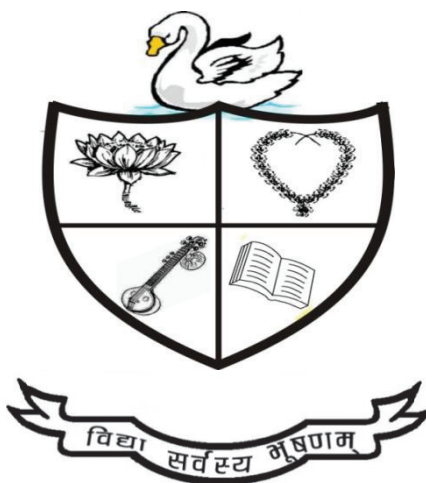


SYLLABUS FOR THE FOUR-YEAR UNDERGRADUATE PROGRAMME (FYUGP)

As per provisions of NEP_2020 to be implemented from
academic year 2022 onwards.

Semester: V	Session: 2024-25
Course Type: DSC	Title: Genetics



Department of Biotechnology
GOVT. DIGVIJAY AUTONOMOUS POST GRADUATE
COLLEGE, RAJNANDGAON (C.G.)



GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE, RAJNANDGAON (C.G.)

FYUGP (NEP 2020 Course)

Department: Biotechnology

Session: 2024-25	Program: B.Sc.
Semester: V	Subject: Biotechnology
Course Type: DSC	Course Code:
Course Title: Genetics	
Credit: 4 (3+1)	Lecture: 60
M.M. 100 = (ESE 80+IA 20)	Minimum Passing Marks: 40%

Title	Calculus
Course Learning Outcome:	<p>After the present course student will be able to -</p> <ul style="list-style-type: none">• to describe the Mendel's law, chromosomal changes and mutation.• gain understanding of Genomic organization• describe the chromosomal change• understand the concept of Linkage

Title	Calculus
Programme Specific Outcome:	<p>Upon completion of this course student will be able to –</p> <ul style="list-style-type: none">• to discuss about the pattern of inheritance,• know genomic sequence of organisms• understand the concept of deletion, duplication etc.• explain crossing over

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

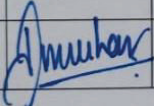
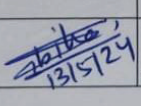
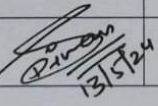
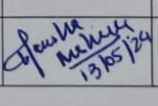
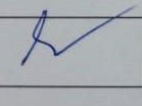
Theory

Units	Lectures	Lectures	Credit
I	15	Introduction: Historical developments in the field of genetics. Organisms suitable for genetic experimentation and their genetic significance. Mendel's laws of Inheritance – Selection of plant, experiment and laws – Concept of dominance, recessiveness, incomplete dominance, Law of segregation & Principle of independent assortment.	1
II	10	Chromosome and genomic organization: Eukaryotic nuclear genome, nucleotide sequence composition –unique & repetitive DNA, satellite DNA. Genetic organization of prokaryotic and viral genome. Exons, introns, genetic code.	2
III	10	Structural changes in chromosomes - Deletion, Duplication, Translocation, Inversion etc. Numerical changes in chromosomes - Aneuploidy, Euploidy. Mutation – History, physical and chemical mutagens.	
IV	10	Linkage and crossing over. Autosomal and Sex-linked inheritance. Extra chromosomal inheritance - cytoplasmic inheritance, organelle heredity.	

Practical Course

Credit = 01; Lecture/Lab hour = 15

- Problems based on monohybrid and dihybrid cross
- Mendel's law based problems
- Problems based on sex linked inheritance
- Autosomal disease based problems
- Pedigree analysis based problems
- Mutation in bacteria
- Permanent and temporary mount of mitosis.
- Permanent and temporary mount of meiosis

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

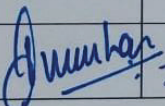
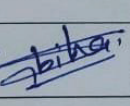
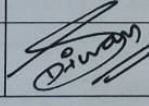
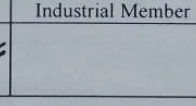
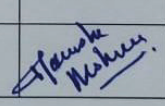
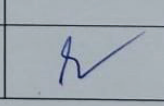
List of Books	<ul style="list-style-type: none"> • 1. Gardner et al. 2003. Principle of Genetics - 8th edition. John Wiley and Sons, New York. • 2. Pierce, Benjamin A. 2012. Genetics: a conceptual approach. New York: W.H. Freeman. • 3. Hartl, D. L., & Jones, E. W. (1998). Genetics: Principles and analysis. Sudbury, Mass: Jones and Bartlett Publishers. • 4. Prescott, L. M., Harley, J. P., Klein, D. A., Willey, J. M., Sherwood, L. M., & Woolverton, C. J. (2008). Microbiology. Estados Unidos: McGraw-Hill. • 5. Pelczar, M. J., Chan, E. C. S., & Krieg, N. R. (2010). Microbiology. New Delhi: Tata McGraw-Hill.
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Evaluation Scheme		
Exam Type	Mode of Exam	Marks
Theory	External	80
	Internal	20
Practical	External	40
	Internal	10

