

DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM & MARKING SCHEME

B.Sc. V, VI Semester

MICROBIOLOGY

(Based on Choice Based Credit System)

SESSION : 2025-26



ESTD : 1958

**GOVT. V.Y.T. PG AUTONOMOUS COLLEGE,
DURG, 491001 (C.G.)**

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A⁺, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

Phone : 0788-2212030

Website - www.govtsciencecollegedurg.ac.in, Email – autonomousdurg2013@gmail.com

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM 2025-26

PART – A: INTRODUCTION			
Program: B.Sc.		Semester - V	Session: 2025-26
1	Course Code	BMB-501	
2	Course Title	Food and Dairy Microbiology	
3	Course Type	DSC	
4	Course Learning Outcomes (CLO)	This Course will enable the students to – CO 1 define the significance and activities of microorganisms in food CO 2 relate the principles in traditional food preservation techniques CO 3 identify the starter cultures of different microbial food products CO 4 explain the types of food intoxications CO 5 examine the food born infections	
5	Credit Value	03 Credits	Credit = 15 Hours - Learning & Observation
6	Total Marks	Max. Marks: 100	Minimum Passing marks: 40
PART – B: CONTENT OF THE COURSE			
Total no. of Teaching/ Learning Periods = 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Periods
I	Introduction to food and dairy Microbiology: Importance of studying food and dairy microbiology, Traditional and ayurvedic foods of Indian origin, Classification of food in relation to shelf life.		9
II	Microbial spoilage: principles, Intrinsic and extrinsic factors that affect growth and survival of microbes in foods, natural flora and source of contamination of foods in general.		9
III	Principles and methods of food preservation: Physical methods of food preservation: temperature, Pasteurization, canning, drying, High pressure and Irradiation; chemical methods of food preservation: salt, sugar, organic acids, SO ₂ and antibiotics.		9
IV	Microbiology of fermented milk and fermented food: Starter lactic cultures, fermented milk products- yogurt, butter and cheese, other fermented foods- idly, bread. Microorganisms as food- Mushroom. Prebiotics and Probiotics- definition and uses.		9
V	Food borne diseases: food poisoning, food infections and intoxications. Causative agents, symptoms and preventive measures. Food intoxications: Clostridium botulinum and mycotoxins; Food infections: <i>Bacillus cereus</i> , <i>Escherichia coli</i> , <i>Shigella</i> , <i>Listeria monocytogenes</i> .		9

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni	Industrial Representative- Shri Amitesh Mishra
Subject Expert - Dr. Anita Mahiswar	Student Nominee – Ms. Yogita Lokhande
Subject Expert - Dr. Sonal Mishra	Departmental members
VC Nominee – Dr. Prakash Saluja	1. Mrs. Rekha Gupta
Member of Other Department- Dr. G.S. Thakur	2. Mrs. Neetu Das
	3. Ms. Mrinalini Soni
	4. Ms. K.K. Yashoda

Part – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. Biochemistry of milk products: Andrews AT, Varley J. (1994). Royal Society of Chemistry.
2. Food microbiology: Banwart GJ. (1989)
3. A textbook of Microbiology: R. C. Dubey and Maheshwari, S Chand publications.
4. Food Microbiology, 5th Edition; William C. Frazier, Dennis C. Westhoff and N.M. Vanitha

Reference Books:

1. Basic food microbiology: Chapman & Hall, New York.
2. Modern Food Microbiology: Jay JM, Loessner MJ and Golden DA. (2005).7th edition, CBS Publishers and Distributors, Delhi
3. Food Microbiology: Adams MR and Moss MO. (1995)., Cambridge.

Online Resources – e-Resources/ e-Books and e- learning portals

- <https://bookarchive.net/pdf/industrial-microbiology-by-i-e-casida-jr/>
- <http://foodhaccp.com/foodsafetymicro/onlineindex.html>
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SMB2203.pdf
- <http://www.cpe.rutgers.edu/courses/current/If0401wa.html>
- <https://www.classcentral.com/course/swavam-food-microbiology-and-food-safety-17609>

Part – D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 20 Marks

End Semester Exam (ESE): 80 Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Internal Test of 20 Marks and Assignment of 20 Marks
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Semester End Exam (SEE)	Pattern -FOUR Questions (A, B, C, D) from each Unit
	Question - A & B: (Compulsory) Very short answer type (02 each) 04 x 5 = 20 Marks
	Question - C: Short answer type question 05 x 5 = 25 Marks
	Question - D: Long answer type question 07 x 5 = 35 Marks
	Total = 80 Marks

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni	Industrial Representative- Shri Amitesh Mishra
Subject Expert - Dr. Anita Mahiswar	Student Nominee – Ms. Yogita Lokhande
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	3. Ms. Mrinalini Soni
	4. Ms. K.K. Yashoda

GOVT. V.Y.T.PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
LAB COURSE

PART – A: INTRODUCTION					
Program: B.Sc.		Semester - V		Session: 2025-26	
1	Course Code	BMBL-501			
2	Course Title	Lab. Course			
3	Course Type	Laboratory Course			
4.	Course Learning Outcomes (CLO)	This Course will enable the students to: CO 1 illustrate the methods for isolation, detection and identification of microorganisms from food samples CO 2 outline the spoilage microorganisms of food CO 3 compare the effect of temperature on the spoilage of food products CO 4 relate the parts of mushrooms			
5.	Credit Value	1 Credit	1 Credit = 30 Hours Learning and Observation		
6.	Total Marks	Maximum Marks :50		Minimum Passing Marks:20	
PART – B: CONTENT OF THE COURSE					
S.No.	List of Experiments				
1.	Isolation of spoilage microorganisms from bread				
2.	MBRT of milk samples and their standard plate count				
3.	Isolation of bacteria and fungi from food products				
4.	Microbiological examination of canned foods				
5.	Isolation of spoilage bacteria from fruits and vegetables				
6.	Effect of temperature on the spoilage of food products				
7.	Microbiological examination of mushrooms				
8.	Microbiological examination of packaged food				
PART – C: LEARNING RESOURCES					
Text Books, Reference Books and Others					
Text Books Recommended:					
1. Practical Microbiology: Dubey and Maheshwari. D.K., S. Chand & Company, Pvt. Ltd., New Delhi.					
2. Laboratory experiments in Microbiology: Gopal Reddy					
3. Microbiology Laboratory Manual: Cappuccino, Sherman, Pearson Education.					
Online Resources:					
http://www.onlinelabs.in http://www.vlab.co.in http://www.vlab.amrita.edu					
PART – D: ASSESSMENT AND EVALUATION					
Suggested Continuous Evaluation Methods:					
Maximum Marks:		50 Marks			
(Will include Internal assessment, Lab records and End Semester Viva/Voce and performance)					
Semester End Exam (SEE)		Laboratory performance: As per Dept. (LOCF)			

