ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ.

ಜ್ಞಾನ ಗಂಗಾ, ಕಲಬುರಗಿ–585 106, ಕರ್ನಾಟಕ, ಭಾರತ

(ಕರ್ನಾಟಕ ರಾಜ್ಯ ವಿಶ್ವವಿದ್ಯಾಲಯಗಳ ಅಧಿನಿಯಮ 1976ರಡಿಯಲ್ಲಿ 10–09–1980 ರಂದು ಸ್ಥಾಪಿಸಲಾದ ವಿಶ್ವವಿದ್ಯಾಲಯ ಮತ್ತು 2000ರ ಅಧಿನಿಯಮದ ಅಡಿಯಲ್ಲಿ ಬದಲಾಯಿಸಿದಂತೆ)

ದೂರವಾಣಿ ಸಂ.: 08472-263202 ಫ್ಯಾಕ್ಸ್: 08472-263206, ಇ–ಮೇಲ್: registrargug@rediffmail.com

ವಿದ್ಯಾಮಂಡಲ

ಕ್ರ.ಸಂ.ಗುವಿಕ/ವಿಮವಿ/ಬಿಓಎಸ್/2023–24/ 429 ದಿನಾಂಕ: 09.4.23

ಅಧಿಸೂಚನೆ

ವಿಷಯ: ಸ್ನಾತಕ ಪದವಿ ಕೋರ್ಸಿನ **ಸೂಕ್ಷ್ಮಜೀವಶಾಸ್ತ್ರ** ವಿಷಯದ ಐದನೇ ಹಾಗೂ ಆರನೇ ಸೆಮೇಸ್ಟರ್ ಪಠ್ಯಕ್ರಮ ಅನುಮೋದಿಸಿ 2023–24ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಜಾರಿಗೊಳಿಸಿದ ಬಗ್ಗೆ.

ಉಲ್ಲೇಖ:1. ಸರ್ಕಾರದ ಆದೇಶ ಸಂಖ್ಯೆ. ಇಡಿ 104 ಯುಎನ್ಇ 2023 ಬೆಂಗಳೂರು, ದಿನಾಂಕ:20.07.2023
2. ಸೂಕ್ಷ್ಮಜೀವಶಾಸ್ತ್ರ ವಿಷಯದ ಸ್ನಾತಕ ಅಧ್ಯಯನ ಮಂಡಳಿಯ ನಿರ್ಣಯ ದಿನಾಂಕ: 21.09.2023.
3. ವಿಜ್ಞಾನ ನಿಕಾಯಗಳ ಸಮಿತಿ ಸಭೆಯ ನಿರ್ಣಯ ದಿನಾಂಕ: 06.11.2023
4. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಅನುಮೋದನೆ ದಿನಾಂಕ:08.11.2023

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ಸರ್ಕಾರದ ನಿರ್ದೇಶನದಂತೆ, 2023–24ನೇ ಶೈಕ್ಷಣಿಕ ಪ್ರಸಕ್ತ ಸಾಲಿನಿಂದ ಜಾರಿಗೊಳಿಸಿರುವ ಸ್ನಾತಕ ಪದವಿ ಐದನೇ ಮತ್ತು ಆರನೇ ಸೆಮಿಸ್ಟರ್ ಪಠ್ಯಕ್ರಮವನ್ನು ಜಾರಿಗೊಳಿಸಬೇಕಾಗಿರುವ ಪ್ರಯುಕ್ತ **ಸೂಕ್ಷ್ಮಜೀವಶಾಸ್ತ್ರ** ವಿಷಯದ ಅಧ್ಯಯನ ಮಂಡಳಿಯು ಪಠ್ಯಕ್ರಮವನ್ನು ಪರಿಷ್ಕರಿಸಿ ಶಿಫಾರಸ್ಸು ಮಾಡಿರುವುದರಿಂದ ಸದರಿ ಪಠ್ಯಕ್ರಮವನ್ನು ವಿಜ್ಞಾನ ನಿಕಾಯದ ಸಭೆಯಲ್ಲಿ ಒಪ್ಪಗೆ ಪಡೆದಿರುವಂತೆ, ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಘಟನೋತ್ತರ ಅನುಮೋದನೆಯನ್ನು ನಿರೀಕ್ಷಿಸಿ ಸದರಿ ಪಠ್ಯಕ್ರಮವನ್ನು ಪ್ರಸ್ತುತ ಸ್ನಾತಕ ಪದವಿ ಕೋರ್ಸಿನ **ಸೂಕ್ಷ್ಮಜೀವಶಾಸ್ತ್ರ** ವಿಷಯದ ಐದನೇ ಮತ್ತು ಆರನೇ ಸೆಮೆಸ್ಟರ್ 2023–24ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ ಜಾರಿಗೊಳೀಸಲಾಗಿದೆ.