Evaluation Scheme for Theory (External)					
Type of Question	No. of questions	Marks	Word Limit	Choice	Total Marks
Very Short Answer	08	02	30	No	16
Short Answer	04	06	75	Yes	24
Long Answer	04	10	150	Yes	40

Evaluation Scheme for Theory (Internal)	
Based on Mid-term Exam	20
Total	100

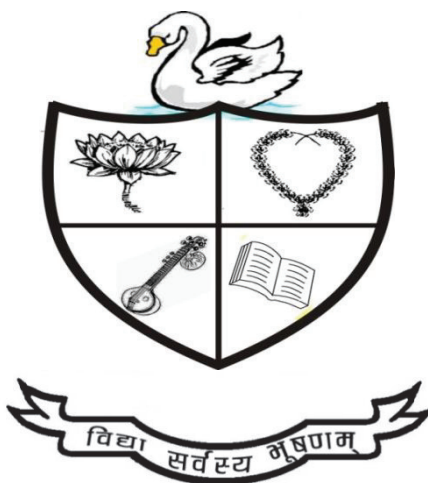
Evaluation Scheme for Practical			
S. No.	Evaluation	Type	Marks
1	Experiment 1	External	10
2	Experiment 2	External	10
3	Experiment 3/ Instrumentation	External	05
4	Spotting	External	10
5	Viva	External	05
6	Sessional	Internal	10
Total			50

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

SYLLABUS FOR THE FOUR-YEAR UNDERGRADUATE PROGRAMME (FYUGP)

As per provisions of NEP_2020 to be implemented from
academic year 2022 onwards.

Semester: V	Session: 2024-25
Course Type: DSE	Title: Bioanalytical Tools



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FYUGP (NEP 2020 Course)

Department: Biotechnology

Session: 2024-25	Program: B.Sc.
Semester: V	Subject: Biotechnology
Course Type: DSE	Course Code:
Course Title: Bio-analytical Tools	
Credit: 4 (3+1)	Lecture: 60
M.M. 100 = (ESE 80+IA 20)	Minimum Passing Marks: 40%

Title	Calculus
Course Learning Outcome:	<p>After the present course student will be able to -</p> <ul style="list-style-type: none">• describe Microscope• gain understanding of basic lab requirement• Understood to concept of chromatography• understand the concept of electrophoresis

Title	Calculus
Programme Specific Outcome:	<p>Upon completion of this course student will be able to –</p> <ul style="list-style-type: none">• determine the principle and applications of microscope• describe the principle of spectrophotometer• understand the principle, types and use of chromatography• explain types of electrophoresis, biosensor and nanotech

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

Theory

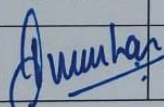
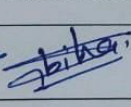
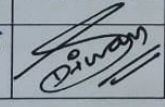
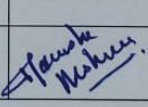
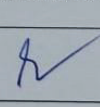
Units	Lectures	Lectures	Credit
I	15	Microscope: simple microscopy, phase contrast microscopy, florescence and electron microscopy (TEM and SEM). pH meter.	1
II	10	Principle and law of colorimetry, spectrophotometry (visible, UV, infra-red). Centrifugation, Laminar Flow, Incubators.	2
III	10	Introduction to the principle of chromatography. Paper chromatography, thin layer chromatography, column chromatography: silica and gel filtration, affinity and ion exchange chromatography, HPLC.	
IV	10	Introduction to electrophoresis. Agarose gel, polyacrylamide gel (SDS-PAGE), isoelectric focusing. Introduction to Biosensors and Nanotechnology and their applications.	