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni Subject Expert - Dr. Anita Mahiswar Subject Expert - Dr. Sonal Mishra VC Nominee – Dr. Prakash Saluja Member of Other Department- Dr. G.S. Thakur	Industrial Representative- Shri Amitesh Mishra Student Nominee – Ms. Yogita Lokhande Departmental members 1. Mrs. Rekha Gupta 2. Mrs. Neetu Das 3. Ms. Mrinalini Soni 4. Ms. K.K. Yashoda
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GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM 2025-26

PART A: INTRODUCTION			
Program: B.Sc.		Semester - V	
Session: 2025-26			
1	Course Code	BMB-502	
2	Course Title	Agriculture Microbiology	
3	Course Type	Discipline Specific Elective (DSE)	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	This Course will enable the students to- CO 1 find the multifarious roles of microorganisms in agriculture CO 2 illustrate microbial damages to plants CO 3 explain harmful effects fungal toxins on human CO 4 examine biological control measures of plant diseases CO 5 relate animal diseases due to microorganisms	
6	Credit Value	03 Credits	Credit = 15 Hours - Learning & Observation
7	Total Marks	Max. Marks: 100	Minimum Passing marks: 40
PART B: CONTENT OF THE COURSE			
Total No. of Teaching-Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Agricultural Microbiology: History of agricultural microbiology; Microbial groups in soil; Bacteria, Actinomycetes, Fungi, Cyanobacteria, Algae, Role of microbes in soil fertility and crop production, Contributions of Subba Rao, Dr. M. Swaminathan in Indian agriculture.		9
II	Bio fertilizers: classification of biofertilizers, Nitrogen fixers, Rhizoplane associative nitrogen fixation, Phosphate solubilizers, PGPR, Phyllosphere microflora, vermiform compost, Cyanobacterial and Azolla Biofertilizers.		9
III	Plant Diseases: Fungal diseases of plants: Rusts of wheat, late blight of potato, red rot of sugarcane; Bacterial diseases of plants: Citrus canker, blight of rice; Viral diseases of plants: Leaf curl of Papaya, vein clearing of lady's finger.		9
IV	Storage fungi: Categories of storage fungi, conditions during storage in relation to damage of seeds, harmful effects. Mycotoxins: Effect on human, Role of toxins in plant pathogenesis, Microbial Enzymes and their significance in agriculture. Agro-wastes: Types and management of Agriculture waste.		9
V	Biological Control of plant diseases: Bacterial control of insect pests: <i>Bacillus thuringiensis</i> as bacterial insecticide; Viral control of insect pests: Nuclear polyhedrosis viruses (NPV) and cytoplasmic polyhedrosis viruses (CPV); Fungal control of insect pests: Entomopathogenic fungi: <i>Beauveria bassiana</i> , <i>Verticillium lecani</i> .		9

Name and Signatures

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Subject Expert - Dr. Sonal Mishra	1. Mrs. Rekha Gupta
VC Nominee – Dr. Prakash Saluja	2. Mrs. Neetu Das
Member of Other Department- Dr. G.S. Thakur	3. Ms. Mrinalini Soni
	4. Ms. K.K. Yashoda

PART – C: LEARNING RESOURCES**Text Books, Reference Books and Others****Text Books Recommended:**

1. Microbial Ecology: Fundamentals & Applications. 4th edition Atlas RM and Bartha R. (2000). Benjamin/Cummings Science Publishing, USA
2. Hand Book of Microbial Biofertilizers, Mahendra K. Rai (2005)., The Haworth Press, Inc. New York.
3. Bioinoculants for Sustainable Agriculture and Forestry, Reddy, S.M. et. al. (2002)., Scientific Publishers.

Reference Books:

1. Soil Microbiology: An Exploratory Approach, Coyne MS. (2001). Delmar Thomson Learning.
2. Agriculture Biotechnology; Altman A (1998)., 1st edition, Marcel decker Inc.
3. Development of Bioinsecticide, Saleem F and Shakoori AR (2012), Lap Lambert Academic Publishing GmbH KG

Online Resources – e-Resources/ e-Books and e- learning portals

- http://www.jnkvv.org/PDF/02042020180252Yogranjan_Lecture%20notes_Agricultural%20Microbiology.pdf
- <https://hpuniv.ac.in/upload/syllabus/5f0d8da1ed0a4B.Sc.HonsMicrobiologyFinal.pdf>

PART – D: ASSESSMENT AND EVALUATION**Suggested Continuous Evaluation Methods:****Maximum Marks:** 100 Marks**Continuous Internal Assessment (CIA):** 20 Marks**End Semester Exam (SEE):** 80 Marks**Internal Assessment:**

Internal Test of 20 Marks and Assignment of 20 Marks

Continuous Comprehensive Evaluation (CCE)

Semester End Exam (SEE)**Pattern -FOUR Questions (A, B, C, D) from each Unit**

Question - A & B: (Compulsory) Very short answer type (02 each) 04 x 5 = 20 Marks
 Question - C: Short answer type question 05 x 5 = 25 Marks
 Question - D: Long answer type question 07 x 5 = 35 Marks
Total = 80 Marks