ಈ ಮಾಹಿತಿಯನ್ನು ಸಂಬಂಧಪಟ್ಟ ಶಿಕ್ಷಕರ ಹಾಗೂ ವಿದ್ಯಾರ್ಥಿಗಳ ಗಮನಕ್ಕೆ ತರಲು ಸೂಚಿಸಲಾಗಿದೆ. ಪಠ್ಯಕ್ರಮದ ವಿವರಗಳನ್ನು ಗುಲಬರ್ಗ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್‌ಸೈಟ್ www.gug.ac.in ದಿಂದ ಪಡೆಯಬಹುದಾಗಿದೆ.

ಕುಲಸಚಿವರು 08.11.23
ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ.

ಗೆ,

1. ಮುಖ್ಯಸ್ಥರು, **ಸೂಕ್ಷ್ಮಜೀವಶಾಸ್ತ್ರ** ಅಧ್ಯಯನ ವಿಭಾಗ, ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ.
2. ಎಲ್ಲಾ ಪದವಿ ಕಾಲೇಜುಗಳ ಪ್ರಾಂಶುಪಾಲರುಗಳಿಗೆ.

ಪ್ರತಿಗಳು:

1. ಡೀನ್‌ರು, ವಿಜ್ಞಾನ ನಿಕಾಯ, ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.
2. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ
3. ನಿರ್ದೇಶಕರು, ಪಿಎಂಇಬಿ ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.
4. ಗ್ರಂಥಪಾಲಕರು, ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.
5. ವಿಜ್ಞಾನ ನಿಕಾಯದ ಎಲ್ಲಾ ಅಧ್ಯಯನ ವಿಭಾಗಗಳ ಮುಖ್ಯಸ್ಥರಿಗೆ ಗು.ವಿ. ಕಲಬುರಗಿ
6. ಸಂಯೋಜಕರು, ಟಾಸ್ಕ್‌ಫೋರ್ಸ್ ಸಮಿತಿ, ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.
7. ವಿಶೇಷಾಧಿಕಾರಿಗಳು, ಆಡಳಿತ, ವಿದ್ಯಾಮಂಡಲ, ಪರೀಕ್ಷಾ, ಅಭಿವೃದ್ಧಿ ಗು.ವಿ. ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.
8. ಮುಖ್ಯಸ್ಥರು, ಗಣಕ ಕೇಂದ್ರ, ಗು.ವಿ. ಕಲಬುರಗಿ ರವರಿಗೆ ವೆಬ್‌ಸೈಟ್‌ನಲ್ಲಿ ಪ್ರತ್ಯೇಕ ಪೋರ್ಟಲ್‌ನಲ್ಲಿ ಪ್ರಕಟಿಸಲು ಸೂಚಿಸಲಾಗಿದೆ.
9. ನೋಡಲ್ ಅಧಿಕಾರಿಗಳು, UUCMS, ಗು.ವಿ.ಕಲಬುರಗಿ ಇವರ ಮಾಹಿತಿಗಾಗಿ
10. ಕುಲಪತಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿ/ಕುಲಸಚಿವರ ಆಪ್ತ ಸಹಾಯಕರ ಗು.ವಿ. ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.