Practical Course

Credit = 01; Lecture/Lab hour = 15

Experiment based on-

- Centrifugation
- Spectrophotometer/Colorimeter
- Paper chromatography/TLC
- PCR
- ELISA
- Electrophoresis
- Microscope
- pH meter

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

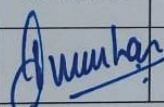
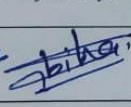
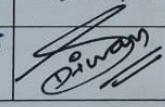
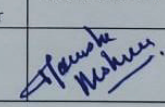
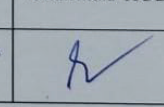
List of Books	<ul style="list-style-type: none"> Hofmann, Andreas, Samuel Clokie, Keith Wilson, and John Walker. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology. 2018. Upadhyay, A., Upadhyay, K., & Nath, N. (2009). Biophysical Chemistry (Principles and Techniques). Chandi Chowk: Global Media.
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Evaluation Scheme		
Exam Type	Mode of Exam	Marks
Theory	External	80
	Internal	20
Practical	External	40
	Internal	10

Evaluation Scheme for Theory (External)					
Type of Question	No. of questions	Marks	Word Limit	Choice	Total Marks
Very Short Answer	08	02	30	No	16
Short Answer	04	06	75	Yes	24
Long Answer	04	10	150	Yes	40

Evaluation Scheme for Theory (Internal)	
Based on Mid-term Exam	20
Total	100

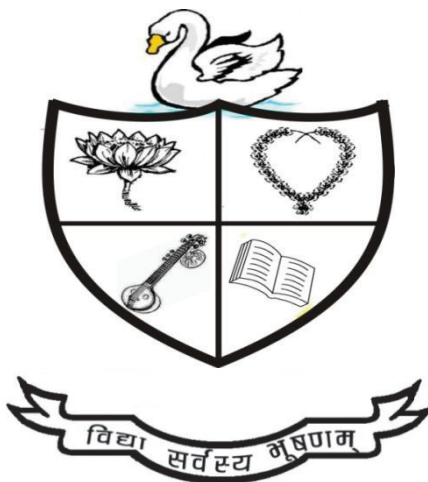
Evaluation Scheme for Practical			
S. No.	Evaluation	Type	Marks
1	Experiment 1	External	10
2	Experiment 2	External	10
3	Experiment 3/ Instrumentation	External	05
4	Spotting	External	10
5	Viva	External	05
6	Sessional	Internal	10
Total			50

Approval of the Board of Studies						
Date: 13/05/2024						
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

**SYLLABUS FOR
THE FOUR-YEAR UNDERGRADUATE PROGRAMME
(FYUGP)**

As per provisions of NEP_2020 to be implemented from
academic year 2022 onwards.

Semester: V	Session: 2024-25
Course Type: GE	Title: Application and Importance of Biotechnology in Human Welfare



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COLLEGE, RAJNANDGAON (C.G.)



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FYUGP (NEP 2020 Course)

Department: Biotechnology

Session: 2024-25	Program: B.Sc.
Semester: V	Subject: Biotechnology
Course Type: GE	Course Code:
Course Title: Application and Importance of Biotechnology in Human Welfare	
Credit: 4	Lecture: 60
M.M. 100 = (ESE 80+IA 20)	Minimum Passing Marks: 40%

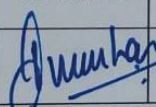
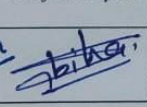
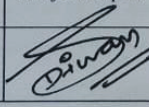
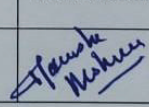

Title	Calculus
Course Learning Outcome:	After the present course student will be able to - <ul style="list-style-type: none">• describe scope of biotechnology• gain understanding of social applications of biotechnology• read and analyse about biotechnology in health• understand the concept of environmental biotechnology

Title	Calculus
Programme Specific Outcome:	Upon completion of this course student will be able to – <ul style="list-style-type: none">• determine the types and history of biotechnology• describe the plant biotechnology• understand the concept of biotechnological products• explain forensic and food biotechnology

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

Theory

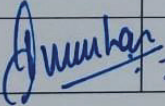
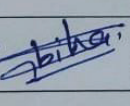
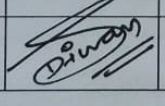
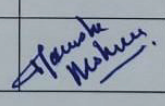
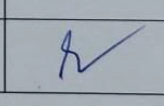
Units	Lectures	Lectures	Credit
I	15	Introduction to Biotechnology – What is Biotechnology? Types of Biotechnology, Scope of Biotechnology, Biotechnology History, Biotechnology tools – bio materials, equipment's	1
II	15	Biotechnology in agriculture – transfer of pest resistance genes to plants, Nitrogen fixating bacteria, biofertilizers – composting, and its byproduct – biogas Golden rice Plant biotechnology – Micropropagation, Production of virus free plants	1
III	15	Biotechnology in Environment – Biodegradation of pollutants Phytoremediation Biosorption of heavy metals Plastic degrading bacteria Biotechnology products – Citric acid, antibiotics, alcohols, enzymes	1
IV	15	Biotechnology in Health – Production of vaccine Gene therapy Production of Monoclonal antibody Stem cell therapy Forensic Biotechnology – DNA finger printing Food biotechnology – Canning, pasteurization	1

