of fiber, yarn and fabric properties and their measurements.

Theory

Unit – 1 Introduction to textile testing.

Importance of textile testing.

Definition to textile testing.

Sampling.

Unit – 2 fiber testing

Fiber dimentions and their management.

Measurement of length, staple length, effective length.

Unit – 3 Yarn testing.

Yarn characteristics and their measurements.

Twist, crimp, strength.

Yarn numbering systems – tex, denier, count.

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Unit – 4 Fabric testing

Fabric count.

Fabric thickness and fabric weight.

Bow and skewness, Dimensional stability.

Tensile strength and tear strength.

Color fastness of fabric.

Air permeability.

Fabric stiffness.

Percent moister content and moisture regain.

Introduction to drapability and Abrasion resistance.

References

- Booth, J.E. (1968): Principles of textile testing, Butterworth Heinemann Ltd. U.K. or CBS Publishers and distributors, 4596/1A, 11Darya Ganj , New Delhi – 110002, 1996.
- Grower and Hanby (1969) : Handbook of textile testing and quality control.
- Indian standards institute (1982) : Handbook of textile testing.
- Shinkle John H. : Textile testing chemical publishing co. inc. Brooklyn, New York.

STATISTICS

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Hemchandracharya North Gujarat University,Patan
Choice Based Credit System (CBCS)
Syllabus for B.Sc. Semester IV (Statistics)
Effective from June, 2013
CC STA- 204
Random variable and Probability Distribution -II

HOURS: 4 / week ***CREDIT: 4*** ***EXAM HRS: 3***

Unit 1: **Characteristics Function and some inequalities (10 L)**
- Characteristic Function and its properties.
- Inversion theorem with proof, use of inversion theorem in deriving different discrete and continuous distributions.
- $P[g(X) \geq k] \leq E[g(X)]/k$, $k>0$.
- Jensen's Inequality
- Inequalities using Jensen's inequalities
  (i) $E(X^2) \geq [E(X)]^2$, (ii) $E(|X|) \leq [E|X|^p]^{1/p}$, (iii) $[E(|X|^s)]^{1/s} \geq [E(|X|^r)]^{1/r}$, $0<r<s$.
- Boole's Inequality and Bonferroni's inequalities

Unit 2: **Continuous Probability Distribution – II (10 L)**
Gamma Distribution
Normal Distribution
Weibull Distribution
- Derivation, basic properties of these distributions – Mean, Variance, moment generating function and moments, cumulant generating function,
- Applications and examples of these distributions.

Unit 3: **Bivariate Discrete Distribution (10 L)**
- Concept of Joint Distribution, joint mass function.
- Bivariate distribution, Marginal and conditional distribu tion
- Independence of Random variables.
- concept of conditional expectation and conditional variance
- moments and product moment, Karl Pearson's Coefficient of correlation

Unit 4: **Markov Chain and its applications (10 L)**
- Definition of Markov cha in,
- Classification of states and chains (communicate, reducible and irreducible states and chains)
- Transition probability and Chapman Kolmogorov equation.
- Applications of Markov chain

Reference Books:

1. Hogg, R.V. and Craig, A.T. (1972): Introduction to Mathematical Statistics, Amerind Pub. Co.
2. Mood, A.M., Greybill, F.A. and Bose, D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.
3. Mukhopadhyay, P. (1996): Mathematical Statistics, New Central Book Agency.

4. Rohtagi, V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley and Sons.
5. Hoel, P.G. (1971): Introduction to Mathematical Statistics, Asia Publishing House.
6. Meyer, P.L. (1970): Introductory Probability and Statistical Applications, Addison Wesley.
7. Gupta, S.C., and Kapoor, V.K. Fundamentals of Mathematical Statistics, Sultan Chand publications.
8. Goon, A.M., Gupta, M.K. and Das Gupta, B. (1991): Fundamentals of Statistics, Vo l.I, WorldPress, Calcutta.
9. A First Course in Probability - Sheldon.M.Ross, (Mc Millian publishing Co.)
10. Introduction to Probability and Statistics for Engineers and Scientists- S.M. Ross (Elsever)
11. A First course in Probabil ity - T.K. Chandra & D.Chatterjee (Narosa Publishing House)
12. Mathematical Statistics (VI Edition) - John E. Freund

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Choice Based Credit System (CBCS)
Syllabus for B.Sc. Semester IV (Statistics)
Effective from June, 2013
CC STA- 205
Statistical Tests, Official Statistics and Sampling