GULBARGA UNIVERSITY

KALABURAGI

Proposed Curriculum Framework of

MICROBIOLOGY

(V and VI SEMESTER)

For

UNDER GRADUATE PROGRAMME

To

GULBARGA UNIVERSITY

CHAIRMAN

DEPARTMENT OF STUDIES AND RESEARCH IN MICROBIOLOGY

2023-24 Onwards

CHAIRMAN
Department of Microbiology
Gulbarga University, Kalaburagi-585106

PREAMBLE

The role of education is paramount in nation building. One of the major objectives of UGC is maintenanceof standards of higher education. Over the past decades the higher education system of our country has undergone substantial structural and functional changes resulting in both quantitative and qualitative development of the beneficiaries. Such changes have gained momentum with the introduction of Choice Based Credit System (CBCS) which further expects Learning Outcome-Based curriculum to maximize the benefits of the newly designed curriculum. The Learning Outcome- Based Curriculum in Microbiologywill help the teachers of the discipline to visualize the curriculum more specifically in terms of the learning outcomes expected from the students at the end of the instructional process. The commission strives to promote the link of students with the society/industry such that majority of the students engage in socially productive activities during their period of study in the institutions and at least half of the graduate students will secure access to employment/self-employment or engage themselves in pursuit of higher education. The model curriculum envisages to cater to the developmental trends in higher education, incorporating multi- disciplinary skills, professional and soft skills such as teamwork, communication skills, leadership skills, time management skills and inculcate human values, professional ethics, and the spirit ofInnovation / entrepreneurship and critical thinking among students and promote avenues for display of these talents, linking general studies with professional courses. Besides imparting disciplinary knowledge to the learners, curriculum should aim to equip the students with competencies like problem solving, analytical reasoning and moral and ethical awareness. Introduction of internship and appropriate fieldwork/case studies are embedded in the curriculum for providing wider exposure to the students and enhancing their employability.

Learning outcomes specify what exactly the graduates are expected to know after completing a Programme of study. The expected learning outcomes are used as reference points to help formulate graduate attributes, qualification descriptors, Programme learning outcomes and course learning outcomes. Keeping the above objectives of higher education in mind the Learning Outcome-Based Curriculum Framework (LOCF) forthe discipline of Microbiology has been prepared and presented here.

CURRICULUM STRUCTURE

Programme: B.Sc. (Honors) **Subject: Microbiology**

1. Microbiology as one of the DSCC –A with another subject as DSCC- B

Sem	Discipline Specific core Courses	Hours of Teaching/week		Discipline Specific Elective Courses (DSE)/Vocational courses (VC)/OE	Hours of Teaching/Week	
		Credit	Hours		Credit	Hours
I	DSC-1: General Microbiology DSC-1 **Practicals**: General Microbiology	4 2	4 4	OE-1.1: Microbial Technology for Human Welfare OR OE-1.1: OR OE-1.1:	3	4
II	DSC-2: Microbial Biochemistry and Physiology DSC-2 **Practicals** : Microbial Biochemistry and Physiology	4 2	4 4	OE-2.1: Environmental and Sanitary Microbiology OR OE-2.1: OR OE-2.1:	3	4
III	DSC-3 Microbial diversity DSC-3 **Practicals**: Microbial Diversity	4 2	4 4	OE-3.1: Management of Human diseases.	3	4
IV	DSC-4: Microbial Enzymology and Metabolism DSC-4 **Practicals**: Microbial Enzymology and Metabolism	4 2	4 4	OE-4.1: Microbial Biotechnology	3	4
V	DSC-5: Microbial genetics and Molecular biology DSC-5 **Practicals:** Microbial Genetics and Molecular biology DSC-6: Immunology and Medical microbiology DSC-6 **Practicals** :Immunology	4 2 4 2	4 3 4 3			