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

List of Books	<ul style="list-style-type: none"> • H.S. Chawla: Introduction to plant biotechnology. Oxford & IBH Publishing Co. (P) Ltd. • B.D. Singh, (2004) Biotechnology. Expending Horizons. First Edition. Kalyani Publishers, Ludhiana. • H Patel – Industrial Microbiology 4th Edition (2003). • KS Bilgrami and AK Pandey – Introduction to Biotechnology Edition 2nd (1998). • U Satayanarayan – Biotechnology, First Edition (2005) Books and Allied (P) Ltd. Kolkata.
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Evaluation Scheme		
Exam Type	Mode of Exam	Marks
Theory	External	80
	Internal	20

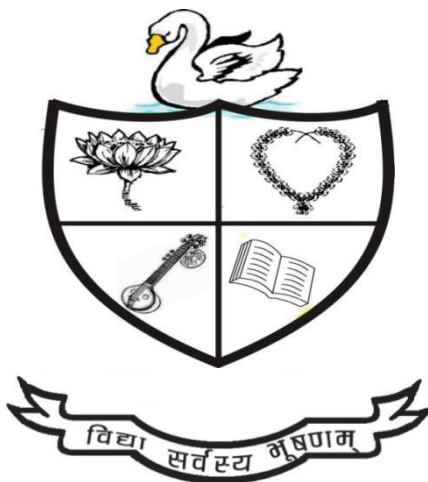
Evaluation Scheme for Theory (External)					
Type of Question	No. of questions	Marks	Word Limit	Choice	Total Marks
Very Short Answer	08	02	30	No	16
Short Answer	04	06	75	Yes	24
Long Answer	04	10	150	Yes	40
Evaluation Scheme for Theory (Internal)					
Based on Mid-term Exam					20
Total					100

Approval of the Board of Studies						
Date: 13/05/2024						
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/Industrial Member	Merit Alumni	Chairman/HOD
Signature						

SYLLABUS FOR THE FOUR-YEAR UNDERGRADUATE PROGRAMME (FYUGP)

As per provisions of NEP_2020 to be implemented from
academic year 2022 onwards.

Semester: V	Session: 2024-25
Course Type: SEC	Products of Industrial Fermentation and Food technology



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FYUGP (NEP 2020 Course)

Department: Biotechnology

Session: 2024-25	Program: B.Sc.
Semester: V	Subject: Biotechnology
Course Type: SEC	Course Code:
Course Title: Products of Industrial Fermentation and Processed Food	
Credit: 2	Lecture: 30
M.M. 50 = (ESE 40+IA 10)	Minimum Passing Marks: 40%

Title	Calculus
Course Learning Outcome:	After the present course student will be able to - <ul style="list-style-type: none">• Determine industrial products• Gain knowledge on uses of industrial products• Understand microbial based products• Describe food products

Title	Calculus
Programme Specific Outcome:	Upon completion of this course student will be able to – <ul style="list-style-type: none">• Understand citric acid and biofuels• Describe industrial enzymes• Understand antibiotic• Explain food preservation

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

Theory

Units	Lectures	Lectures	Credit
I	8	Production of industrial chemicals – Citric acid, acetic acid Production of biofuels – Bioethanol, Biodiesel, Bioelectricity Anaerobic fermentation - methane and compost	1
II	7	Enzyme and cell immobilization – method of production and industrial uses Production of Secondary metabolites Enzymes in food technology Purification & characterization of proteins	
III	8	Solvents (glycerol, acetone, butanol), Antibiotics (penicillin, streptomycin, tetracycline) Amino acids (lysine, glutamic acid). Single cell protein.	1
IV	7	Introduction to food technology: Food Spoilage, Elementary idea of canning and packing, Sterilization and pasteurization, of food products, Food preservation.	

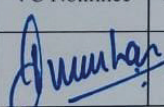
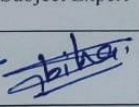
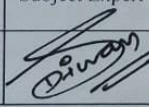
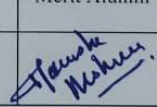
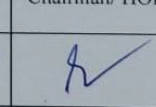
List of Books	<ul style="list-style-type: none"> Laboratory Manual for Biotechnology by Surajit Das And Anchal Singh Ashish S Verma, S Chand Publishing Biotechnology Procedures And Experiments Handbook, S. Harisha, Laxmi Publications Pvt Ltd Shara L. Aranoff, Daniel R. Pearson, Deanna Tanner Okun, Irving A. Williamson, Dean A. Pinkert – Industrial Biotechnology; Nova Science 2009 U Satayanarayan – Biotechnology, First Edition (2005) Books and Allied (P) Ltd. Kolkata.
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Evaluation Scheme for Theory (External)