HOURS: 4 / week ***CREDIT: 4*** ***EXAM HRS: 3***

Unit 1: Large Sample Tests (10 L)
- Concept and elementary idea of statistical hypothesis, simple and composite hypothe sis, null and alternative hypothesis, level of significance, degree of freedom
- Test of normality and Z – test to test the significance of mean based on a large sample, to test the significance of two difference of two means based on large sample
- Test of Proportions - to test the significance of single proportion based on a large sample, to test the significance of difference between two proportions based on large sample
- Fisher's Information and its use to test the significance of coefficient of cor relation

Unit 2: Correlation and regression in three variables (10 L)
- Concept of Yule's notation, Plane of regression for three variables
- Residue and its properties
- Multiple and partial correlation coefficients and their inter relationships
- example

Unit 3: Official Statistics – (10 L)
Indian Census Operations, Origin and functions,
Role of Indian Census operation in planning and development processes,
Origin and functions of -National Sample Survey Organisation (NSSO),
Central Statistical Organisation (CSO), Indian Statistical Institute (ISI),
Indian Council for Medical Researches (ICMR) etc.,
Role of these institutions in the planning and development processes.

Unit 4: Census and Sampling – (10 L)
- Concept of Survey and complete enumeration, difference between survey and census, importance of survey
- Principal steps in sample survey.
- Types of sampling: Probability sampling, Judgment sampling, Mixed sampling, Sampling
- non sampling errors.

Reference Books:
1. Goon A.M., Gupta M.K. & Dasgupta B. (1994): An Outline of Statistical Theory (Vol -1), World Press
2. Johnson, N.I. & Kotz S. (1970): Distributions in Statistics, John Wiley
3. Ross S.M. (1972): Introduction to Probability Models, Academic Press
4. Mood A.M., Graybill F. & Boes D.C. (1974): An Introduction to the Theory of Statistics (3rd ed),McGraw Hill

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5. Hogg R.V. & Craig A.T. (1978): Introduction to Mathematical Statistics
6. Rohatgi V.K. (1984): An Introduction to Probability Th eory & Mathematical Statistics, John Wiley.
7. Stuart G & Ord J.K. (1991): Advanced Theory of Statistics (Vol 2), Charles Griffin
8. Bhattacharya GK & Johnson R. A. (1977): Concepts & Methods of Statistics, John Wiley
9. Sampling Theory and Methods - Murthy.M.N (Statistical Probability Society , Calcutta)
10. Sampling Techniques -Cochran.W.G (Wiley Eastern Ltd)
11. Theory and Analysis of Sample survey - D.Singh and F.S.Chaudhary (John Wiley and Sons)
12. Fundamentals of Statistics (Vol II) - Goon, Gupta & Das Gupta (Sulthan Chand & Sons)
13. Theory and Methods of Survey Sampling. Prentice Hall. Mukhopadhyay, P. (1998)
14. C.S.O. (1984) : Statistical System in India
15. Yule G.U. & Kendall M.G. (1953): An Introductio n to the Theory of Statistics, C.Griffin
16. Kendall M.G. & Stuart A. (1966): Advanced Theory of Statistics (Vol 3), C.Griffin
17. Croxton F.E., Cowden D.J. & Klein (1969): Applied General Statistics, Prentice Hall
18. Mukhopadhyay P. (1999): Applied St atistics

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Choice Based Credit System (CBCS)
Syllabus for B.Sc. Semester IV (Statistics)
Effective from June, 2013

STA- 206

Statistics Practical Based on CC STA-204, CC STA-205

HOURS: 6 / week ***CREDIT: 2.5*** ***EXAM HRS: 3***

(A) Manual Practical

1. Generation of random sample from normal distribution.
2. Fitting of normal distribution.
3. Generation of random sample from gamma distribution
4. Fitting of gamma distribution.
5. Drawing a random sample from Weibull distribution.
6. Large sample tests for testing single mean, difference between two means
7. Large sample tests for testing single proportion, difference between two proportions.
8. Testing significance of the correlation coefficient $\rho = \rho_0$
9. Problems based on bivariate distributions (conditional, marginal and Karl Pearson's Correlation using product moment).
10. Problems based on Markov chains

