या परिष्काराच्या सर्व संबंधितांचा कला विषयात येणे की, दिनांक ०८ जुन २०१९ रोजी संपन्न झालेल्या ४४व्या मासिक परिषद बैठकातील ऐतिहासिक विषय क्र.३९/४४—२०१९ व्या उरावाणुसार प्रस्तुत विद्यापीठात्मक न्यू मोडल डिग्री कॉलेज, हिंगोली येथील विज्ञान व तंत्रज्ञान विद्याशाखाकेंद्रीय पदवी स्तरावरील द्वितीय वर्षात चेकावण्यासाठी CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९—२० पासून लागू करणारात येत आहेत.

1. Biotechnology

सदरील परिष्कार व अभ्यासक्रम प्रस्तुत विद्यापीठात्मक www.srtmun.ac.in या संकेरक्षणाच्या उपलब्ध आहेत. तरी सदरील बाबी ही सर्व संबंधितांचा निर्देशनास आणून घाते.

जानकारी: परिषद, विषय: नाइडुड — ४३९ ६०६.
क्र.क्र.: शैक्षणिक—१/परिषद/न्यूमॉडलकेंद्रीय/पदवी—
सीबीसीएस अभ्यासक्रम/२०१९—२०/४६८

दिनांक : २९.०६.२०१९.

प्रत माहिती व पुढील कार्यवाहीसतः

१) मा. कुलकस्विन साहित्य पाठ्यक्रम, प्रस्तुत विद्यापीठ.
२) मा. सांस्कृतिक, परिशिद्ध व मूल्यमापन मंडळ यांचे कार्यक्रम, प्रस्तुत विद्यापीठ.
३) प्राचीन, न्यू मोडल डिग्री कॉलेज, हिंगोली.
४) साहित्यक तुलसीनगर, पद्मारोह विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलस्विन, पाताल विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टेम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.
Salient Features:

The contextual curriculum constructed for B.Sc. Biotechnology second year is related to the projected educational objectives of higher education and the Tyagragan committee constituted for Model colleges throughout India. During designing the curriculum care has been taken to understand the difficulties and needs of students from all sections of the society and from educationally backward areas are considered for enhancing employability and maximizing opportunities for further education and to serve the need of learner centric Choice Based Credit System (CBCS) course structure to orient and practically train students in the field of Biotechnology. During developing curricula the. The entire Second year curriculum is divided into three streams namely Language Curriculum, Major Curriculum and Life Skill Curriculum weighted in the ratio 8:18:4. The course under Language Curriculum consists of Marathi/ Hindi as Indian language and English as compulsory language for both semesters. The major curriculum is divided as major core, Supportive and innovative curriculum. Under this Biochemistry, Genetics Seminar, Field Visit are major core; Immunology is supportive and Lab Course-3 is applied curriculum for Third Semester. Whereas Metabolism, molecular Biology Seminar, Field Visit are major core; Developmental Biology is supportive and Lab Course-4 is applied curriculum for Fourth semester. The Life-Skill Curriculum Is categorized into Job Oriented and Value Oriented curriculum. History of Marathwada, Civilizational Backdrop of India, Folklore and Folk History of Maharashtra are value oriented courses; Ethics, Patenting and Bio-entrepreneurship is job oriented curriculum for Third semester whereas Religious and communal harmony, Peace and conflict resolution, freedom struggle of India are value oriented courses; Plant tissue culture and plant biotechnology is job oriented curriculum for Fourth semester.

Utility:

The curriculum of B.Sc. Second year Biotechnology course will train the students in field Indian and English languages. The syllabus of major curriculum will be helpful in understanding basic and applied concepts in the field of Embryology, Biomolecules, Genetics and Immunology. The courses in Value oriented Skills will present and cultivate history and culture of India among students. The job oriented curriculum will fulfill the local needs of farmers and will helpful protecting the intellectual property of our country.

Learning Objectives:

1. To pass on knowledge of basic and applied biotechnology.
2. To design the curriculum that enable students to prepare for JAM and other competitive examinations of M.Sc. admission and other competitive examinations successfully.
3. To make the students aware of Indian culture, folks and history.
4. To brought balance between highly instrumentalized, market driven soft-skills and a value oriented and general life enhancing skills.
5. To match students Indian language and English language competencies.

Prerequisites:

The course is offered for a student registered for undergraduate programme in the faculty of Science and Technology who had primary knowledge and training in the field of basic biological, chemical, mathematical and physical sciences and interested to gain additional advanced knowledge in the field of biotechnology.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Total Credits</th>
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<tr>
<td>BBT 3-IA</td>
<td><strong>भारतीय भाषा</strong> मराठी भाग- 03/ हिंदी भाग-03</td>
<td>04</td>
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<td>BBT 3-IB</td>
<td><strong>English</strong> Critical Reasoning, Writing and Presentation</td>
<td>04</td>
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<tr>
<td>BBT 3-IIA-A</td>
<td><strong>Major (Core)</strong> Biochemistry</td>
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<tr>
<td>BBT 3-IIA-B</td>
<td><strong>Major (Core)</strong> Genetics</td>
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<td>BBT 3-IIB</td>
<td><strong>Major (Supportive)</strong> Immunology</td>
<td>04</td>
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<tr>
<td>BBT 3-IIC</td>
<td><strong>Major (Innovative)</strong> Lab Course-3</td>
<td>04</td>
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<tr>
<td>BBT 3-IIIA</td>
<td><strong>Job Oriented Life Skills</strong> Ethics, Patenting and Entrepreneurship</td>
<td>02</td>
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<tr>
<td>BBT 3-III B</td>
<td><strong>Value Oriented Life Skills</strong> History of Marathwada / Civilizational Backdrop of India / Folklore and Folk History of Maharashtra</td>
<td>02</td>
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<td>BBT 3-IIA-C</td>
<td><strong>Major (Core)</strong> Seminar</td>
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<td>BBT 3-IIA-D</td>
<td><strong>Major (Core)</strong> Field Visit</td>
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</table>