Type of Question	No. of questions	Marks	Word Limit	Choice	Total Marks
Long Answer	05	08	150	Yes (attempt any 5 out of 8)	40

Evaluation Scheme for Theory (Internal)

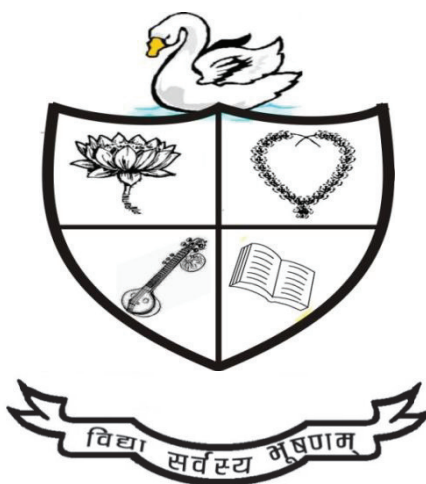
Based on Mid-term Exam I & II	10
Total	50

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

SYLLABUS FOR THE FOUR-YEAR UNDERGRADUATE PROGRAMME (FYUGP)

As per provisions of NEP_2020 to be implemented from
academic year 2022 onwards.

Semester: VI	Session: 2024-25
Course Type: DSC	Title: Immunology



Department of Biotechnology
GOVT. DIGVIJAY AUTONOMOUS POST GRADUATE
COLLEGE, RAJNANDGAON (C.G.)



GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE, RAJNANDGAON (C.G.)

FYUGP (NEP 2020 Course)

Department: Biotechnology

Session: 2024-25	Program: B.Sc.
Semester: VI	Subject: Biotechnology
Course Type: DSC	Course Code:
Course Title: Immunology	
Credit: 4 (3+1)	Lecture: 60
M.M. 100 = (ESE 80+IA 20)	Minimum Passing Marks: 40%

Title	Calculus
Course Learning Outcome:	<p>After the present course student will be able to -</p> <ul style="list-style-type: none">• aware about the details of the defence system of our body and its impact on our health.• gain understanding of cells of immune system• read and analyse about the MHC• understand the concept of Vaccine

Title	Calculus
Programme Specific Outcome:	<p>Upon completion of this course student will be able to –</p> <ul style="list-style-type: none">• demonstrate the knowledge of immunology and advanced laboratory practices in the same area.• understand the autoimmune disease• explain immunological techniques

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

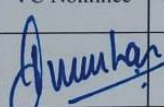
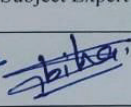
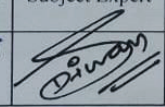
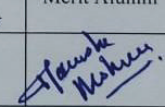
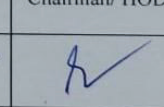
Theory

Units	Lectures	Lectures	Credit
I	15	Immune Response - An overview, components of mammalian immune system. Concept of Immunity: Innate and Acquired, Humoral and Cell mediated Response.	1
II	10	Cells and Organs involved in Immune system - Structure and Function. Molecular structure of Immuno-globulins or Antibodies. Antigen – properties.	2
III	10	Major Histocompatibility complexes – class I & class II MHC antigens. Immunity to infection – immunity to different organisms – bacteria and viruses. Autoimmune diseases, Immunodeficiency-AIDS.	
IV	10	Vaccines & Vaccination – adjuvants, cytokines, DNA vaccines, recombinant vaccines. Blood group and RH factor. Introduction to immunodiagnostics – RIA, ELISA.	

Practical Course

Credit = 01; Lecture/Lab hour = 15

- Enumeration of WBC in blood sample.
- Preparation of a blood smear and differential blood count.
- To separate serum from the given blood sample.
- To determine Albumin Globulin ratio in given serum sample.
- Estimation of serum protein by Folin Lowry test.
- Detection of class specific Antibody by Double Diffusion method.
- Study of Agglutination reaction
- Study of ELISA technique.
- Immuno-diffusion test.
- Blood group determination by slide agglutination reaction.