(B) Practical Using MS Excel

1. Generation of random sample from normal distribution.
2. Fitting of normal distribution.
3. Generation of random sample from gamma distribution
4. Fitting of gamma distribution.
5. Drawing a random sample from Weibull distribution.
6. Large sample tests for testing single mean, difference between two means
7. Large sample tests for testing single proportion, difference between two proportions.
8. Testing significance of the correlation coefficient $\rho = \rho_0$
9. Problems based on bivariate distributions (conditional, marginal and Karl Pearson's Correlation using product moment).
10. Problems based on Markov chains

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GEOLOGY

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

NAAC Accreditation Grade - "B"

SYLLABUS

(As per the Guidelines of UGC)

Semester III and IV

For Graduate Degree in

GEOLOGY

(Earth Sciences)

(In force from June, 2016)

Three Years – Six Semester studies leading to
Degree of Bachelor in Science (B. Sc.)
Based on
Choice Based Credit System (CBCS)

Submitted by
Department of Geology
R. R. Mehta College of Science
Palanpur-385001

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B. Sc. SEMESTER – IV

Design and Structure of Geology (Earth Sciences) UG Courses for Choice Based Credit System to be implemented from June 2016.

Units	Geology Theory	Geology Theory	Geology Practical
	GEO 204	**GEO 205**	**GEO 206**
	4 Credits	**4 Credits**	**2.5 Credits**
	Lectures per week : 4	Lectures per week : 4	Practical per week : 2 of three hours each
	Total Marks : 100	Total Marks : 100	Total Marks : 100
	Internal Marks : 30	Internal Marks : 30	Internal Marks : 30
	External Marks : 70	External Marks : 70	External Marks : 70
I	Dynamics of the Earth	Physical Geology, Soil	Crystallography, Petrology, Structural Geology, Palaeontology Laboratory Work
II	Stratigraphy, Physiography of India	Chemical Mineralogy, Crystallography	
III	Structural Geology	Geomorphology, Engineering Geology	
IV	Economic Geology	Stratigraphy, Palaeontology	

Compulsory field work in a suitable geological area to study the elementary aspects of field geology either in semester III or semester IV.

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

CBCS - Semester - Grading Pattern

B.Sc. GEOLOGY Theory: SEMESTER-IV

(Semester end Examination)

CC GEO-204 TH: Dynamics of the Earth, Stratigraphy, Physiography of India, Structural Geology, Economic Geology.

&

CC GEO-205 TH: Physical Geology, Soil, Chemical Mineralogy, Crystallography, Geomorphology, Engineering Geology, Stratigraphy, Palaeontology.

Format for Question paper Core Compulsory Courses in GEOLOGY

Time: 3Hrs **Total Marks: 70**

Part A

(Answer all questions)

1-06. Questions such as, MCQs, Fill in the blanks, Match the pairs, etc. (Each of **1** Mark) [Covering All Units]

Part B

(Answer all questions)

07-11. Very short answer type questions such as, Definition, Explain the terms, Examples etc. (Each of **2** Mark) [Covering All Units]

Part C

(Answer any Five/Eight of the following)

12-19. Short answer type questions such as, Definition, Explain the terms, examples/problems, reasons, differences, figures/diagrams, etc. (Each of **2** Marks) [Covering All Units]

Part D

(Answer any Five/Eight of the following)

20-27. Medium answer type questions such as, Short notes, figures/diagrams, examples/problems, reasons, differences, etc. (Each of **4** Marks) [Covering All Units]

Part E

(Answer any Four/Eight of the following)

28-35. Long answer type questions such as, Describe / Discuss in detail, diagrams, examples/ problems, etc. (Each of **6** Marks) [Covering All Units]

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CBCS - Semester - Grading Pattern

B.Sc. GEOLOGY Practical: SEMESTER-IV

CC GEO-206 PR: Crystallography, Petrology, Structural Geology and Palaeontology Lab.

(In force from June 2016)

❖ **Study of the Optical properties of the Rocks**

1) **Microscopic identification of following rocks:**
   Granite, Syenite, Gabbro, Rhyolite, Trachyte, Basalt, Conglomerate, Sandstone, Limestone, Quartzite, Marble, Schist, Gneiss.

❖ **Study of the Crystallography systems:**

2) Identification of typical crystal models belonging to Orthorhombic and Hexagonal (Beryl and Calcite types) systems with their forms and indices.

❖ **Study of Palaeontology:**

3) Identify typical fossil specimens showing Modes of fossilization – Petrifaction, Mould of skeleton and Imprint.

❖ **Study of Structural Geology :**

4) Construction of geological cross sections of inclined beds with igneous intrusions, geometrical exercises, outcrop filling problems.