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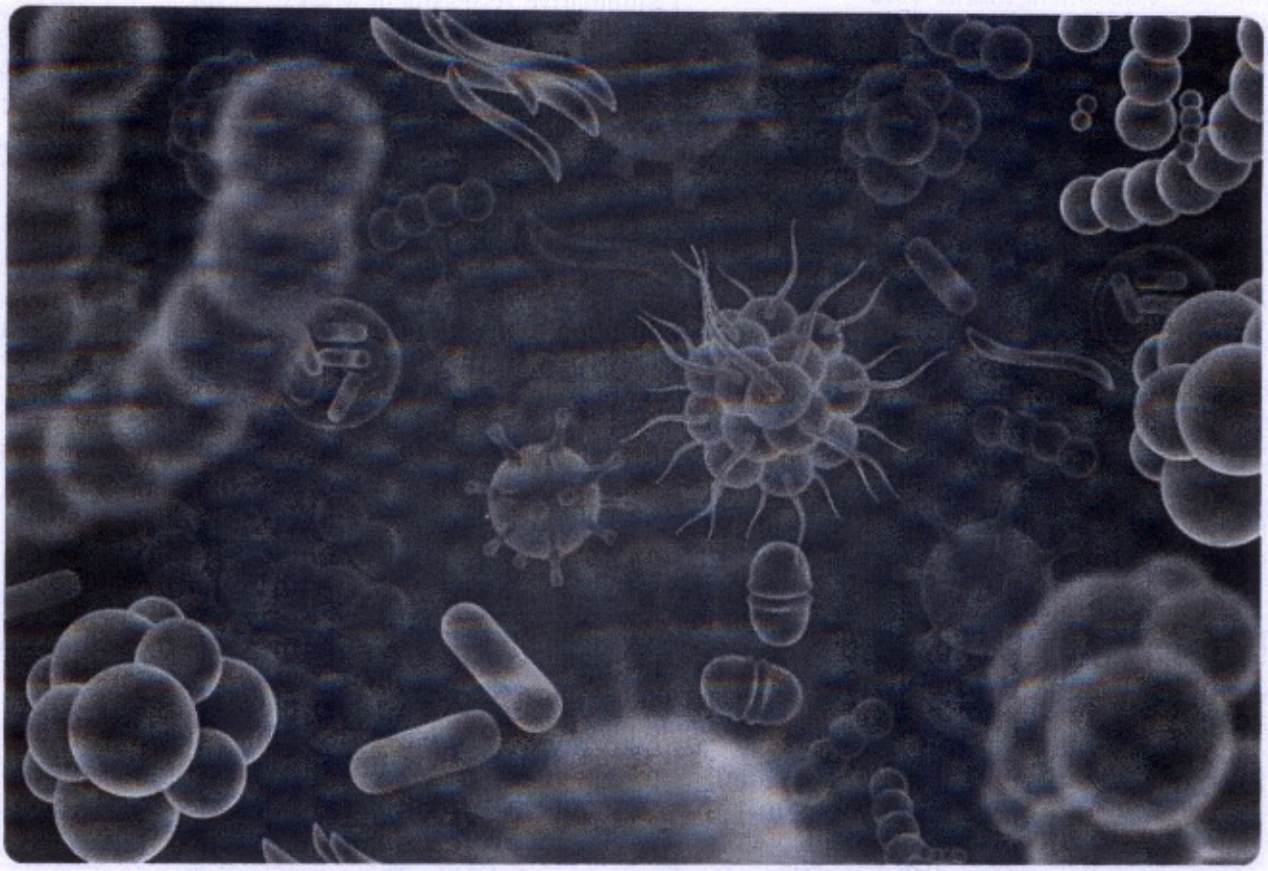
	and Medical microbiology					
VI	DSC-7: Food and Dairy Microbiology	4	4			
	DSC-7: **Practicals**: Food and Dairy Microbiology	2	3			
	DSC-8: Industrial Microbiology and Bioprocess Technology	4	4			
	DSC-8: **Practicals**: Industrial Microbiology and Bioprocess Technology	2	3			

AECC 1 : Language 1
AECC 2 : Language 2
AECC 3 : Environmental Studies
AECC 4 : Constitution of India
SEC1 : Digital fluency
SEC2 : Artificial Intelligence
SEC3 : Cyber Security
SEC4 : Professional Communication

Government of Karnataka

Curriculum Framework for Undergraduate Programme in Colleges and Universities of Karnataka State



5th and 6th Semester Model Syllabus
for
B.Sc. in
MICROBIOLOGY

Submitted to

VICE CHAIRMAN
KARNATAKA STATE HIGHER EDUCATION COUNCIL
30, PRASANNA KUMAR BLOCK, BENGALURU CITY UNIVERSITY CAMPUS
BENGALURU, KARNATAKA – 560 009

CHAIRMAN
Department of Microbiology

Government of Karnataka

Model Curriculum

Program Name	**BSc in MICROBIOLOGY**	Semester	**V**
Course Title	**MOLECULAR BIOLOGY (Theory)**		
Course Code:	**MIC C9-T**	No. of Credits	**04**
Contact hours	**60 Hours(4 Hours per week)**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s) :

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

CO1. Understand concepts involved in replication, transcription, translation, regulation of gene expression in bacteria and Eukaryotes.