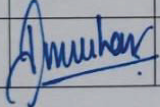
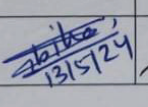
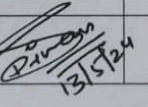
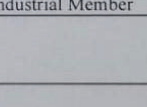
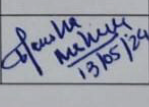
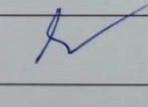
Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

List of Books	<ul style="list-style-type: none"> • Kuby, Janis, Jenni Punt, Sharon A. Stranford, Patricia P. Jones, and Judith A. Owen. Immunology. 2019. • Abbas, Abul K., Andrew H. Lichtman, and Shiv Pillai. Basic Immunology: Functions and Disorders of the Immune System. 2020. • Playfair, J. H. L., and B. M. Chain. Immunology. Oxford: Blackwell, 2005.
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Evaluation Scheme		
Exam Type	Mode of Exam	Marks
Theory	External	80
	Internal	20
Practical	External	40
	Internal	10

Evaluation Scheme for Theory (External)					
Type of Question	No. of questions	Marks	Word Limit	Choice	Total Marks
Very Short Answer	08	02	30	No	16
Short Answer	04	06	75	Yes	24
Long Answer	04	10	150	Yes	40
Evaluation Scheme for Theory (Internal)					
Based on Mid-term Exam					20
Total					100

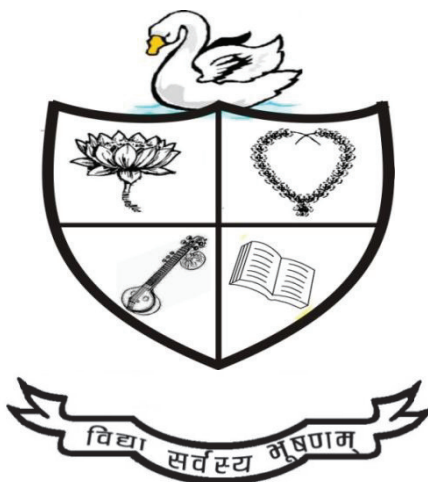
Evaluation Scheme for Practical			
S. No.	Evaluation	Type	Marks
1	Experiment 1	External	10
2	Experiment 2	External	10
3	Experiment 3/ Instrumentation	External	05
4	Spotting	External	10
5	Viva	External	05
6	Sessional	Internal	10
Total			50

Approval of the Board of Studies						
Date: 13/05/2024						
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

**SYLLABUS FOR
THE FOUR-YEAR UNDERGRADUATE PROGRAMME
(FYUGP)**

As per provisions of NEP_2020 to be implemented from
academic year 2022 onwards.

Semester: VI	Session: 2024-25
Course Type: DSE	Title: Plant Biotechnology



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GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE, RAJNANDGAON (C.G.)

FYUGP (NEP 2020 Course)

Department: Biotechnology

Session: 2024-25	Program: B.Sc.
Semester: VI	Subject: Biotechnology
Course Type: DSE	Course Code:
Course Title: Plant Biotechnology	
Credit: 4 (3+1)	Lecture: 60
M.M. 100 = (ESE 80+IA 20)	Minimum Passing Marks: 40%

Title	Calculus
Course Learning Outcome:	<p>After the present course student will be able to -</p> <ul style="list-style-type: none">• explain about the basics of plant tissue culture, concept of the technique and uses in the different area.• gain understanding of PTC methods• read and analyse about culture of various cell type• understand the significance of PTC

Title	Calculus
Programme Specific Outcome:	<p>Upon completion of this course student will be able to –</p> <ul style="list-style-type: none">• will gain proficiency in laboratory techniques such as sterilization, preparation of MS media, and process of micropropagation.• describe the sterilization and propagation• understand the concept of anther and ovary culture• explain Bt plants

Approval of the Board of Studies						
Date: 13/05/2024						
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

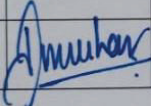
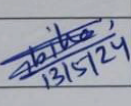
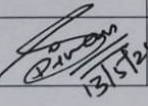
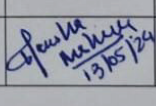
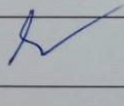
Theory

Units	Lectures	Lectures	Credit
I	15	Scope of plant biotechnology. Structure and organization of plant cell. Basic principle of plant tissue culture. Totipotency – definition, example of some plant cells.	1
II	10	Methodology - Sterilization (physical and chemical methods), Culture media - MS and B5. Phytohormones – Shooting and rooting. Plant cell culture methods - Callus induction, subculture, plantlet formation and hardening.	2
III	10	Embryo culture and embryo rescue. Anther, pollen and ovary culture for production of haploid plants. Protoplast isolation, culture and fusion.	
IV	10	Plant transformation technology: Mechanism of DNA transfer – Ti, Ri plasmid, Microinjection. Applications – Production of virus free plant, micropropagation, insect resistance plant – Bt gene.	