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S. Y. B. Sc.

SEMESTER IV

GEOLOGY - THEORY and PRACTICALS

Course-wise detail syllabus

GEO 204 TH: Dynamics of the Earth, Stratigraphy, Physiography of India, Structural Geology, Economic Geology.

Unit vise Course details

Unit –1 **Dynamics of the Earth:**

Diastrophism – evidences of upheaval and subsidence.

Atmospheric circulation, weather and climate changes.

Land – air – sea interaction, earth's heat budget and global climatic changes.

Unit –2 **Stratigraphy:**

Correlation and Homataxis of strata, lithostratigraphic, chronostratigraphic and biostratigraphic units.

Physiographic and structural subdivisions of India and their characteristics.

Unit –3 **Structural Geology:**

Structures in rocks – primary and secondary. Elementary study of joints, faults, and folds – their types and classification. Inliers and Outliers. Unconformity and Overlap.

Unit –4 **Economic Geology:**

Basic ideas about the methods of mineral exploration.

Study of the following economic minerals with reference to India: Coal and Petroleum, Minerals used for Cement, Glass and Ceramic industries. Fertilizer minerals.

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GEO 205 TH: Physical Geology, Soil, Chemical Mineralogy, Crystallography, Geomorphology, Engineering Geology, Stratigraphy, Palaeontology.

Unit vise Course details

Unit –1 **Physical Geology:** Geophysical conditions of the earth – Gravity, Magnetic, and Heat flow. Ocean as a thermostat for the earth's surface heat balance.

Soil: Soils – definition, classification, composition, texture, fertility, chief types and soil profile. Soil-erosion and conservation.

Unit –2 **Chemical Mineralogy:** Chemical properties of minerals including isomorphism, polymorphism, pseudomorphism, fluorescence and phosphorescence. Importance of minerals.

Crystallography: Crystal systems: Orthorhombic, Hexagonal (Beryl and Calcite types only) – their study with examples in details.

Unit –3 **Geomorphology:** General principles of geomorphology; types and study of landforms. Broad ideas on the aspects of applied geomorphology.

Engineering Geology: Geology in relation to engineering. Properties on rocks to be used as building stones.

Unit –4 **Stratigraphy:** Classification of geological formations of India. Brief account of different geological formations of India. Study of Archean and Dharwar formations of India along with their economic importance.

Palaeontology: Systematic classification of organisms – their characters, environmental factors and geological distribution of mollusca, brachiopoda, echinodermata and arthropoda. Uses of fossil study.

Reference Books:

1) Geology of India, D. N. Wadia (!978), Tata Mc. Graw Hill.
2) Invertebrate Palaeontology, H. Woods (1982), Cambridge University Press.
3) Mineral Economics, R. K. Sinha and N. L. Sharma (1981), Oxford IBH Publishers.
4) Manual of Geological Maps, Gokhale.
5) Structural Geology, M. P. Billings (1977), Prentice Hall.
6) India's Mineral Resources, S. Krishnaswamy, (1979) Oxford & IBH Co.
7) Rutley's Elements of Mineralogy, H. H. Read, CBS publishers.
8) Principles Physical Geology, Arthur Holmes (1978), ELBS.
9) Engineering and General Geology, Parbin Singh (1994), S.K. Kataria and Sons, Delhi.
10) Geomorphology, Enayat Ahmed, Kalyani Publisher, New Delhi.
11) Principles of Geomorphology, W. D.Thornbury (1969), John Willey Inc.

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GEO 206 PR: Crystallography, Petrology, Structural Geology & Palaeontology Lab.

Course details

- **Microscopic identification of following rocks:**

  Granite, Syenite, Gabbro, Rhyolite, Trachyte, Basalt, Conglomerate, Sandstone, Limestone, Quartzite, Marble, Schist, Gneiss.

- **Crystallography:**
  Study of typical crystal models belonging to Orthorhombic and Hexagonal (Beryl and Calcite types) systems with their forms and indices in details.
- **Palaeontology:**
  Typical fossil specimens showing Modes of fossilization – Petrifaction, Mould of skeleton and Imprint.
- **Structural Geology:**
  Construction of geological cross sections of inclined beds with igneous intrusions, geometrical exercises, outcrop filling problems.

Compulsory field work in a suitable geological area to study the elementary aspects of field geology either in semester III or semester IV.