Name and Signatures**Chairperson/ HOD- Dr. Pragya Kulkarni****Subject Expert - Dr. Anita Mahiswar****Subject Expert - Dr. Sonal Mishra****VC Nominee – Dr. Prakash Saluja****Member of Other Department- Dr. G.S. Thakur****Industrial Representative- Shri Amitesh Mishra****Student Nominee – Ms. Yogita Lokhande****Departmental members**

1. Mrs. Rekha Gupta
2. Mrs. Neetu Das
3. Ms. Mrinalini Soni
4. Ms. K.K. Yashoda

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
LAB COURSE

PART – A: Introduction			
Program: B.Sc.		Semester -V	Session: 2025-26
1	Course Code	BMBL-502	
2	Course Title	Lab. Course	
3	Course Type	Laboratory Course	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	This Course will enable the students to- CO1 examine microbial population of soil and their role CO 2 demonstrate role of microorganisms for plant growth CO 3 identify specific plant diseases CO 4 identify specific animal diseases	
6	Credit Value	1 Credit	1 Credit = 30 Hours Learning and Observation
7	Total Marks	Maximum Marks: 50	Minimum Passing Marks: 20

PART: B CONTENT OF THE COURSE

S. No.	List of Exercises
1	Enumeration of microbial population in soil- bacteria, fungi, actinomycetes.
2	Isolation of <i>Rhizobium</i> from legume root nodule and seed treatment studies.
3	Isolation of <i>Azotobacter/ Azospirillum</i> and study their effects.
4	Isolation of BGA from water/soil and its mass cultivation.
5	Isolation of PGPR from soil.
6	Study of storage fungi.
7	Symptomatic study of plant diseases and causal organism.

PART – C: LEARNING RESOURCES

Text Books, Reference Books and Others

Text Books Recommended:

1. Laboratory Manual of Microbiology and Biotechnology; Aneja K. R
2. Practical Microbiology, R. C. Dubey and D. K. Maheshwari.
3. Laboratory Manual in Microbiology. By P. Gunasekaran.

Online Resources:

- <https://nishat2013.files.wordpress.com/2013/11/laboratory-exercises-in-microbiology-book.pdf>
- <https://books.google.co.in/books?id=Wh9OTbjcsfUC&printsec=age&q&f=false>

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

(Will include Internal assessment, Lab records and End Semester Viva/Voce and performance)

Semester End Exam (SEE)	Laboratory performance: As per Dept. (LOCF)
Name and Signatures	

Chairperson/ HOD- Dr. Pragya Kulkarni Subject Expert - Dr. Anita Mahiswar Subject Expert - Dr. Sonal Mishra VC Nominee – Dr. Prakash Saluja Member of Other Department- Dr. G.S. Thakur	Industrial Representative- Shri Amitesh Mishra Student Nominee – Ms. Yogita Lokhande Departmental members 1. Mrs. Rekha Gupta 2. Mrs. Neetu Das 3. Ms. Mrinalini Soni 4. Ms. K.K. Yashoda
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GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM

PART – A: Introduction			
Program: B.Sc.		Semester - V	Session: 2025-26
1	Course Code	BMB 503	
2	Course Title	Microbial Biotechnology	
3	Course Type	Discipline Specific Elective Course (DSE) II	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to – ➤ relate the concepts of genetic engineering ➤ classify different types of vectors ➤ explain the techniques in Molecular Biology ➤ identify cDNA libraries and their applications ➤ examine the products of rDNA technology	
6	Credit Value	03 Credits	Credit = 15 Hours - Learning & Observation
7	Total Marks	Max. Marks: 100	Minimum Passing marks: 40
PART – B: Content of the Course			
Total No. of Teaching-Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Genetic Engineering: Tools and techniques in genetic engineering, Restriction endonucleases- Types and uses, DNA modifying enzymes and their applications: DNA polymerases and DNA ligases.		9
II	Cloning Vectors: Definition and Properties Plasmid vectors: pBR and pUC series. Bacteriophage lambda and M13 based vectors. Cosmids, BACs, YACs.		9
III	Techniques in Molecular Biology: DNA electrophoresis, Introduction to PCR, RAPD, RFLP. Nucleic acid hybridization techniques- Southern, Northern, Western and Dot blots. DNA microarray analysis.		9
IV	cDNA libraries and Applications of rDNA Technology: Genomic and cDNA libraries; Preparation and uses, Screening of libraries: Colony hybridization and colony PCR.		9
V	Products of recombinant DNA technology: Products of human therapeutic interest - insulin, hCGH, antisense molecules. Bt transgenic - cotton, brinjal, Gene therapy, recombinant vaccines, protein engineering and site directed mutagenesis.		9

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Subject Expert - Dr. Sonal Mishra
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Industrial Representative- Shri Amitesh Mishra
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Departmental members
 1. Mrs. Rekha Gupta
 2. Mrs. Neetu Das
 3. Ms. Mrinalini Soni
 4. Ms. K.K. Yashoda

Part – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. A Text Book of Microbiology: R. C. Dubey & D. K. Maheshwari
2. Biotechnology; V. Kumaresan
3. Genetics - Arora and Sandhu

Reference Books:

1. Genes XI - Lewin, B.
2. Principles of Genetics - Gardner, Simmons and Snustad
3. Concepts of Genetics - Klug and Cummings
4. Microbial Genetics - Freifelder
5. Molecular cloning Vol. 1-III. Sambrook & Russel.