Practical Course

Credit = 01; Lecture/Lab hour = 15

- Collection of plant sample
- Sterilization of explant
- Media preparation
- Meristem / bud culture, shoot multiplication & rooting
- Organogenesis
- Embryo culture
- Anther culture
- Seed culture

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

List of Books	<ul style="list-style-type: none"> • Razdan MK – Introduction to Plant Tissue Culture 2nd Edition; Oxford & Ibh Publishing Co. Pvt Ltd 2010 • Vasil IK – Plant Cell and Tissue Culture; Springer 1994 • Bhojwani SS and Razdan MK – Plant Tissue Culture; Elsevier • J Hammond, P McGarvey & V Yusibov (Eds): Plant Biotechnology, Springer Verlag.2000. • H.S. Chawla: Introduction to plant biotechnology. Oxford & IBH Publishing. • B.D. Singh, (2004) Biotechnology. Expending Horizons. First Edition. Kalyani Publishers, Ludhiana.
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Evaluation Scheme

Exam Type	Mode of Exam	Marks
Theory	External	80
	Internal	20
Practical	External	40
	Internal	10

Evaluation Scheme for Theory (External)

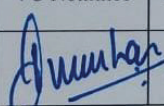
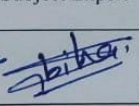
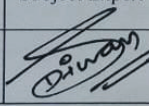
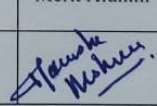
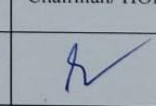
Type of Question	No. of questions	Marks	Word Limit	Choice	Total Marks
Very Short Answer	08	02	30	No	16
Short Answer	04	06	75	Yes	24
Long Answer	04	10	150	Yes	40

Evaluation Scheme for Theory (Internal)

Based on Mid-term Exam	20
Total	100

Evaluation Scheme for Practical

S. No.	Evaluation	Type	Marks
1	Experiment 1	External	10
2	Experiment 2	External	10
3	Experiment 3/ Instrumentation	External	05
4	Spotting	External	10
5	Viva	External	05
6	Sessional	Internal	10
Total			50

Approval of the Board of Studies						
Date: 13/05/2024						
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

SYLLABUS FOR THE FOUR-YEAR UNDERGRADUATE PROGRAMME (FYUGP)

As per provisions of NEP_2020 to be implemented from
academic year 2022 onwards.

Semester: VI	Session: 2024-25
Course Type: GE	Title: IPR, Bio-Entrepreneurship and Bioethics



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GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE, RAJNANDGAON (C.G.)

FYUGP (NEP 2020 Course)

Department: Biotechnology

Session: 2024-25	Program: B.Sc.
Semester: VI	Subject: Biotechnology
Course Type: GE	Course Code:
Course Title: IPR, Bio-Entrepreneurship and Bioethics	
Credit: 4	Lecture: 60
M.M. 100 = (ESE 80+IA 20)	Minimum Passing Marks: 40%

Title	Calculus
Course Learning Outcome:	After the present course student will be able to - <ul style="list-style-type: none">• describe fundamentals of IPR• gain understanding of Patent• read and analyse about the bio-entrepreneurship• understand the concept of bioethics

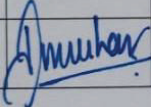
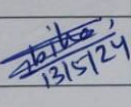
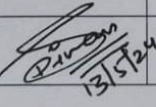
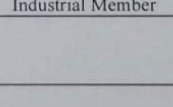
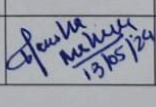
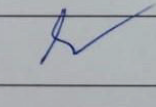
Title	Calculus
Programme Specific Outcome:	Upon completion of this course student will be able to – <ul style="list-style-type: none">• determine the Types of IPR• describe the copyright and trademark• understand the concept of bio-entrepreneurship development program• explain ethical issues in biotechnology research

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

Theory

Units	Lectures	Lectures	Credit
I	15	IPR – Definition, Patent – patentable ideas, filling process, Patent document, patent protection and commercialization of patentable idea Copyright – IP for copyright, originality of materials, obtaining copyright registration, copyright in literature – citation and plagiarism	1
II	10	Trademark- Rights of trademark- kind of signs used as Trademark-type, Trademark registration GI of products – need, types of GI products in India,	1
III	10	Bio-Entrepreneurship - Scope in Bio-entrepreneurship, types of bio industries, establishment & operation of biofirms, Entrepreneurship development programs- MSME, DBT, BIRAC & Make in India. Opportunities of bio- entrepreneurship in Biotechnology. Promotion of entrepreneurship, Factors influencing entrepreneurship	1
IV	10	Ethical issues in biotechnology – Gene manipulation, experiments in animals and humans Animal rights, protection of biodiversity Biopiracy	1