CO2. Differentiate the process of replication, transcription, translation, regulation of gene expression in bacteria and Eukaryotes.

CO3. Understand the genetic switch in bacteriophages.

CO4. Compare and contrast housekeeping, constitutive, inducible and repressible genes

CO5. Outline regulatory mechanisms in bacteria to control cellular processes

Contents	
UNIT 1: DNA Replication and Prokaryotic transcription.	**15 Hrs**
DNA Replication : Bacterial Cell cycle. Replicon. *OriC*. Bidirectional replication. Steps in Initiation of replication. DNA polymerases, Replication fork, replisome. Mechanism of DNA polymerase III in detail. Ligase. Eukaryotic DNA polymerases. Termination of replication. Extrachromosomal replicons. Replication of DNA strand with 5' end,linear end, replication of adenovirus and ϕ29 DNAs, rolling circle in replication of phage genomes, F plasmid,. Replication of ColE1 DNA. Replication of mtDNA, D loop. Replication of telomeres	
Prokaryotic transcription: Transcription bubble, Stages of transcription, Bacterial RNA polymerase - structure and mechanism, recognition of promoters and DNA melting, abortive initiation. Elongation, Termination, antitermination. Phage T7 RNA polymerase, alternative sigma factors - transcription of heat shock genes, phage SPO1 genes, sporulation in *Bacillus*. Stringent response in *E.coli*.	

UNIT 2 Transcription **Eukaryotic Transcription**: Eukaryotic RNA polymerases - RNA polymerase I, II, III. Mechanism of RNA polymerase in detail. Promoters, Transcription factors, basal apparatus, promoter clearance, elongation. Enhancers, silencers, termination. **RNA splicing and Processing**: mRNA capping, pre-mRNA splicing, lariat, snRNPs, spliceosome, autocatalytic splicing, alternative splicing, polyadenylation, tRNA splicing and maturation, production of rRNA, Catalytic RNAs - auto splicing, ribozymes, rinonuclease P,viroids and virusoids, RNA editing	**15 Hrs**
UNIT 3 Translation Genetic code, tRNA structure, charging of tRNA, differences between initiator tRNA and elongator tRNA, ribosome structure. Accuracy of translation. Stages of translation. Role of IFs in initiation of bacterial translation, Formation of initiation complex. Initiation of eukaryotic translation - Scanning model of mRNA, IRES, Role of eIFs. Elongation of polypeptide - EF-Tu, EF-G, peptide bond formation, peptidyl transferase activity, translocation, eEFs. Termination. Regulation of translation. Post translational modifications of proteins. Protein maturation and secretion - protein splicing,molecular chaperones. Protein translocation and secretion in bacteria	**15 Hrs**
UNIT 4 Regulation of gene Expression **Control of gene expression in prokaryotes** Regulatory mechanisms in bacteria. Positive and negative transcriptional control in bacteria. Operon concept, polycistronic mRNA. *lac* operon - negative inducible, allolactose,mutants of *lac* operon structure of *lac* repressor, mechanism of binding of repressor to operator. Catabolite repression of *lac* operon.Regulation by lac repressor and CAP. *trp* operon regulation - repressor control & attenuator control. Arabinose operon - positive and negative transcriptional control by AraC. Riboswitch control of *rib* operon of *Bacillus subtilis*. Control of translation by riboswitches and small RNAs. Global regulatory mechanisms - *mal* regulon, two-component signal transduction systems.Regulation of lytic & lysogenic life cycle in bacteriophage λ. Control of lytic cycle by regulatory proteins - *cro* gene, *N* gene, lambda repressor - structure, DNA binding mechanism. Events in switch from lytic to lysogenic cycle. Maintenance of lysogeny. **Control of gene expression in eukaryotes** Regulation through modification of gene structure- DNase I hypersensitivity, histone modifications, chromatin remodeling, DNA methylation. Regulation through transcriptional activators, Co-activators and repressors, enhancers and insulators. Regulation through RNA processing and degradation. Regulation through RNA interference	**15 Hrs**