**Note:**
1. Code BBT3-IA, BBT3-IB are Language Curriculums.
2. Code BBT 3-IIA-A, BBT 3-IIA-B, BBT 3-IIA-C, BBT 3-IIA-D, BBT3-IIB, BBT3-IIC are Major Curriculums.
3. BBT3-IIIA, BBT3-III B are Life Skill Curriculums.
_स्वामी रामानंद तीथं मराठवाडा विद्यापीठ, नांदेड संचलित
न्यू मॉडेल डिग्री कॉलेज, हिंदौली
बी.एस.ए. जैवशास्त्राला (सत्र पदती)_

तितसरस्त्र (भाषा अभ्यास)
BBT3 – IA: मराठी भाग-03 (भारतीय भाषा)

एकूण गुण:अंतर्गत ५० + विविधस्वरूप ५० rक : 45

व- दैलकोमे %
1. गहिर ले तांडण - ह. ना. आपटे
2. पेंड - योगीराज वाग्मारे
3. ईद - दरार हबीब
de. तीमी वातच वेंगची - मधु सावंत
d- लकोम इज्कुल इंजीनियरिंग
1. शील व सीज़नी नसेल तर - डॉ. बाबासाहेब अंबेडकर
e. छत्रपती शाहु आमचा लोकसिद्ध ईश्वर - डॉ. आ.ह.साऊंके
f. शेवटचे किरके - संत गाडगेबाबास.
4. शेतक-वांच्या दुकाने सनात मुळ - शेषराव नाये.

c- औषधिद %
1. शील व सीजनी नसेल तर - डॉ. बाबासाहेब अंबेडकर
e. छत्रपती शाहु आमचा लोकसिद्ध ईश्वर - डॉ. आ.ह.साऊंके
f. शेवटचे किरके - संत गाडगेबाबास.
4. शेतक-वांच्या दुकाने सनात मुळ - शेषराव नाये.

d- लकोम इज्कुल इंजीनियरिंग
1. शील व सीजनी नसेल तर - डॉ. बाबासाहेब अंबेडकर
e. छत्रपती शाहु आमचा लोकसिद्ध ईश्वर - डॉ. आ.ह.साऊंके
f. शेवटचे किरके - संत गाडगेबाबास.
4. शेतक-वांच्या दुकाने सनात मुळ - शेषराव नाये.

M ज्योगिदै लिख% 
1. मुलाखत
e. कार्यक्रमाचे संयोजन
e. संगणक आणि मराठी भाषा
4. मराठी प्रमाणलेखनाचे नियम.

I अहंकार गी 
1. निवडक मुलाखती- भालचंद्र नेमाडे लोकवातमय ग्रह, मुंबई
e. सुगम मराठी व्याकरण लेखन- मो.रावणातील उकाशन, पुणे 2007
Swami Ramanand Teerth Marathwada University, Nanded's
NEW MODEL DEGREE COLLEGE, HINGOLI
B.SC. Biotechnology (Semester Pattern)

III Semester (Language Curriculum)

BBT 3 – IA हिंदीभाषा- 03 (भारतीयभाषा)

Marks: Internal 50 + External 50
Total Periods: 45

खण्ड अ] कहानी विभाग

1] प्रेमचंद - गुल्ली-डंडा
2] मोहन राकेश - मलबे का मालिक
3] निर्मल वर्मा - परिदेव
4] ओमप्रकाश वाल्मीकि - आम्मा
5] राजी सेठ - परमा की शादी

खण्ड ब] आलोचना:स्वरूपऔरप्रकार
Periods: 10

खण्ड अ] देवनागरी लिपि की विशेषताएँ
Periods: 10

खण्ड ड] जनसंचार के माध्यम और हिंदी भाषा

1] परंपरागत माध्यम
2] आधुनिक माध्यम

संदर्भ ग्रंथ :
1] प्रयोजनमूलक हिंदी विविध आयाम - डॉ. अभिनव देशमुख (विकास प्रकाशन कानपूर)
2] हिंदी भाषा का आधुनिकीकरण एवं मानकीकरण - श्री त्रिभुवननाथ शुक्ल (विकास प्रकाशन कानपूर)
3] व्यावहारिक हिंदी - विनोद गोदरे
Swami Ramanand Teerth Marathwada University, Nanded’s
NEW MODEL DEGREE COLLEGE, HINGOLI
B.SC. Biotechnology (Semester Pattern)

III Semester (Language Curriculum)

BBT 3 – IB Critical Reasoning, Writing and Presentation (English)

Marks: Internal 50 + External 50

Total Periods: 45

Unit-I- Introduction to Critical Thinking. 11 Periods
1. Critical Thinking, Benefits of Critical Thinking, Barriers to Critical Thinking.
2. Arguments, Types of arguments.
5. Preparing for Critical Writing.