Online Resources – e-Resources/ e-Books and e- learning portals

- <https://www.egyankosh.ac.in/bitstream/123456789/86112/1/Unit-14.pdf>
- [https://file.hukum.uns.ac.id/data/PDIH%20File/e-book/Wilson%20Wall%20C%20Genetic%20DNA%20Technology%20Legal Aspects.pdf](https://file.hukum.uns.ac.id/data/PDIH%20File/e-book/Wilson%20Wall%20C%20Genetic%20DNA%20Technology%20Legal%20Aspects.pdf)
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SBB2102.pdf
- <https://asutoshcollege.in/new-web/Study Material/microbial genetics 07042020.pdf>
- https://faculty.ksu.edu.sa/sites/default/files/5_68.pdf

Part – D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 20 Marks

End Semester Exam (ESE): 80 Marks

CCE	Internal test of 20 marks and assignment of 20 marks
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End Semester Exam (ESE):	Four questions (ABCD) from each unit A & B Compulsory very short type 02 each - 4X 5 = 20 Marks C Short answer type question 5X5 = 25 Marks D Long answer type 7X5 = 35 Marks Total = 80 Marks
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Subject Expert - Dr. Anita Mahiswar
Subject Expert - Dr. Sonal Mishra
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Departmental members
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8. Ms. K.K. Yashoda

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART – A: Introduction			
Program: B.Sc.		Semester -V	Session: 2025-26
1	Course Code	BMB 503 P	
2	Course Title	Lab. Course	
3	Course Type	Laboratory Course	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to – ➤ identify the competent cells and demonstrate transformation ➤ make use of electrophoresis and examine restriction digestion and ligation ➤ perform Southern blotting ➤ examine PCR results	
6	Credit Value	1 Credit	Credit = 30 Hours. Laboratory or Field learning/ Training
7	Total Marks	Max. Marks: 50	Min. Passing marks: 20
PART – B: Content of the Course			
Module	Topics (Course contents)		No. of Period
Lab./ Field Training/ Experiment contents of Course	1. Demonstration of Bacterial Transformation and calculation of transformation efficiency. 2. Interpretation of gel electropherograms. 3. Digestion of DNA using restriction enzymes and analysis by agarose gel electrophoresis. 4. Demonstration of Ligation of DNA fragments. 5. Demonstration of Amplification of DNA by PCR. 6. Demonstration of Southern blotting. 7. Observation of Bt crops.		30
Key Words	Electrophoresis, Restriction enzymes, Ligation, PCR Amplification, Southern blotting		
PART – C: Learning Resources			
Text Books, Reference Books and Others			
Text Books Recommended: 1. Microbiology – A Practical Approach - Bhavesh Patel and Nandini Phanse 2. Experiments in Biotechnology - Nighojkar and Nighojkar 3. Current protocols in molecular biology- Ausbel			
Online Resources: • https://home.sandiego.edu/~josephprovost/Bacterial%20Transformation%20Protocol.pdf • https://vyngocnguyen.files.wordpress.com/2016/04/e8-packet11-2.pdf • https://faculty.ksu.edu.sa/sites/default/files/polymerase_chain_reaction_pcr.pdf • https://www.deshbandhucollege.ac.in/pdf/e-resources/botany/LS-VI-Blotting-Techniques.pdf			
PART – D: Assessment and Evaluation			
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks			
End Semester Exam (ESE):	Laboratory/ Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work – 20 Marks B. Spotting based on tools & technology (written) - 10 Marks C. Viva-voce (based on principle/ technology) – 05 Marks		Managed by course teacher as per lab. status

Ans.

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
LAB COURSE

PART A: INTRODUCTION					
Program: B.Sc.		Semester -IV		Session: 2025-26	
1	Course Code	BMBL-402			
2	Course Title	Lab. Course			
3	Course Type	Laboratory Course			
4.	Course Learning Outcomes (CLO)	This Course will enable the students to - CO 1 distinguish pathogenic and non-pathogenic fungi CO 2 demonstrate fungal preservation under laboratory conditions CO 3 identify the life cycle of disease-causing fungi CO 4 examine plant disease symptoms in the laboratory			
5.	Credit Value	1 Credit	1 credit =30 Hours – Learning and Observation		
6.	Total Marks	Maximum Marks :50		Minimum Passing Marks:20	
PART: B CONTENT OF THE COURSE					
S.No.	List of Experiments				
1.	Isolation of fungi from different sources				
2.	Preservation of pure cultures of common fungi.				
3.	Study of the vegetative and reproductive structures through temporary and permanent slides: <i>Mucor, Rhizopus, Saccharomyces, Aspergillus, Penicillium, Erysiphe, Agaricus, Fusarium, Cercospora, Colletotrichum, Cladosporium and Alternaria</i>				
4.	Study of common plant diseases on the basis of causal agent, symptoms, epidemiology and control; White rust of crucifers; Downy mildew; Late blight of potato; Powdery mildew, Ergot of rye; Black stem rust of wheat; Loose smut of wheat; Wilt of tomato				
PART – C: LEARNING RESOURCES					
Text Books, Reference Books and Others					
Text Books Recommended:					
1. Laboratory Manual of Microbiology and Biotechnology; K. R Aneja					
2. Practical Microbiology; R. C. Dubey and D. K. Maheshwari.					
3. Laboratory Manual in Microbiology; P. Gunasekaran.					
4. Experiments in Microbiology, Plant Pathology and Biotechnology; K.R. Aneja. New Age Pub. 2017					
Online Resources:					
• https://nikolaussucher.github.io/bio-two/fungi.html					
• Practical manual of Plant pathology					
• Plant Pathology Concepts and Laboratory Exercises 240131 100459.pdf (tnau.ac.in)					
PART – D: ASSESSMENT AND EVALUATION					
Suggested Continuous Evaluation Methods:					
Maximum Marks:		50 Marks			
(Will include Internal assessment, Lab records and End Semester Viva/Voce and performance).					
Semester End Exam (SEE)		Laboratory performance: As per Dept. (LOCF)			

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni	Industrial Representative- Shri Amitesh Mishra
Subject Expert - Dr. Anita Mahiswar	Student Nominee – Ms. Yogita Lokhande
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VC Nominee – Dr. Prakash Saluja	1. Mrs. Rekha Gupta
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GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM (2025-26)

PART – A: INTRODUCTION			
Program: B.Sc.		Semester - VI	
1	Course Code	BMB-601	
2	Course Title	Medical and Veterinary Microbiology	
3	Course Type	DSC	
4	Course Learning Outcomes (CLO)	This Course will enable the students to - CO 1 define the history of medical microbiology CO 2 identify medically important microorganisms CO 3 explain the mechanism of infection CO 4 examine bacterial diseases CO 5 examine fungal diseases	
5	Credit Value	03 Credits	Credit = 15 Hours - Learning & Observation
6	Total Marks	Max. Marks: 100	Minimum Passing marks: 40