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HEMCHANDRACHARYA NORTH GUJARAT

UNIVERSITY, University Road, P.O. BOX NO: 21,

PATAN-384265.

N. Gujarat,INDIA.

NAAC Accreditation Grade–"A"

FACULTY OF

SCIENCE GEOLOGY

SYLLABUS

(Effective from June-2018)

B.Sc. (Semester IVProgramme)

The proposed new courses in Geology for undergraduate classes are reassigned in accordance to semester / CBCS / Grading system with new education policy. The new course is based on model curriculum of the university grants commission.

The medium of instruction should be Gujarati / English and the question paper should be drawn in Gujarati / English version. Students are permitted to write answer in English or Gujarati language.

Its objectives are as under:

1. To meet the growing demand of Specialization and Advanced Courses in applied science.
2. To help the colleges to update and modernize their laboratories.
3. To redesign the courses the special emphasis on local requirements, environment, to link the courses with requirements of the industries and research.
4. To prepare for National level entrance test like NET / SLET / JRF and other competitive exams.

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HEMCHANDRACHARYA NORTH
GUJARAT UNIVERSITY,UniversityRoad,
P.O. BOX NO: 21, PATAN-384265.

N. Gujarat,INDIA.

NAAC Accreditation Grade–"A"

FACULTY OF

SCIENCE GEOLOGY

SYLLABUS

(Effective from June-2018)

Common Formula for Question Paper (Core Course)

Time: 3 Hours Total Marks: 70

Theory Examination Pattern (Core Course):

Que. No: 1	A: Write any Two out of Three Questions.	**14 Marks**
	B: Write any one out of Two Questions.	**06 Marks**
Que. No: 2	A: Write any Two out of Three Questions.	**14 Marks**
	B: Write any one out of Two Questions.	**06 Marks**
Que. No: 3	A: Write any Two out of Three Questions.	**14 Marks**
	B: Write any one out of Two Questions.	**06 Marks**
Que. No: 4	Write any Ten out of Twelve Short questions / M.C.Q / Short numerical / diagram (Three Questions to be asked from each Unit).	**10 Marks**

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NAAC Accreditation Grade–"A"

FACULTY OF

SCIENCE GEOLOGY

SYLLABUS

(Effective from June-2018)

Common Formula for Question Paper (Elective Course)

Time: 2 Hours

Total Marks: 50

TheoryExaminationPattern (Elective Course):

Que. No: 1	A: Write any two out of Three Questions. (Each of 05 marks)	**10 Marks**
Que. No: 2	A: Write any two out of Three Questions. (Each of 05 marks)	**10 Marks**
Que. No: 3	A: Write any two out of Three Questions. (Each of 05 marks)	**10 Marks**
Que. No: 4	A: Write any two out of Three Questions. (Each of 05 marks)	**10 Marks**
Que. No: 5	Write any Ten out of Twelve Short question / M.C.Q / Short numerical / diagram (Three Questions to be asked from each Unit).	**10 Marks**

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HEMCHANDRACHARYA NORTH

GUJARAT UNIVERSITY,University Road,

P.O. BOX NO: 21, PATAN-384265.

GEOLOGY

PRACTICAL

(Effective from June-2018)
GEO 401 PR-1

Common Formula for Question Paper (Practical Course)

Time: 05 Hours

Total Marks: 50

Practical Examination Pattern:

1. Identify the Microscopic Rock section. Give the texture, Mineral constituents and Conclusion of it. Give the name of the Rocks and draw a section of over the polarizer and between the crossed nicols.

2. Identify the given Crystal model and Write the Axial ratio, System, Symmetry, Class, Type, Combination forms and Mineral name.

3. Viva-voce.

4. Journal Work.

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GEOLOGY

PRACTICAL

(Effective from June-2018)
GEO 402 PR-2

Common Formula for Question Paper (Practical Course)

Time: 05 Hours

Total Marks: 50

Practical Examination Pattern:

1. Draw a given map section and write a description of it.
2. Viva-voce.
3. Journal Work.

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B. Sc. Semester – IV

Design and Structure of Geology (Earth Sciences) UG Courses for Choice Based Credit System to be implemented from June 2018.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN						
B. Sc. Three year (General) Programme with 144 credits Se mester-III and IV in **GEOLOGY** from June-2018						
General pattern/scheme of study components along with credits						
Study Components		**Instru Hrs/ Week**	**Examination**			**Cr edi ts**
			Internal Marks	**UNi. Exam. Marks**	**Total Marks**	
Semester - IV						
	Core Compulsory (CC) Course					
GEO 401	Dynamics of the Earth, Stratigraphy, Physiography of India, Structural and Economic Geology.	3	30	70	100	3
GEO 402	Physical Geology, Soil, Chemical Mineralogy, Crystallography, Geomorphology, Engineering Geology, Stratigraphy, Palaeontology.	3	30	70	100	3
CC-III-4	Core Course	3	30	70	100	3
CC-IV-4	Core Course	3	30	70	100	3
	Practical core (PC) Course					
GEO 401 PR-1	Crystallography, Petrology, StructuralGeology and Paleontology Lab.	3		50	50	1.5
GEO 402PR-2	Structural Geology Lab.	3		50	50	1.5
PC-III-4	Practical Core Course	3		50	50	1.5
PC-IV-4	Practical Core Course	3		50	50	1.5
	Foundation Course (FC)					
FG	Compulsory English (L.L.)	3	30	70	100	2
	Elective Course (EC)					
EG	Elective (Generic) Course	2		50	50	2
GEO 403(CSE)	Elective (Geology) Course- Basics of Remote sensing	2		50	50	2
		30	**150**	**650**	**800**	**24**

Compulsory field work in a suitable geological area to study the elementary aspects of field geology either in semester III or semester IV.

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B. Sc. Semester IV

GEOLOGY - THEORY and PRACTICALS

Course-wise detail syllabus

GEO 401: Dynamics of the Earth, Stratigraphy, Physiography of India, Structural Geology, Economic Geology.

Unit	Course details
Unit –1	**Dynamics of the Earth:** Diastrophism – evidences of upheaval and subsidence. Atmospheric circulation, weather and climate changes. Land – air – sea interaction, earth's heat budget and global climatic changes.
Unit –2	**Stratigraphy:** Correlation and Homataxis of strata, lithostratigraphic, chronostratigraphic and biostratigraphic units. Physiographic and structural subdivisions of India and their characteristics. **Structural Geology:** Structures in rocks – primary and secondary. Elementary study of joints, faults, and folds – their types and classification. Inliers and Outliers. Unconformity and Overlap.
Unit – 3	**Economic Geology:** Basic ideas about the methods of mineral exploration. Study of the following economic minerals with reference to India : Coal and Petroleum, Minerals used for Cement, Glass and Ceramic industries. Fertilizer minerals.

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GEO 402: Physical Geology, Soil, Chemical Mineralogy, Crystallography, Geomorphology, Engineering Geology, Stratigrpahy, Palaeontology.

Unit	Course details
Unit –1	**Physical Geology :** Geophysical conditions of the earth – Gravity, Magnetic, Heat flow. Ocean as a thermostat for the earth's surface heat balance. **Soil:** Soils – definition, classification, composition, texture, fertility, chief types and soil profile. Soil-erosion and conservation. **Geomorphology:** General principles of geomorphology; types and study of landforms. Broad ideas on the aspects of appliedgeomorphology.
Unit –2	**Chemical Mineralogy:** Chemical properties of minerals including isomorphism, polymorphism, pseudomorphism, fluorescence and phosphorescence. Importance of minerals. **Crystallography:** Crystal systems: Orthorhombic, Hexagonal (Beryl and Calcite types only) - their study with examples in details. **Engineering Geology:** Geology in relation to engineering. Properties on rocks to be used as building stones.
Unit - 3	**Stratigrpahy:** Classification of geological formations of India. Brief account of different geological formations of India. Study of Archean and Dharwar formations of India along with their economic importance. **Palaeontology:** Systematic classification of organisms – their characters, environmental factors and geological distribution of mollusca, brachiopoda, echinodermata and arthropoda. Uses of fossil study.

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Reference Books:

1) Geology of India, D. N. Wadia (!978), Tata Mc. GrawHill.

2) Invertebrate Palaeontology, H. Woods (1982), Cambridge UniversityPress.

3) Mineral Economics, R. K. Sinha and N. L. Sharma (1981), O xford IBH Publishers.

4) Manual of Geological Maps,Gokhale.

5) Structural Geology, M. P. Billings (1977), PrenticeHall.

6) India's Mineral Resources, S. Krishnaswamy, (1979) Oxford & IBHCo.

7) Rutley's Elements of Mineralogy, H. H. Read, CBSpublishers.

8) Principles Physical Geology, Arthur Holmes (1978),ELBS.

9) Engineering and General Geology, Parbin Singh (1994), S.K. Kataria and Sons,Delhi.