Unit-II-Accuracy in Writing 12 Periods
1. The Writing Process.
2. The Elements of Writing.
4. Preparing for Critical Writing

Unit- III Presentation and Documentation 10 Periods
1. Seminar Papers.
2. Project Reports.
3. Documentation
4. M.L.A. Format of Documentation

Unit-IV-Soft Skills for Academic Presentation 12 Periods
1. Audience.
2. The Objective of Presentation.
3. Techniques of Effective Presentation.
4. Visual Presentation Aids

Reference Books:
1. Sonima K.K. and Dr. Anitha Ramesh K: Critical Reasoning, Writing and Presentation University of Calicut, School of Distance Education Kerala, India.
Swami Ramanand Teerth Marathwada University, Nanded's  
NEW MODEL DEGREE COLLEGE, HINGOLI  
B.SC. Biotechnology (Semester Pattern)  

III Semester (Major Curriculum)  
BBT 3 – IIA-A Biochemistry (Major Core)  

Marks: Internal 50 + External 50  
Total Periods: 45  

Unit-I: Basics of Biochemistry  
08 Periods  
1.1 Types of Biomolecules  
1.2 Functional groups in Biochemistry  
1.3 Concepts of Bioenergetics  
1.4 Water: Structure and Functions  
1.5 Biological Buffers  

Unit-II: Glycobiology and Lipid Chemistry  
15 Periods  
2.1 Concept of Carbohydrates  
2.2 Classification of carbohydrates  
2.3 Open and Ring Structure of carbohydrates  
2.4 Reducing and non-reducing sugars  
2.5 Brief account of techniques in Glycobiology  
2.6 Fatty acids and Triglycerols  
2.7 Nomenclature and classification of Lipids  
2.8 Membrane lipids  
2.9 Fat Soluble Vitamins  
2.10 Techniques use for study of lipids  

Unit –III: Protein Biochemistry  
12 Periods  
3.1 Concepts and Classification of Amino acids  
3.2 Biological Peptides  
3.3 Concepts of peptide bond  
3.4 Structural classification of proteins  
3.5 Chromatographic techniques for purification of proteins  

Unit-IV: Nucleotides and Nucleic acids  
10 Periods  
4.1 Nucleotides and Nucleosides  
4.2 Major and Minor Nitrogenous bases  
4.3 Concept of base pairing  
4.4 Double helical DNA structure  
4.5 Types of RNA  
4.6 A, B and Z form of DNA  

References:  
4. Biochemistry: Zubay- WCB publishers  
### Unit-I: Overview of Genetics and Mendel's principles

1.1 Brief history of genetics
1.2 Areas of genetics
   a. Classical genetics
   b. Molecular genetics
   c. Evolutionary genetics
   d. Biochemical Genetics
1.3 Mendel's experiment and laws
1.4 Multiple alleles and genotypic interaction

### Unit-II: Sex determination and linkage

2.1 Sex determination patterns
2.2 Dosage compensation
2.3 Expressivity and penetrance
2.4 Sex linkage
2.5 Sex limited and sex influenced traits
2.6 Pedigree analysis

### Unit III: Chromosomal Mapping and Bacterial genetics

3.1 Diploid Mapping
3.2 Tetrad analysis
3.3 Somatic crossing over
3.4 Human chromosome mapping
3.5 Transformation, Conjugation, Transduction
3.6 Lysogenic and Lytic cycles

### Unit IV: Cytogenetics and Evolutionary genetics

4.1 Chromosome structure changes
   a. Centromeric breaks
   b. Duplication
   c. Chromosomal rearrangements in human chromosome
4.2 Variation in chromosome number
   a. Euploidy
   b. Aneuploidy
   c. Mosaicism
4.3 Quantitative genetics
4.4 Hardy-Weinberg equation
4.5 Mechanism of speciation
REFERENCES FOR READING

9. Molecular Biology of the Cell, Albert Bruce, Garland Science Publication
10. Genome- T.A. Brown, John Wiley
Unit I: Basics of Immunology
1. Brief History of Immunology
2. Innate and adaptive immunity
3. Cells and molecules involved in immune system
4. Primary and secondary lymphoid organs
5. Haematopoiesis and cell differentiation

Unit II: Antigen and Antibodies
1. Immunogenicity and antigenicity
2. Properties of antigens
3. Concept of super antigen
4. B and T cell epitope
5. Adjuvant and haptens
6. Structure and functions of antibodies
7. Classification of antibodies

Unit III: Antigen-Antibody interaction study
1. Precipitation reaction
2. Agglutination reaction
3. RIA
4. ELISA
5. Immunofluorescence microscopy
6. Flow cytometry
7. Western blotting
8. Hybridoma technology

Unit IV: Immune Effector Mechanism
1. Cytokines
2. Complement system
3. T-cell effector mechanism
4. Leucocyte migration and inflammation
5. Vaccines
6. Autoimmunity
7. Transplantation immunology