PART – B: CONTENT OF THE COURSE

Total No. of Teaching-Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	Introduction of medical microbiology and concept of infection: Historical development, Koch & River's postulates, role of microbiology in medicine of medically important microbes; microbial flora of human body.	9
II	Pathogenesis: Microbial infection-types, stages and process. Mechanism of bacterial adhesion, colonization and invasion of mucous membranes of respiratory, enteric and urogenital tracts. Role of agresins, depolymerizing enzymes, organotropism, variation and virulence.	9
III	Bacterial Pathogenesis: Pathogenic bacteria- morphological characteristics, epidemiology, pathogenesis, laboratory diagnosis and treatment of pathogenic bacteria; <i>Staphylococcus aureus</i> , group A <i>Streptococcus</i> , <i>Pneumococci</i> , <i>E. coli</i> , <i>Salmonella</i> , <i>Corynebacterium Mycobacterium</i> and drug resistance.	9
IV	Clinical Mycology: Superficial, subcutaneous, cutaneous and systemic mycoses. General description of mycotic pathogens, the diagnosis and prevention. Pathogenic fungi: <i>Microsporium</i> , <i>Trichophyton</i> , <i>Histoplasma capsulatum</i> , <i>Blastomyces dermatitidis</i> , <i>Candida albicans</i> , <i>Cryptococcus neoformans</i> .	9
V	Veterinary Microbiology: Introduction, history and scope, Sources and routes of infection, Zoonoses, Study of following animal diseases with respect to etiology, symptoms, mode of transmission, prophylaxis and control: FMD, swine flu, bird flu, Rabies, bovine tuberculosis, Marek's, Ranikhet disease, brucellosis, distemper, transgenic animals.	9

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni 	Industrial Representative- Shri Amitesh Mishra
Subject Expert - Dr. Anita Mahiswar	Student Nominee – Ms. Yogita Lokhande 
Subject Expert - Dr. Sonal Mishra 	Departmental members
VC Nominee – Dr. Prakash Saluja	1. Mrs. Rekha Gupta 
Member of Other Department- Dr. G.S. Thakur 	2. Mrs. Neetu Das 
	3. Ms. Mrinalini Soni 
	4. Ms. K.K. Yashoda 

PART – C: LEARNING RESOURCES

Text Books, Reference Books and Others

Text Books Recommended:

1. Text book of Microbiology; R. Anantharayanan, C. K. Jayaram Panikar, Orient Longman, Mumbai.
2. Medical microbiology; P. Chakraborty
3. A Text Book of Microbiology: R. C. Dubey & D. K. Maheshwari

Reference Books:

1. Medical Microbiology; N. C. Dey and T. K. Dey, Allied agency, Calcutta.
2. Microbiology; Davis, Dulbecco, Eisen Harper and Row Maryland.

Online Resources – e-Resources/ e-Books and e- learning portals

- <https://microbiologysociety.org/static/uploaded/23cbf9c5-f8c8-4f91-b092a4ad819e6357.pdf>
- https://books.google.co.in/books?id=RLpEDwAAQBAJ&pg=PA46&source=gbs_toc_r&cad=2#v=onepage&q&f=false
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SMB3101.pdf
- <https://repository.poltekkes-kaltim.ac.id/1153/1/medical%20microbiology.pdf>

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Comprehensive Evaluation (CCE): 20 Marks

Semester End Exam (SEE): 80 Marks

Internal Assessment:

Internal Test of 20 Marks and Assignment of 20 Marks

Continuous Comprehensive Evaluation (CCE)

Semester End Exam (SEE)

Pattern -FOUR Questions (A, B, C, D) from each Unit

- Question - A & B: (Compulsory) Very short answer type (02 each) 04 x 5 = 20 Marks
- Question - C: Short answer type question 05 x 5 = 25 Marks
- Question - D: Long answer type question 07 x 5 = 35 Marks

Total = 80 Marks

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni	Industrial Representative- Shri Amitesh Mishra
Subject Expert - Dr. Anita Mahiswar	Student Nominee – Ms. Yogita Lokhande
Subject Expert - Dr. Sonal Mishra	Departmental members
VC Nominee – Dr. Prakash Saluja	1. Mrs. Rekha Gupta
Member of Other Department- Dr. G.S. Thakur	2. Mrs. Neetu Das
	3. Ms. Mrinalini Soni
	4. Ms. K.K. Yashoda

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
LAB COURSE 2025-26

PART – A: INTRODUCTION					
Program: B.Sc.		Semester -VI		Session: 2025-26	
1	Course Code	BMBL-601			
2	Course Title	Lab. Course			
3	Course Type	Laboratory Course			
4.	Course Learning Outcomes (CLO)	This Course will enable the students to – ➤ prepare culture media and examine of different pathological samples ➤ compare various staining techniques ➤ relate serological tests for disease diagnosis ➤ justify antibiotic sensitivity tests			
5.	Credit Value	1 Credit	1 Credit = 30 Hours Learning and Observation		
6.	Total Marks	Max. Marks: 50		Min. Passing marks: 20	
PART: B CONTENT OF THE COURSE					
S.No.	List of Exercises				
1.	Preparation of culture media: Blood agar, Chocolate agar, MacConkey agar				
2.	Isolation of bacteria from tooth crevices				
3.	Staining techniques: Gram staining, Acid fast staining, metachromatic granule staining				
4.	Demonstration of hemolysis on blood agar				
5.	Perform microscopic examination of urine				
6.	Isolation and identification of bacteria from pathological samples				
7.	Perform serological tests: WIDAL, VDRL.				
8.	Perform antibiotic sensitivity test by disc diffusion method.				
PART – C: Learning Resources					
Text Books, Reference Books and Others					
Text Books Recommended:					
1. Laboratory Manual of Microbiology and Biotechnology: Aneja K. R					
2. Practical Microbiology: R. C. Dubey and D. K. Maheshwari.					
3. Laboratory Manual in Microbiology: P. Gunasekaran.					
Online Resources:					
• https://books.google.co.in/books?id=Wh9OTbjcsfUC&printsec=age&q&f=false					
• https://microbiologysociety.org/static/uploaded/23cbf9c5-f8c8-4f91-b092a4ad819e6357.pdf					
• https://books.google.co.in/books?id=RLpEDwAAQBAJ&pg=PA46&source=gbv_toc_r&cad=2#v=onepage&q&f=false					
PART – D: Assessment and Evaluation					
Suggested Continuous Evaluation Methods:					
Maximum Marks:		50 Marks			
(Will include Internal assessment, Lab records and End Semester Viva/Voce and performance)					
Semester End Exam (SEE)		Laboratory performance: As per Dept. (LOCF)			