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
Understand concepts involved in replication, transcription, translation, regulation of gene expression in bacteria and eukaryotes		√	√		√							√
Differentiate the process of replication, transcription, translation, regulation of gene expression in bacteria and eukaryotes		√	√		√							√
Understand the genetic switch in bacteriophages		√	√		√							√
Compare and contrast housekeeping, constitutive, inducible and repressible genes		√	√		√							√
Outline regulatorymechanisms in bacteria to control cellular processes		√	√		√							√

Pedagogy: Lectures, Seminars, Industry/Institute Visits, Debates, Quiz, Project and Assignments

Formative Assessment for Theory	
Assessment Occasion/ type	**Marks**
Attendance	10
Seminar	10
Debate/Quiz/Assignment	10
Class test	10
Total	**40 Marks**
Formative Assessment as per guidelines are compulsory	

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Model Curriculum

Course Title	**MOLECULAR BIOLOGY (Practical)**	Practical Credits	**02**
Course Code	**MIC C10-P**	Contact Hours	**4 Hours/ week**
Formative Assessment	**25 Marks**	Summative Assessment	**25 Marks**

Practical Content

1. Micropipeting: Moving Very Small Volumes Very Accurately
2. Study of semi-conservative replication of DNA through micrographs / schematic representations
3. Extraction of crude DNA from bacteria and yeast by phenol/chloroform method.
4. Determination of purity and quantity of DNA
5. Determination of DNA melting point and GC content
6. Extraction and visualization of plasmids from bacterial cultures
7. Extraction and visualization of genomic DNA from bacterial cultures
8. Measurement of β-galactosidase activity in stimulated and control cells of *E.coli*
9. β-galactosidase Activity Assay in Yeast
10. DNA extraction from agarose gel
11. RNA extraction and visualization from yeast.
12. Analysis of RNA quality and integrity
13. Determining nucleotide composition of RNA
14. Restriction enzyme digestion of DNA molecule - DNA fingerprinting
15. Resolution and visualization of proteins by Polyacrylamide Gel Electrophoresis (SDS-PAGE)

Pedagogy: Experiential learning, Problem solving, Project

Formative Assessment for Practical	
Assessment Occasion/ type	**Marks**
Class Records	05
Test	10
Attendance	05
Performance	05
Total	**25 Marks**
Formative Assessment as per guidelines are compulsory	

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Model Curriculum

Program Name	B.Sc. in MICROBIOLOGY	Semester	V
Course Title	MICROBIAL GENETICS (Theory)		
Course Code:	MIC C11-T	No. of Credits	03
Contact hours	45 Hours(3 Hours per week)	Duration of SEA/Exam	2 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

Course Pre-requisite(s) :

Course Outcomes (COs) : After the successful completion of the course, the student will be able to:

CO1 Understand the fundamental molecular principles of genetics
CO2 Understand relationship between phenotype and genotype in genetic traits;
CO3 Knowledge on the basis of genetic mapping in bacteria, linkage analysis in fungi.

Contents	
Mendel's principles of inheritance: Special features of pea plants as an ideal system to study genetics and Mendel's cross breeding experimental approach to prove genetic principles. Principles of dominance and Segregation; phenotype, genotype, traits controlled by genes, existence of alleles (dominant and recessive), segregation of alleles during the formation of gametes, aggregation of alleles during fertilization, monohybrid (single character) cross, F1 and F2 generation, heterozygous, homozygous, test cross to test genotype of F1 plants. Principle of independent assortment; Dihybrid (two characters) cross, pattern of assortment of alleles. Chromosomal basis of inheritance; chromosome number, haploid (n), diploid (2n). Chromosomal theory of Heredity; Experimental evidence linking the inheritance of genes to chromosomes, Chromosomes as arrays of genes, Chromosomal basis of Mendel's principles of segregation and independent assortment.	**15 Hrs**
Historical developments of DNA as a genetic material; Griffith experiment of Transformation,Proof that genetic information stored in DNA, Enzymatic approach to prove DNA mediates transformation by A very, MacLeod and McCarty, Hershey and Chase experiment to prove DNA carries the genetic information in T2 bacteriophage. RNA stores the genetic information in some viruses, viroids and prions. Structure of Watson Crick model of DNA, Plasmid DNA. Mechanism of DNA replication, enzymes involved in replication. Organization of genes in viruses, prokaryotes and eukaryotes, mitochondria and chloroplast.	**15 Hrs**
Genetics of Viruses Structure and life cycle of Bacteriophage T4 and Lambda, lytic and lysogenic cycle of bacteriophage. Genetics of Bacteria; Structure and life cycle of bacteria *E. coli* Mutant genes in bacteria, mutants blocked in their ability to utilize specific energy sources, mutants unable to synthesize an essential metabolite, mutants resistant to antibiotics. Mechanism of genetic exchange in bacteria, Bacterial Transformation: Types of transformation mechanisms found in prokaryotes, Natural and artificial methods of transformation. Bacterial Conjugation: U-tube experiment to prove physical contact between bacteria is essential for gene transfer, properties of the F plasmid, F^+ x F^- conjugation, sexduction F'x F^- conjugation, Hfr x F^- conjugation, Gene mapping in bacteria by conjugation. Transduction: Generalized and specialized transduction, plasmids and episomes. Genetics of Fungi: life cycle of Yeast and Neurospora, Terad analysis, unordered tetrad analysis in yeast, ordered tetrad analysis in Neurospora, two point and three point test cross, detecting linkage and mapping genes in yeast and neurospora.	**15 Hrs**