REFERENCES
<table>
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<tr>
<th>Marks: Internal 50 + External 50</th>
<th>Total Periods: 45</th>
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<tr>
<td>4. Reaction of amino acids, sugars, lipids</td>
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<td>5. Isolation, purity determination and quantization of cholesterol, DNA &amp; RNA</td>
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<tr>
<td>6. Quantization of proteins and sugars &amp; amino acids</td>
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<td>7. Analysis of oils, iodine number, saponification value, acid number</td>
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<td>8. Biochemical estimation of blood sugar</td>
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<td>9. Color reactions of different types of carbohydrate</td>
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<tr>
<td>11. Preparation of egg albumin, milk, casein, cysteine, and starch</td>
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<tr>
<td>12. Concept of buffers, pH, morality and nomarality (Problem solving and preparation)</td>
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<tr>
<td>13. Biochemical estimation of DNA/RNA</td>
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<tr>
<td>14. Estimation of Glucose, Uric acid and Bilirubin from blood/Urine</td>
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<td>15. Problems based on Mendelian genetics, Gene linkage, Sex linked inheritance and Crossing over.</td>
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<tr>
<td>16. Determination of ABO Blood group</td>
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<td>17. Determination of total leukocyte count</td>
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<td>18. Determination of differential leukocyte count</td>
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<tr>
<td>20. Ouchterloney double diffusion and Radial immunodiffusion</td>
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<td>21. Quantitative precipitation assay</td>
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<td>22. Immuno electrophoresis</td>
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<td>23. Latex agglutination</td>
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<td>24. Widal Test</td>
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<td>25. VDRL</td>
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Swami Ramanand Teerth Marathwada University, Nanded's  
NEW MODEL DEGREE COLLEGE, HINGOLI  
B.SC. Biotechnology (Semester Pattern)  
III Semester (Life Skill Curriculum)  

BBT 3 –IIIA  Ethics, Patenting and Bio-Entrepreneurship (Job Oriented Life Skills)  

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<td><strong>Unit- 1: Introduction to Biosafety and Bioethics</strong></td>
<td>10 Periods</td>
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<tr>
<td>1.1 Need of Bioethics and Biosafety</td>
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<tr>
<td>1.2 Definition and Applications of Biosafety and Bioethics</td>
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<tr>
<td>1.3 Human Genome Project and ethical issues</td>
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<tr>
<td>1.4 Biosafety guidelines and Regulations</td>
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<td>1.5 GLP and GMP</td>
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<td><strong>Unit-2: Introduction to IPR</strong></td>
<td>11 Periods</td>
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<tr>
<td>2.1 Meaning and Forms of IPR</td>
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<tr>
<td>2.2 History and Evolution of Patent Law</td>
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<tr>
<td>2.3 Classification of Patents</td>
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<td>2.4 Grant of Patent and Patenting Authorities</td>
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<td>2.5 Patent owner: rights and duties</td>
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<tr>
<td><strong>Unit-3: Need and Protection of Patenting</strong></td>
<td>11 Periods</td>
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<tr>
<td>3.1 Protection of Plant Varieties</td>
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<td>3.2 Patent law: Present scenario</td>
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<tr>
<td>3.3 Case studies in IPR</td>
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<tr>
<td>A. Diamond Vs Chakrabhorty case</td>
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<td>B. Neem and Turmeric Patent case</td>
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<td>C. Basmati rice case</td>
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<td>3.4 Myriads case on gene patenting</td>
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<td><strong>Unit-4: Bio-entrepreneurship</strong></td>
<td>13 Periods</td>
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<tr>
<td>4.1 Innovations and Entrepreneurship</td>
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<td>4.2 Enterpreneurship in the Biotechnological Context</td>
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<td>4.3 Biotechnology Industry and Firm Structure</td>
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<td>4.4 Product Development and Innovation diffusion</td>
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<td>4.5 Biotechnology Industry growth Models</td>
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<td>4.6 Factors affecting biotech business</td>
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**References:**
BBT 3 –IIIB Folklore and Folk History of Maharashtra (Value Oriented Life Skills)

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<tr>
<td><strong>Unit- 1: Spiritual Folks of Maharashtra</strong></td>
<td>12 Periods</td>
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<tr>
<td>1.1 Lalit</td>
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<tr>
<td>1.2 Keertan</td>
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<tr>
<td>1.3 Dashawatar</td>
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<td>1.4 Gondhal</td>
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<td>1.5 Waghya-Murali</td>
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<td>1.6 Sogi, Bhajan and Bharud</td>
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<tr>
<td><strong>Unit-2: Folks For Social Message</strong></td>
<td>10 Periods</td>
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<tr>
<td>2.1 Vasudeo</td>
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<td>2.2 Bahurupi Kuki</td>
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<td>2.3 Powada</td>
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<td>2.4 Shahiri</td>
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<tr>
<td><strong>Unit-3: Folks for Entertainment</strong></td>
<td>13 Periods</td>
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<tr>
<td>3.1 Dhandar</td>
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<td>3.2 Kalgi-Tura</td>
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<td>3.3 Aikeev Lawni</td>
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<td>3.6 Bhutya</td>
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<td><strong>Unit- 4: Traditional Folks Dance of Maharashtra</strong></td>
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<td>4.1 Fugdi</td>
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<td>4.3 Lavni Dance</td>
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<td>4.5 Koli Nrutya</td>
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**References**