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni	Industrial Representative- Shri Amitesh Mishra
Subject Expert - Dr. Anita Mahiswar	Student Nominee – Ms. Yogita Lokhande
Subject Expert - Dr. Sonal Mishra	Departmental members
VC Nominee – Dr. Prakash Saluja	1. Mrs. Rekha Gupta
Member of Other Department- Dr. G.S. Thakur	2. Mrs. Neetu Das
	3. Ms. Mrinalini Soni
	4. Ms. K.K. Yashoda

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM 2025-26

PART – A: INTRODUCTION					
Program: B.Sc.		Semester - VI		Session: 2025-26	
1	Course Code	BMB-602			
2	Course Title	Clinical Microbiology			
3	Course Type	Discipline Specific Elective (DSE)			
4.	Course Learning Outcomes (CLO)	This Course will enable the students to – CO 1 develop a clear vision about various aspects of infectious diseases CO 2 explain the portal of entry of pathogens CO 3 identify the method of collection of clinical samples and their processing CO 4 distinguish different types of infectious diseases CO 5 explain diagnostic procedures of infectious diseases			
5.	Credit Value	03 Credits	Credit = 15 Hours - Learning & Observation		
6.	Total Marks	Max. Marks: 100		Minimum Passing marks: 40	
Total no. of Teaching/ Learning Periods = 45 Periods (45 Hours)					

PART – B: CONTENT OF THE COURSE

Unit	Topics (Course contents)	No. of Period
I	Basic concepts in Clinical Microbiology - Sterilization & disinfection, minimum inhibitory concentration, Classification of disease – infectious, communicable, contagious, nosocomial, iatrogenic & zoonotic diseases.	9
II	Chain of infection -Portal of entry and exit of pathogen. Collection of clinical samples and Laboratory diagnosis: precautions required for sample collection (oral cavity, throat, skin, blood, urine, faeces).	9
III	Viral Infections and Diseases - Study of disease; causative agent, infectious dose, portal of entry, virulence, epidemiology, laboratory diagnosis, prophylaxis and treatment of AIDS, Polio, Rabies, Hepatitis. Newly emerging diseases: Dengue and Ebola, COVID.	9
IV	Bacterial Infections and Diseases - Study of disease; causative agent, infectious dose, portal of entry, virulence, epidemiology, laboratory diagnosis, prophylaxis and treatment of Tuberculosis, Typhoid, Cholera, Tetanus, Syphilis, Gastroenteritis caused by E. coli.	9
V	Fungal and Protozoal Diseases - Study of disease; Causative agent, portal of entry, pathogenicity, laboratory diagnosis and treatment of Dermatophytosis, Malaria, Amoebic dysentery.	9

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni Subject Expert - Dr. Anita Mahiswar Subject Expert - Dr. Sonal Mishra VC Nominee – Dr. Prakash Saluja Member of Other Department- Dr. G.S. Thakur	Industrial Representative- Shri Amitesh Mishra Student Nominee – Ms. Yogita Lokhande Departmental members 1. Mrs. Rekha Gupta 2. Mrs. Neetu Das 3. Ms. Mrinalini Soni 4. Ms. K.K. Yashoda
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PART – C: LEARNING RESOURCES

Text Books, Reference Books and Others

Text Books Recommended:

1. Textbook of Microbiology; Ed 8th, Anantnarayan P. and Paniker, C. K. J., (2009), Universities press, Hyderabad.
2. A text book of Microbiology; Chakraborty P (2013) New Central Book Agency, Delhi.
3. Medical Bacteriology and Microbiology; 16th Ed, Dey, N. C. and Dey, T. K., (1999) Allied Agency, Calcutta.

Reference Books:

1. Microorganisms in our world; Atlas, R. M. (1995), Mosby Year Book Inc.
2. Microbiology; 4th Ed., Davis, B. D., Dulbecco, R, Eisen, H. N., Ginsberg, R. S., (1990), Harper and Row Publishers, Singapore.
3. Microbiology; 2nd Ed., Prescott, L. M., Hartley, J. P. and Klein, D. A., (1993), W. M. C. Brown Publ, England.
4. Microbiology; 8th Ed., Tortora, G. J., Funke, B. R. and Case, C. L., (2004), Person Education (Low Price edition), Delhi

Online Resources:

- <https://www.routledge.com/Clinical-Microbiology/Struthers/p/book/9781498786898>
- https://sist.sathvabama.ac.in/sist_coursematerial/uploads/SMB3101.pdf
- <https://repository.poltekkes-kaltim.ac.id/1153/1/medical%20microbiology.pdf>
- <https://pubmed.ncbi.nlm.nih.gov/21413252/Medical-Microbiology-PubMed-nih.gov>

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Comprehensive Evaluation (CCE): 20 Marks

Semester End Exam (SEE): 80 Marks

Internal Assessment:

Continuous Comprehensive Evaluation (CCE)

Internal Test of 15 Marks and Assignment of 15 Marks

Semester
End Exam
(SEE)

Pattern -FOUR Questions (A, B, C, D) from each Unit

Question - A & B: (Compulsory) Very short answer type (02 each) 04 x 5 = 20 Marks