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Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
Understand the fundamental molecular principles of genetics		√		√			√					
Understand relationship between phenotype and genotype in genetic traits;		√					√				√	
Knowledge on the basis of genetic mapping in bacteria, linkage analysis in fungi.		√					√					√

Pedagogy: Lectures, Seminars, Industry/Institute Visits, Debates, Quiz, Project and Assignments

Formative Assessment for Theory	
Assessment Occasion/ type	**Marks**
Attendance	10
Seminar	10
Debate/Quiz/Assignment	10
Class test	10
Total	**40 Marks**
Formative Assessment as per guidelines are compulsory	

Government of Karnataka

Model Curriculum

Course Title	MOLECULAR GENETICS (Practical)		Practical Credits	02
Course Code	MIC C12-P		Contact Hours	4 Hours/ week
Formative Assessment	25 Marks	Summative Assessment		25 Marks

Practical Content	
	Practicals - List of experiments
1	Isolation of bacteria/fungal DNA
2	Isolation of Coliphages from sewage
3	Bacterial survival against UV-radiation
4	Isolation of antibiotic resistant mutant by gradient plate method
5	Isolation and characterization of petite mutant in yeast
6	Induction of mutation in yeast and bacteria by chemicals / radiation
7	Replica plating technique
8	Bacterial plasmid isolation
9	Restriction digestion of DNA
10	Ligation
11	Bacterial transformation
12	Bacterial conjugation

MICROBIAL GENETICS

Course Objectives:

The objectives of this course are to introduce students to:

- Basics of genetics and classical genetics covering prokaryotic and eukaryotic domains.
- Classical concepts of Mendelian genetics, recombination in bacteria and fungi.

Student Learning Outcomes:

At the end of the course, students should be able to:

- Describe fundamental molecular principles of genetics;
- Understand relationship between phenotype and genotype in human genetic traits;
- Evaluate the basics of genetic mapping in bacteria, linkage analysis in fungi.

Pedagogy: Experiential learning, Problem solving, Project

Formative Assessment for Practical	
Assessment Occasion/ type	**Marks**
Class Records	05
Test	10
Attendance	05
Performance	05
Total	**25 Marks**
Formative Assessment as per guidelines are compulsory	

REFERENCES :

1. Microbial Genetics by Maloy ET. Al. 1994. Jones and Bartlett Publishers.
2. Molecular Genetics of Bacteria by J. W. Dale. 1994. John Wiley and Sons.
3. Modern Microbial Genetics. 1991 by Streips and Yasbin. Niley Ltd.
4. Moleculat Biology of the Gene 4th Edition by J.D. Watson, N.H. Hoppkins, J.W. Roberts, J.A. Steitz and A.M. Weiner. 1987, The Benjamin / Cummings Publications Co. Inc. California.
5. Gene VII by Lewin Oxford University Press. 2000.
6. Bacterial and Bacteriophage Genetics. 4th Editions by Birge.
7. Microbial Genetics by Frefielder. 4th Edition.
8. Organization of Prokayotic Genome. 1999 by Robert L.Charlebois, ASM Publications.
10. Molecular Genetics of Bacteria, 1997 by Larry, Snyder and Wendy, Champness, ASM

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