4. V K Joshi Lok Natyachi Parampata Thokal Prakashan Pune, 1961 p 65
5. R. C. Dere. Lok Sanskhthi Upasak Sahityalay Pune, 1971 p 21
6. Mahadev Shastri Editor Bharatiya Sanskriti Kosh (vol.3) Bharatiya Kosh Mandal Pune p 121
7. V K Joshi Lok Natyachi Parampara Thokal Prakashan Pune, 1%1 p 132 6 ibidem p 133.
8. Shinde Gondhal Kalavanth Karad (Dt Satara)
10. Sharad Vyavahare Lok Dharmtya Natyachi J a Jan. (j ha Jan, Viswabharati Prakasan Nagpur, 1990 p.47
## III Semester (Life Skill Curriculum)

**BBT 3 –IIIB History of Marathwada (Value Oriented Life Skills)**

<table>
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<tr>
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<th>Total Periods: 45</th>
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### Unit- 1: Dynasty of Marathwada
- 1.1 Satvahan Dynasty
- 1.2 Vakatak Dynasty
- 1.3 Rashtrakut Dynasty
- 1.4 Yadav Dynasty

**12 Periods**

### Unit- 2: Marathwada Under the Nizam
- 2.1 Nizam’s of Hyderabad state
- 2.2 Political, Religious, Social and Educational condition.
- 2.3 Hyderabad freedom struggle Hyderabad state congress
- 2.4 Hyderabad state shedule caste Fedration

**11 Periods**

### Unit- 3: Excavated sites, Art and Architecture of Marathwada
- 3.1 Shur Excavated sites
- 3.2 Ter Excavated sites
- 3.3 Kandhar Excavated sites
- 3.4 Caves - Ajintha, Ellora and Shur
- 3.5 Forts - Doulatabad and Kandhar

**12 Periods**

### Unit- 4: Historical Religious sites of Marathwada
- 4.1 Sachkhand Gurudwara Nanded
- 4.2 Aundha Nagnath Temple
- 4.3 Mallinath Digambar Jain Temple
- 4.4 Narsi Namdev Temple

**10 Periods**

### References:
Swami Ramanand Teerth Marathwada University, Nanded's
NEW MODEL DEGREE COLLEGE, HINGOLI
B.SC. Biotechnology (Semester Pattern)
III Semester (Life Skill Curriculum)

BBT 3 –IIIB Civilizational Backdrop OF India (Value Oriented Life Skills)

Marks: External 50
Total Periods: 45

Unit-1: Prehistoric Age and Indus Valley Civilisation
1.1 Pre-historic age
1.2 The culture existing during the ancient period.
1.3 Indus Valley Civilisation: the inception, phases of society, economy, and culture
1.4 decline and the end of the Indus Valey civilisation.

Unit-2 :India during Early Age
1.1 The Mahajanpadas and Janapadas
1.2 The rise of Nanda Dynasty
1.3 The rise of Buddhism: Factors responsible for the spread of Buddhism
1.4 The Rise of Mauryan Empire
1.5 Emperor Ashok and his works:
1.6 Gupta Dynasty and successors

Unit-3:India During Medieval Period
3.1 Major Dynasties of Early Medieval Period
3.2 Cultural and religious circumstances
3.3 Rise of Provincial Dynasties and Vijaynagar Emoire
3.4 The Dominance and Expansion of Mughal Empire

Unit-4 :Indian Civilisation in Modern Period
1.1 The renaissance of Indian Art forms Renaissance of Indian art and modern Indian literature.
1.2 The Early uprising against British rule
1.3 Development in art, Literature and architecture in modern history
1.4 Indian freedom movement
1.5 Major personalities in Modern India
A. Mahatma Gandhi
B. Dr. Babasaheb Ambedkar

References:
# B.Sc. Biotechnology (CBCS)

<table>
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<tr>
<th>Course Code</th>
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<td>BBT 4-IIA-D</td>
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**Note:**
1. Code BBT4-IA, BBT4-IB are Language Curriculums.
2. Code BBT 4-IIA-A, BBT 4-IIA-B, BBT 4-IIA-C, BBT 4-IIA-D, BBT4-IIB, BBT4-IIC are Major Curriculums.
3. BBT4-IIIA, BBT4-III B are Life Skill Curriculums.
वें- एकण गुण: अंतर्गत ५० + बहिःस्थ ५०  
रक : ४५

1. वंदे मातरम—स्वामी रामानंद तीर्थ  
2. स्त्री पुरुष तुलना—तारावाई सिंदे  
3. पोलिसांचा सर्वसमिट—लक्षण गायकवाद  
4. उन्हाळा—अनिल अवचाट  
5. नित्ययज्ञाची गरज—विनोबा भावे  
6. सहायी पास झालो—किर्शोर शांतावाई काळे  

c- गोलफ्ळज्ड एज़ ब्हें  
रक : ६१३

1. ज्ञानिकर्त लेखन  
2. सुत्रसंचालन  
3. संगणकात मराठीचा उपयोग  
4. मराठीतील संक्षीपत्तिकरण.

d- हीक्को ब्रजुव्ह पे  
रक : ६०९

1. इंटरनेट स्वरूप व उपयोग  
2. मराठी संकेतस्थापावी माहिती  

M हीफुकल्कु पे  
रक : ६१०

1. बोली भाषा व प्रमाण भाषा—स्वरूप, वैशिष्ट्ये, परस्पर संबंध.