Question - C: Short answer type question 05 x 5 = 25 Marks

Question - D: Long answer type question 07 x 5 = 35 Marks

Total = 80 Marks

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni

Subject Expert - Dr. Anita Mahiswar

Subject Expert - Dr. Sonal Mishra

VC Nominee – Dr. Prakash Saluja

Member of Other Department- Dr. G.S. Thakur

Industrial Representative- Shri Amitesh Mishra

Student Nominee – Ms. Yogita Lokhande

Departmental members

1. Mrs. Rekha Gupta

2. Mrs. Neetu Das

3. Ms. Mrinalini Soni

4. Ms. K.K. Yashoda

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
LAB COURSE

PART – A: INTRODUCTION					
Program: B.Sc.		Semester -VI		Session: 2025-26	
1	Course Code	BMBL- 602			
2	Course Title	Lab. Course			
3	Course Type	Laboratory Course			
4.	Course Learning Outcomes (CLO)	This Course will enable the students to – CO 1 find the methods of collection and transport of clinical samples CO 2 explain the principles of clinical phenomena for diagnosis of diseases CO 3 experiment with isolation and identification of disease-causing organisms CO 4 relate antibiotic responses of pathogenic microorganisms			
5.	Credit Value	1 Credit	1 Credit = 30 Hours Learning and Observation		
6.	Total Marks	Max. Marks: 50		Min. Passing marks: 20	
PART: B CONTENT OF THE COURSE					
S.No.	List of Exercises				
1.	Collection & transport of clinical specimens.				
2.	Serological tests-WIDAL, VDRL, ELISA				
3.	Demonstration Chick Embryo techniques-inoculation and harvesting				
4.	Study of growth characters of isolated pathogens on following media: MacConkey agar, EMB agar, Mannitol salt agar, Salmonella Shigella agar, TSI agar				
5.	Physical, Chemical and Microscopic examination of Clinical samples –urine, pus				
6.	Isolation, identification of pathogens from clinical samples: <i>E. coli</i> , <i>Salmonella spp.</i> , <i>Pseudomonas spp.</i> , <i>Proteus spp.</i> , <i>Klebsiella spp.</i> , <i>Shigella spp.</i> , <i>Staphylococcus spp.</i> , <i>Streptococcus spp.</i>				
7.	Isolation and observation of fungal pathogens using Lactophenol cotton blue stain.				
8.	Direct examination of faeces for ova and cysts				
9.	Antibiotic sensitivity testing of the isolates				
PART – C: Learning Resources					
Text Books, Reference Books and Others					
Text Books Recommended:					
1. Laboratory Manual of Microbiology and Biotechnology; Aneja K. R.					
2. Practical Microbiology; R.C. Dubey and D. K. Maheshwari.					
3. Laboratory Manual in Microbiology; P. Gunasekaran.					
Online Resources:					
https://books.google.co.in/books?id=Wh9OTbjcsfUC&printsec=frontcover&source=gbs https://microbiologysociety.org/static/uploaded/23cbf9c5-f8c8-4f91-b092a4ad819e6357.pdf https://books.google.co.in/books?id=RLpEDwAAQBAJ&pg=PA46&source=gbs_toc_r&cad=2#v=onepage&q&f=false					
PART – D: ASSESSMENT AND EVALUATION					
Suggested Continuous Evaluation Methods:					
Maximum Marks: 50 Marks					
(Will include Internal assessment, Lab records and End Semester Viva/Voce and performance)					
Semester End Exam (SEE)		Laboratory performance: As per Dept. (LOCF)			

Name and Signatures Chairperson/ HOD- Dr. Pragya Kulkarni Subject Expert - Dr. Anita Mahiswar Subject Expert - Dr. Sonal Mishra VC Nominee – Dr. Prakash Saluja Member of Other Department- Dr. G.S. Thakur		Industrial Representative- Shri Amitesh Mishra Student Nominee – Ms. Yogita Lokhande Departmental members - Mrs. Rekha Gupta - Mrs. Neetu Das - Ms. Mrinalini Soni - Ms. K.K. Yashoda
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GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM 2025-26

PART – A: INTRODUCTION					
Program: B.Sc.		Semester - VI		Session: 2025-26	
1	Course Code	BMB-602			
2	Course Title	Clinical Microbiology			
3	Course Type	Discipline Specific Elective (DSE)			
4.	Course Learning Outcomes (CLO)	This Course will enable the students to – CO 1 develop a clear vision about various aspects of infectious diseases CO 2 explain the portal of entry of pathogens CO 3 identify the method of collection of clinical samples and their processing CO 4 distinguish different types of infectious diseases CO 5 explain diagnostic procedures of infectious diseases			
5.	Credit Value	03 Credits	Credit = 15 Hours - Learning & Observation		
6.	Total Marks	Max. Marks: 100		Minimum Passing marks: 40	

Total no. of Teaching/ Learning Periods = 45 Periods (45 Hours)

PART – B: CONTENT OF THE COURSE

Unit	Topics (Course contents)	No. of Period
I	Basic concepts in Clinical Microbiology - Sterilization & disinfection, minimum inhibitory concentration, Classification of disease – infectious, communicable, contagious, nosocomial, iatrogenic & zoonotic diseases.	9
II	Chain of infection -Portal of entry and exit of pathogen. Collection of clinical samples and Laboratory diagnosis: precautions required for sample collection (oral cavity, throat, skin, blood, urine, faeces).	9
III	Viral Infections and Diseases - Study of disease; causative agent, infectious dose, portal of entry, virulence, epidemiology, laboratory diagnosis, prophylaxis and treatment of AIDS, Polio, Rabies, Hepatitis. Newly emerging diseases: Dengue and Ebola, COVID.	9
IV	Bacterial Infections and Diseases - Study of disease; causative agent, infectious dose, portal of entry, virulence, epidemiology, laboratory diagnosis, prophylaxis and treatment of Tuberculosis, Typhoid, Cholera, Tetanus, Syphilis, Gastroenteritis caused by E. coli.	9
V	Fungal and Protozoal Diseases - Study of disease; Causative agent, portal of entry, pathogenicity, laboratory diagnosis and treatment of Dermatophytosis, Malaria, Amoebic dysentery.	9

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni	Industrial Representative- Shri Amitesh Mishra
Subject Expert - Dr. Anita Mahiswar	Student Nominee – Ms. Yogita Lokhande
Subject Expert - Dr. Sonal Mishra	Departmental members
VC Nominee – Dr. Prakash Saluja	1. Mrs. Rekha Gupta
Member of Other Department- Dr. G.S. Thakur	2. Mrs. Neetu Das
	3. Ms. Mrinalini Soni
	4. Ms. K.K. Yashoda

PART – C: LEARNING RESOURCES**Text Books, Reference Books and Others****Text Books Recommended:**

1. Textbook of Microbiology; Ed 8th, Anantnarayan P. and Paniker, C. K. J., (2009), Universities press, Hyderabad.
2. A text book of Microbiology; Chakraborty P (2013) New Central Book Agency, Delhi.
3. Medical Bacteriology and Microbiology; 16th Ed, Dey, N. C. and Dey, T. K., (1999) Allied Agency, Calcutta.