10) Geomorphology, Enayat Ahmed, Kalyani Publisher, NewDelhi.

11) Principles of Geomorphology, W. D.Thornbury (1969), John WilleyInc.

GEO 403 (CSE):Basics of Remote sensing

Unit	Coursedetails	Credits
Unit–1	Remote sensing – History,Introduction, Types, Use.	**1**
Unit–2	Applications of remote sensing, Indian remote sensing satellites.	**1**

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GEO 401 PR-1: Crystallography, Petrology, Structural Geology and PalaeontologyLab.

Course details
Microscopic identification of following rocks: Granite, Syenite, Gabbro, Rhyolite, Trachyte, Basalt, Conglomerate, Sandstone, Limestone, Quartzite, Marble, Schist, Gneiss. **Crystallography:** Study of typical crystal models belonging to Orthorhombic and Hexagonal (Beryl and Calcite types) systems with their forms and indices in details. **Palaeontology:** Typical fossil specimens showing Modes of fossilization – Petrifaction, Mould of skeleton and Imprint.

GEO 402 PR-2: StructuralGeologyLab.

Course details
Structural Geology: Construction of geological cross sections of inclined beds With igneous intrusions, geometrical exercises, outcrop filling problems.

Compulsory field work in a suitable geological area to study the elementary aspects of field geology either in semester III or semester IV.

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ELECTIVE

GENERIC

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B. Sc. (Sem-I to VI) Programme

Under CBCS-Semester-Grading pattern
List of Elective (Generic) Courses (W.E.F : June 2012)

Each Course of 2 credits and Number of Contact hours = 2 Per Week

(Approximately 24 Contact Hours in Each Semester)

N.B : There are possibilities of Modification in these Course

SEMESTER I

EG-111	Communication Skills
EG-112	Basics of Mathematics
EG-113	Basics of Biology

SEMESTER II

EG-121	Environmental Science
EG-122	Disaster Management

SEMESTER III

EG-211	Personality Development
EG-212	Value Oriented Education

SEMESTER IV

EG-221	Entrepreneurship Development and Small Scale Business Management
EG-222	Human Rights

SEMESTER V

EG-311	Database Management System
EG-312	Indian Constitution

SEMESTER VI

EG-321	Information Technology
EG-322	Naturopathy

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Examination Scheme for Elective (Generic) Course

For Generic Courses Other than Computer Courses

Time: **2 Hours** **Theory Examination** Total Marks: **50**

1.	MCQs (10 out of 12) (Each of **1** Mark) [At least **6** questions from each Unit]	**10**
2 (A)	Short notes (2 out of 3) (Each of **4** Mark) [only from Unit-I]	**08**
2. (B)	Long Question (2 out of 4) (Each of **3** Mark) [only from Unit-I]	**06**
2. (C)	Short Question (6 out of 9) (Each of **1** Mark) [only from Unit-I]	**06**
3 (A)	Short notes (2 out of 3) (Each of **4** Mark) [only from Unit-II]	**08**
3. (B)	Long Question (2 out of 4) (Each of **3** Mark) [only from Unit-I]	**06**
3. (C)	Short Question (6 out of 9) (Each of **1** Mark) [only from Unit-I]	**06**

Examination Scheme for Elective (Generic) Course

For Computer Courses : EG-311,EG-321

Time: **1.5 Hours** **Theory Examination** Total Marks: **30**

1.	MCQs (6 out of 9) (Each of **1** Mark) [At least **4** questions from each Unit]	**06**
2 (A)	Short notes (2 out of 3) (Each of **4** Mark) [only from Unit-I]	**08**
2. (B)	Short notes (4 out of 6) (Each of **1** Mark) [only from Unit-I]	**04**
3 (A)	Short notes (2 out of 3) (Each of **4** Mark) [only from Unit-II]	**08**
3. (B)	Short notes (4 out of 6) (Each of **1** Mark) [only from Unit-II]	**04**

Practical Examination

Examination Pattern for EG-311,EG-321: (Computer Courses)

Time: **1 Hour**] [Maximum Marks: **20**

1.	પ્રેક્ટિકલ (2 પ્રેક્ટિકલ સ્વાધ્યાયમાંથી કોઈ પણ 1) Practical (1 out of 2 practical exercise)	**15**
2. a.	મૌખિક પ્રશ્નોત્તરી. [*viva-voce.*]	**03**
b.	પ્રયોગપોથી [Journal.]	**02**

Note: * Student will have to note all the steps/procedure related to the practical carried out by him/her in his/her answer book. Due weightage should be given while evaluating the practical. The purpose of this requirement is to create the skill of documentation among the students.