l एल्फ्लोक्लिग  

1. व्यावहारिक मराठी भाग २—संपा. डॉ. साहेब खंडारे निर्मल प्रकाशन, नांदेड २००३  
2. शासन व्यवहाराला मराठी—भाषा संचालनालय संचालक, म.स.मुंबई प्र.आ. १९९७
Swami Ramanand Teerth Marathwada University, Nanded's
NEW MODEL DEGREE COLLEGE, HINGOLI
B.SC. Biotechnology (Semester Pattern)

IV Semester (Language Curriculum)

BBT 4 – IA हिंदीभाषा- 04 (भारतीयभाषा)

Marks: Internal 50 + External 50
Total Periods: 45

खण्ड अ] कायेत्तर गद्य

| Periods:14 |
| 1] मझदूरी और प्रेम - सरदार पूर्णसिंह (निबंध) |
| 2] बेला और गुंगिया - महादेवी वर्मा (रेखाचित्र) |
| 3] घुमककड़शास्त्र - राहुल संकृत्यायन (यात्रा वर्णन) |
| 4] ऊँचा परबत गहरा सागर - विष्णु प्रभाकर (एकांकी) |
| 5] कस्तूरी कुंडल बसे - मैसेयी पुष्पा (आत्मकथा अंश) |

खण्ड ब] पल्लवन

खण्ड क] समाचार लेखन ; विज्ञापन लेखन

खण्ड ढ] इंटरनेट और हिंदी भाषा :

| Periods:10 |
| 1] इंटरनेट : उपयोगिता |
| 2] वेब सर्चिंग : उपयोगिता |
| 3] ब्लॉग लेखन : स्वतुप और पद्धति |
| 4] ई-मेल : निर्माण और सम्प्रेषण |

संदर्भ ग्रंथ :

| 1] हिंदी गद्य की नवीन विधाये - राजेन्द्रप्रसाद श्रीवास्तव (साहित्य रत्नालय कानपूर) |
| 2] प्रयोजनमूलक हिंदी डॉ. लक्ष्मीकान्त पांडेय (विकास प्रकाशन कानपूर) |
| 3] हिंदी कम्प्यूटिंग - श्री. त्रिभुवननाथ शुक्ल (विकास प्रकाशन कानपूर) |
| 4] कार्यालय हिंदी सिद्धांत और प्रयोग - दंगल झाल्टे. (विकास प्रकाशन कानपूर) |
Unit I: Poetry
1. What is Literature?
2. What are poetry and Poetic devices?
3. Gitanjali- Rabindranth Tagore
4. Golpitha- Namdev Dhasal

Unit II: Fiction
1. What is fiction & related terms to fiction
2. The Grass is Singing- Doris Lessing

Unit III: Prose
1. Annihilation of Caste- Dr. Ambedkar
2. Discovery of India- Pandit Neharu
3. The Souls of Black Folks- W.E.B. DuBois

Unit IV: Drama
1. What is a Drama & Dramatic device?
2. Hamlet- William Shakespeare
3. Shakuntala- Kalidasa

References Books:
10. Ambedkar, B.R., Annihalation of Caste
11. Neharu, Pandit, Discovery of India
13. Kalidas, Shakuntalam
Unit-I: Basics of Bioenergetics

1.1 Concepts of Thermodynamics

1.1.1 Types of Biochemical reactions
   a. Cleavage
   b. Nucleophilic and electrophilic reaction
   c. Aldol condensation
   d. Rearrangements
   e. Elimination
   f. Isomerization
   g. Free radical reactions
   h. Group transfer reactions
   i. Oxidation reduction reactions

1.2 ATP as energy currency

1.3 High Energy Compounds

Unit-II: Carbohydrate Metabolism

2.1 Glycolysis
2.2 Kreb Cycle
2.3 Fates of pyruvate under anaerobic condition
2.4 Gluconeogenesis
2.5 Glycogen Breakdown
2.6 Pentose Phosphate Pathway
2.7 Electron Transport Chain

Unit-III: Lipid Nucleic acid and Metabolism

3.1 Digestion and Transport of fats
3.2 β-Oxidation of saturated fatty acids
3.3 Ketone bodies
3.4 Fatty acid Biosynthesis
3.5 De-Novo biosynthesis of purines and Pyrimidines
3.6 Biosynthesis of Thymidylate
3.7 Catabolism of purine and pyrimidines
3.8 Salvage Pathway

Unit –IV: Metabolism of Amino acids

4.1 Overview of amino acid biosynthesis
4.2 Amino group catabolism
4.3 Amination, Deamination and Transamination reactions
4.4 Urea Cycle
4.5 Overview of amino acid catabolism
References:

4. Biochemistry: Zubay- WCB publishers
Unit-I: Structure, Chemistry and replication of DNA
1.1 Discovery of DNA
1.2 Double Helical Model of DNA
1.3 Chemistry of DNA
1.4 Mechanism of DNA replication
1.5 Enzymes involved in replication

Unit-II: Gene Expression
1.1 Genetic Code
1.2 Process of Transcription
1.3 Post Transcriptional Modification
1.4 Process of Translation
1.5 Post Translational Modifications
1.6 Inhibitors of Transcription and Translation

Unit-III DNA Mutation and Repair and recombination
3.1 Mutation Fluctuation Test
3.2 Spontaneous Versus Induced Mutation
3.3 Mutation Rates
3.4 Point Mutations
3.5 Spontaneous Mutagenesis
3.6 Chemical Mutagenesis
3.7 DNA Repair
   a. Damage Reversal
   b. Excision Repair
   c. Double-Strand Break Repair
   d. Postreplicative Repair
3.8 Recombination