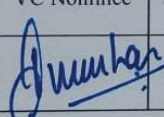
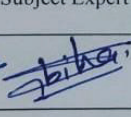
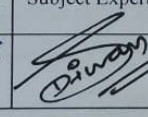
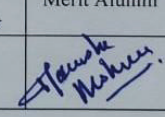
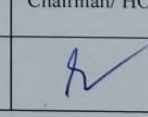
List of Books	<ul style="list-style-type: none"> • Jyoti Rattan, Intellectual Property Rights, Edition: 2nd Edition, 2024 • Sumeet Malik, Intellectual Property Rights Manual, 1st Edition, 2013 • Rajmohan Joshi, Biosafety and Bioethics 2006 • Alastair V. Campbell, Bioethics: The Basics, 2013 • Holger Patzelt, Handbook of Bio-entrepreneurship, 2008
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Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

Evaluation Scheme		
Exam Type	Mode of Exam	Marks
Theory	External	80
	Internal	20

Evaluation Scheme for Theory (External)					
Type of Question	No. of questions	Marks	Word Limit	Choice	Total Marks
Very Short Answer	08	02	30	No	16
Short Answer	04	06	75	Yes	24
Long Answer	04	10	150	Yes	40

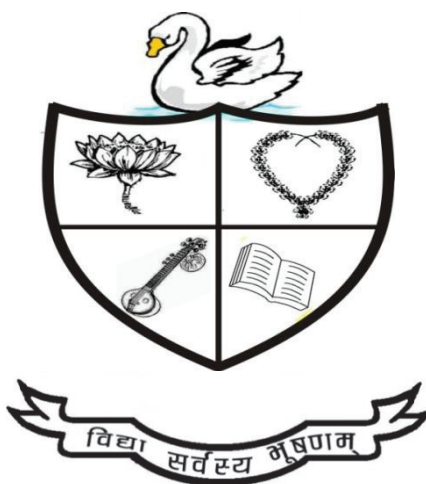
Evaluation Scheme for Theory (Internal)	
Based on Mid-term Exam	20
Total	100

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

**SYLLABUS FOR
THE FOUR-YEAR UNDERGRADUATE PROGRAMME
(FYUGP)**

As per provisions of NEP_2020 to be implemented from
academic year 2022 onwards.

Semester: VI	Session: 2024-25
Course Type: SEC	Title: Project on Plant Tissue Culture



Department of Biotechnology
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GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE, RAJNANDGAON (C.G.)

FYUGP (NEP 2020 Course)

Department: Biotechnology

Session: 2024-25	Program: B.Sc.
Semester: VI	Subject: Biotechnology
Course Type: SEC	Course Code:
Course Title: Project on Plant Tissue Culture	
Credit: 2	Lecture: 30
M.M. 50 = (ESE 40+IA 10)	Minimum Passing Marks: 40%

Title	Calculus
Course Learning Outcome:	After the present course student will be able to - <ul style="list-style-type: none">• Describe plant tissue culture• Gain knowledge on methodology of PTC• Understand PTC based conservation• Explain application of PTC

Title	Calculus
Programme Specific Outcome:	Upon completion of this course student will be able to – <ul style="list-style-type: none">• Understand basics of PTC• Describe steps of PTC• Understand germplasm conservation• Explain production of synthetic seed

Approval of the Board of Studies						
Date:	Date: 13/05/2024					
Name	Prof. S. K. Jadhav	Sabiha Naz	Dr. Shubha Diwan	Shri Sanjay Bhagwat	Ku. Varsha Meshram	Dr. Pramod Kumar Mahish
Designation	VC Nominee	Subject Expert	Subject Expert	Employment/ Industrial Member	Merit Alumni	Chairman/ HOD
Signature						

Make detailed report on (any three) following project topic

• Selection of Explant	• Explant sterilization
• Hormones – Auxin and Cytokinin	• Production of Callus
• Micropropagation	• Culture of anther and ovary
• Steps of Plant tissue culture	• Production of synthetic seed
• Germplasm conservation	• Application of Plant tissue culture

List of Books	<ul style="list-style-type: none"> • Razdan MK – Introduction to Plant Tissue Culture 2nd Edition; Oxford & Ibh Publishing Co. Pvt Ltd 2010 • Vasil IK – Plant Cell and Tissue Culture; Springer 1994 • Bhojwani SS and Razdan MK – Plant Tissue Culture; Elsevier • TJ Fu, G Singh and WR Curtis (Eds): Plant Cell and Tissue Culture for the production of Food Ingredient. Kluwer Academic/Plenum Press, 1999
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Evaluation Scheme

Evaluation	Marks	Pattern
Project Report	30	Internal
Viva based on project report	10	Internal and Inter-departmental
Internal test	10	Internal

Approval of the Board of Studies						
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