* These answer book will be submitted with the along with the mark sheet to the university by the examiner.

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SEMESTER IV

EG-221 Entrepreneurship development and Small scale business management
EG-222 Human Rights

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Programme code :	**B.Sc.**		**Programme Name :**	**Entrepreneurship Development and Small Scale Business Management**
Course Code	EG221		**Semester :**	IV
Personality Development				
Course type :	Elective Generic		**Total credit :**	02
Teaching time (hours)		**Examination Marking scheme**		
Theory (hrs)	**Practical** (hrs)	**Internal** (Marks)	**External** (Marks)	**Total** (Marks)
2	-	-	50	50

Entrepreneurship Development and Small Scale Business Management

Unit I

1. Entrepreneurship -Concept and Theories
2. Entrepreneurship Development
3. Steps in Setting Up a Small Business Enterprise
4. Small Business Analysis Skills and Market research

Unit II

1. Preparation of Business plan
2. Financial management issues in SSE
3. Operational management issues in small scale enterprise
4. Marketing Management Issues in SSE

Reference book

IGNOU study material for entrepreneurship course

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Programme code :	**B.Sc.**		**Programme Name :**	**Human Rights**
Course Code	EG 222		**Semester :**	IV
Personality Development				
Course type :	Elective Generic		**Total credit :**	02
Teaching time (hours)		**Examination Marking scheme**		
Theory (hrs)	**Practical** (hrs)	**Internal** (Marks)	**External** (Marks)	**Total** (Marks)
2	-	-	50	50

Human Rights

UNIT:1

1. Meaning And Evolution Of Human Rights , Nature ,Concept Development & Importance
2. Human Rights In India : Civil and Political Rights International Documents

UNIT:2

1. Social & Economics Rights
2. Implementation of Human Rights
3. Human Rights Agencies: Structure, And Organization
   - (i) National Human Rights Commission
   - (ii) National Commission For Women
   - (iii) Special Commissions For Weaker Sections-SC,ST And OBC

Books Recommended

1. C.Jamnadas & co. – Concept of Human Rights
2. Deep & Deep Publication –Human Rights
3. Eastern Book Agency –Human Rights
4. C.J. Nirmal (Ed.), *Human Rights In India: Historical, Social And Political Perspectives* New Delhi: OUP, 2000, Reprint Of 1995.
5. Centre For Development And Human Rights, *The Right To Development: A Primer* New Delhi: Sage, 2004
6. V.T. Thamilmaran, *Human Rights In Third World Perspective* New Delhi: Har Anand, 1992
7. G.S. Bajwa, *Human Rights In India: Implementation And Violations* New Delhi: Anmol, 1995
8. R.C. Hingorani, *Human Rights In India* New Delhi: OUP And IBH, 1985
9. Aftab Alam (Ed.) *Human Right In India: Issues And Challenges* Delhi: Raj, 2000
10. Amnesty International, *Human Rights In India* New Delhi: Vistaar, 1993
11. Sunita Samal, *Human Rights And Development In Emerging World Order* New Delhi: Kanishka, 2003.
12. Tim Dunne And Nicholas J. Wheeler (Eds.), *Human Rights In Global Politics,* Cambridge University Press, Cambridge, 1998

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ENGLISH

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HEMACHANDRACHARYA NORTH GUJARAT UNIVERSITY
PATAN-384 265

NAAC Accreditation Grade –"B"

English Compulsory

New Syllabus (CBCS)
(For Semester : I to IV)

ARTS / SCIENCE / FINE ARTS

W.E.F. JUNE-2011

Date:20/6/2011

Total Page:05

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S.Y.B.A. / B. Sc / Fine Arts Programme
Semester -4
C – 216 English Compulsory

Unit 1 Lesson 8 to 12 Stories — **Text** **Glimpses of Life**- An Anthology of Short Stories (Orient Black Swan)

Unit 2 **Vocabulary** (Text based)
Use of Idioms and Phrases in meaningful sentences

Unit 3
Grammar
Identification of Clauses
Non – Finite Verbs
Prefix and Suffix

Unit 4 **Application for Jobs.**

Recommended Reading

1 High School English Grammar – Wrenn & Martin
2 Contemporary English Grammar – David Green