Unit-IV Regulation of gene Expression and Extrachromosomal Inheritance
4.1 The Operon Model
4.2 Lac Operon (Inducible System)
4.3 Trp Operon (Repressible System)
4.4 Lytic and Lysogenic Cycles in Phage
4.5 Transposable Genetic Elements
4.6 Maternal Effects
   a. Snail Coiling
   b. Moth Pigmentation
4.7 Cytoplasmic Inheritance
   a. Mitochondria
   b. Chloroplasts
   c. Infective Particles
REFERENCES:

9. Molecular Biology of the Cell, Albert Bruce, Garland Science Publication
10. Genome- T.A. Brown, John Wiley
Unit-I: Principles of Developmental Biology  09 Periods
1.1 Comparative Embryology
1.2 Evolutionary Embryology
1.3 Medical Embryology and Teratology
1.4 Mathematical Modeling of Development
1.5 Environmental Developmental Biology
1.6 Experimental Embryology
1.7 Developmental Constraints

Unit-II: Early and late Embryonic development in Animals  13 Periods
2.1 Structure of the Gametes
2.2 Recognition of Egg and Sperm
2.3 Gamete Fusion and Polyspermy
2.4 The Activation of Egg Metabolism
2.5 Early embryonic development of
   a. Sea urchin
   b. Birds
   c. Mammals
2.6 Metamorphosis in insects and amphibians
2.7 Regeneration and aging

Unit-III: Basics of Plant Development  13 Period
3.1 Pollination mechanisms and adaptations
3.2 Double fertilization
3.3 Seed-structure appendages and dispersal mechanisms.
3.4 Embryo and endosperm
3.5 Apomixis and polyembryony
3.6 Endosperm types, structure and functions
3.7 Dicot and monocot embryo

Unit-IV: Plant Embryology  10 Periods
4.1 Embryonic Development in plant
4.2 Dormancy
4.3 Germination
4.4 Vegetative Growth
4.5 The Vegetative-to-Reproductive Transition
4.5 Senescence
References:
4. Chordate Embryology & Histology V K Agarwal, Usha GuptaS Chand & Company Ltd
10. Human Embryology and Developmental biology: Bruce M. Carlson
11. Medical Embryology-Jan Longmann
1. Genetic recombination (conjugation, transformation, transduction) in bacteria.

2. Isolation of genomic DNA from bacteria, animal and plant cells.

3. Isolation of plasmid DNA by using alkaline lysis method.

4. Agarose gel electrophoresis by using DNA markers for molecular wt. determination.

5. Isolation of antibiotic resistant bacteria by gradient plate method.

6. Replica plating for transfer of bacterial colony.

7. Study of Hens embryo for developmental stage study.

8. Demonstration on mammalian gametes

9. Experiments based on plant development

10. Biochemical estimation of blood sugar

11. Estimation of Glucose, Uric acid and Bilirubin from blood/Urine

12. Salivary amylase Assay
### BBT 4 –IIIA  Plant Tissue Culture and Plant Biotechnology (Job Oriented Life Skills)

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<tr>
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<td>Unit- 1: Introduction to Plant Tissue Culture</td>
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<tr>
<td>1.1 Laboratory Organisation</td>
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<td>1.2 Nutrition Medium</td>
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<td>1.3 Sterilisation Techniques</td>
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<td>1.4 Types of Culture</td>
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<td>A. Seed Culture</td>
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<td>B. Embryyo Culture</td>
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<td>C. callus culture</td>
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<td>Unit-2: Advances in plant tissue Culture</td>
<td>12 Periods</td>
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<td>2.1 Micropropogation</td>
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<td>2.2 Suspension Culture</td>
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<td>2.3 Invitro Production of Haploids</td>
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<td>2.4 Protoplast Isolation and Fusion</td>
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<td>Unit-3: Transgenics in Plant Improvement</td>
<td>11 Periods</td>
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<tr>
<td>3.1 Methods of Gene Transfer in plants</td>
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<td>3.2 Resistance of Crops to biotic and abiotic stress</td>
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<td>3.3 Insect resistance</td>
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<td>3.4 Virus and Disease resistance</td>
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<td>3.5 Herbicide resistance</td>
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<td>Unit- 4: Plant Biotechnology for quality</td>
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<td>4.1 Transgenic for improved storage</td>
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<td>4.2 Longer life transgenic flowers</td>
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<td>4.3 Transgenic plants as bioreactor</td>
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<td>4.4 Transgenics for male sterility</td>
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<td>4.5 Arguments in favour and against of transgenic crop</td>
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**References:**

BBT4 –IIIB Religious And Communal Harmony In India (Value Oriented Life Skills)

Marks: External 50                  45 Marks

Unit-1 : Theoretical Overview 12 Period

1.1 Need of Communal harmony
1.2 Fact of National Integration
1.3 Hindu Rights in Promoting National Integration
1.4 Communal Harmony and National Integration
1.5 Role of humanism in communal harmony
1.6 Public participation in national integration

Unit-2 : Religion and Secularism 11 Period

2.1 National Integration through religion
2.2 Some Hindu-Muslim Cults in Promoting Harmony
2.3 Role of religion in strengthening nation
2.4 Role of Language and culture in national integration

Unit-3 : Women and Communal Harmony 11 Period

3.1 Role of women in communal harmony
3.2 Portrayal of women and communal Harmony in Media
3.3 Holocaust of women in communal riots
3.4 Role of women in national integration

Unit-4 : Problems of Communalism in India 11 Periods

4.1 Recent issue in communal tension
4.2 Communal Hatred
4.3 Communal Problem and National Integration
References:


Swami Ramanand Teerth Marathwada University, Nanded's  
NEW MODEL DEGREE COLLEGE, HINGOLI  
B.Sc. Biotechnology (Semester Pattern)  
IV Semester (Life Skill Curriculum)  

BBT4 –IIIB Peace and conflict Resolution (Value Oriented Life Skills) 

Marks: External 50 45 Marks

Unit 1: Introduction To Peace  
1.1 Meaning and concepts of peace  
1.2 Positive and Negative Peace  
1.3 Measuring peace  
4.1 The global peace index  
1.4 Zones of Instability

Unit- 2: Conflict Analysis  
2.1 Structural conditions  
2.2 Conflict and social order  
2.3 Traditional management strategies  
2.4 Dispute settlement and conflict resolution  
2.5 Conflict transformation and Peace Building

Unit -3 : Issues of conflict  
3.1 Understanding of war  
3.2 Sources of social conflict  
3.3 Feminist understanding of violence  
3.4 Political Economy  
3.5 Environmental concerns

Unit -4: Strategies for peace  
4.1 Control of Military power  
4.2 Conflict resolution and Management  
4.3 Self determination  
4.4 Global order and governance  
4.5 Peace Movements

References:  
Unit 1: Revolt of 1857 and Formation of Congress
1.1 Nature and Causes of revolt
1.2 Consequences of revolt
1.3 Queens Proclamation of 1858
1.4 Formation and Objectives of INC
1.5 INC during 1885-1905
1.6 Partition of Bengal

Unit 2: India After World War-I
2.1 Rowalt Act
2.2 Jalionwala bag
2.3 Simmon Commission
2.4 Round Table Conference
2.5 Quit India Movement

Unit 3: Gandhian Phase in National Movement
3.1 Emergence of Gandhi
3.2 Gandhian Theories
3.3 Champaranya Satyagrah
3.4 Kheda Satyagrah
3.5 Ahmedabad Mill Strike

Unit 4- Final Stage of Freedom Struggle
4.1 Minto-Morley Reforms and Communal representation
4.2 Dyarchy
4.3 Indian Independence act of 1947
4.4 The Making of Indian Constitution
4.5 Role of B.R. Ambedkar

References:
5. Ranajith Guha, A Subaltan, Communalism in Modern India, Har Anand Publications Delhi.
8. P.N. Chopra, et.al, Modern India, Sterling Publishers, New Delhi, 2005
10. Sekhar Bandyopadhyaya, From Plassey to Partition and After: A History of Modern India, Orient Blackswan Pvt Ltd
### Question Paper Structure for University Exam (ESE).

#### For Theory Papers

<table>
<thead>
<tr>
<th>Maximum Marks: 50</th>
<th>Time: 3.00 Hours</th>
</tr>
</thead>
</table>
| Note: 1. Question No. 01 is compulsory  
2. Attempt any four among Q.2 to Q. 8.  
3. Draw neat well labeled diagram whenever necessary. |

Q. 1 Answer the following in short 10 Marks  
A.  
B.  
C.  
D.  
E.  

Q. 2 Descriptive Question 10 Marks  

Q. 3 Descriptive Question 10 Marks  

Q. 4 Descriptive Question 10 Marks  

Q. 5 Short Note (Solve any two) 10 Marks  
a)  
b)  
c)  

Q. 6 Descriptive Question 10 Marks  

Q. 7 Descriptive Question 10 Marks  

Q. 8 Descriptive Question 10 Marks  

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#### For Practical Paper

<table>
<thead>
<tr>
<th>Maximum Marks: 50</th>
<th>Time: 3.00 Hours</th>
</tr>
</thead>
</table>
| Q.1 Major Experiment 20 Marks  
Q.1 A.  
B.  

Q.2 Minor Question 15 Marks  
Q.2 Identify and comment on following spots  

Q.3 Record Book 10 Marks  

Q.4 Viva-Voce 05 Marks |

**Note:** Similar pattern should be applied for Internal Practical Assessment
Internal Assessment for Theory Paper (CA)

Maximum Marks-50

Internal Exam of theory paper should follow following pattern for continuous Assessment
I. Two mid-term exam of 15 Marks Each
II. Assignment of 20 Marks

Internal Assessment for Seminar (CA)

Maximum Marks-25

Students have to choose any title related with basic or applied knowledge of any Major Core papers of respective semester and should present with power point presentation. For assessment of seminar following marking system will be followed
I. Expression 05 Marks
II. Presentation Skill 05 Marks
III. Subject Knowledge 10 Marks
IV. Ability to Answer 05 Marks

Internal Assessment for Field visit (CA)

Maximum Marks-25

Student have to visit nearby Industry/National Laboratory /Site/Consultancy to gain deep knowledge of the course. Assessment of candidate will be based on actual presence of candidate on site and preparation of excursion report of the visit.