Reference Books:

1. Microorganisms in our world; Atlas, R. M. (1995), Mosby Year Book Inc.
2. Microbiology; 4th Ed., Davis, B. D., Dulbecco, R, Eisen, H. N., Ginsberg, R. S., (1990), Harper and Row Publishers, Singapore.
3. Microbiology; 2nd Ed., Prescott, L. M., Hartley, J. P. and Klein, D. A., (1993), W. M. C. Brown Publ, England.
4. Microbiology; 8th Ed., Tortora, G. J., Funke, B. R. and Case, C. L., (2004), Person Education (Low Price edition), Delhi

Online Resources:

- <https://www.routledge.com/Clinical-Microbiology/Struthers/p/book/9781498786898>
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SMB3101.pdf
- <https://repository.poltekkes-kaltim.ac.id/1153/1/medical%20microbiology.pdf>
- <https://pubmed.ncbi.nlm.nih.gov/21413252/>
Medical Microbiology - PubMed (nih.gov)

PART – D: ASSESSMENT AND EVALUATION**Suggested Continuous Evaluation Methods:****Maximum Marks:** 100 Marks**Continuous Comprehensive Evaluation (CCE):** 20 Marks**Semester End Exam (SEE):** 80 Marks**Internal Assessment:**

Continuous Comprehensive Evaluation (CCE)

Internal Test of 15 Marks and Assignment of 15 Marks

**Semester
End Exam
(SEE)****Pattern -FOUR Questions (A, B, C, D) from each Unit**

Question - A & B: (Compulsory) Very short answer type (02 each) 04 x 5 = 20 Marks

Question - C: Short answer type question 05 x 5 = 25 Marks

Question - D: Long answer type question 07 x 5 = 35 Marks

Total = 80 Marks**Name and Signatures****Chairperson/ HOD- Dr. Pragya Kulkarni****Subject Expert - Dr. Anita Mahiswar****Subject Expert - Dr. Sonal Mishra****VC Nominee – Dr. Prakash Saluja****Member of Other Department- Dr. G.S. Thakur****Industrial Representative- Shri Amitesh Mishra****Student Nominee – Ms. Yogita Lokhande****Departmental members**

1. Mrs. Rekha Gupta

2. Mrs. Neetu Das

3. Ms. Mrinalini Soni

4. Ms. K.K. Yashoda

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
LAB COURSE

PART – A: INTRODUCTION			
Program: B.Sc.		Semester -VI	
Session: 2025-26			
1	Course Code	BMBL- 602	
2	Course Title	Lab. Course	
3	Course Type	Laboratory Course	
4.	Course Learning Outcomes (CLO)	This Course will enable the students to – CO 1 find the methods of collection and transport of clinical samples CO 2 explain the principles of clinical phenomena for diagnosis of diseases CO 3 experiment with isolation and identification of disease-causing organisms CO 4 relate antibiotic responses of pathogenic microorganisms	
5.	Credit Value	1 Credit	1 Credit = 30 Hours Learning and Observation
6.	Total Marks	Max. Marks: 50	Min. Passing marks: 20

PART: B CONTENT OF THE COURSE

S.No.	List of Exercises
1.	Collection & transport of clinical specimens.
2.	Serological tests-WIDAL, VDRL, ELISA
3.	Demonstration Chick Embryo techniques-inoculation and harvesting
4.	Study of growth characters of isolated pathogens on following media: MacConkey agar, EMB agar, Mannitol salt agar, Salmonella Shigella agar, TSI agar
5.	Physical, Chemical and Microscopic examination of Clinical samples –urine, pus
6.	Isolation, identification of pathogens from clinical samples: <i>E. coli</i> , <i>Salmonella spp.</i> , <i>Pseudomonas spp.</i> , <i>Proteus spp.</i> , <i>Klebsiella spp.</i> , <i>Shigella spp.</i> , <i>Staphylococcus spp.</i> , <i>Streptococcus spp.</i>
7.	Isolation and observation of fungal pathogens using Lactophenol cotton blue stain.
8.	Direct examination of faeces for ova and cysts
9.	Antibiotic sensitivity testing of the isolates

PART – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. Laboratory Manual of Microbiology and Biotechnology; Aneja K. R
2. Practical Microbiology; R.C. Dubey and D. K. Maheshwari.
3. Laboratory Manual in Microbiology; P. Gunasekaran.

Online Resources:

- <https://books.google.co.in/books?id=Wh9OTbjcsfUC&printsec=frontcover&source=gbs>
- <https://microbiologysociety.org/static/uploaded/23cbf9c5-f8c8-4f91-b092a4ad819e6357.pdf>
- https://books.google.co.in/books?id=RLpEDwAAQBAJ&pg=PA46&source=gbs_toc_r&cad=2#v=onepage&q&f=false

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

(Will include Internal assessment, Lab records and End Semester Viva/Voce and performance)

Semester End Exam (SEE)	Laboratory performance: As per Dept. (LOCF)
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Name and Signatures Chairperson/ HOD- Dr. Pragya Kulkarni Subject Expert - Dr. Anita Mahiswar Subject Expert - Dr. Sonal Mishra VC Nominee – Dr. Prakash Saluja Member of Other Department- Dr. G.S. Thakur	Industrial Representative- Shri Amitesh Mishra Student Nominee – Ms. Yogita Lokhande Departmental members 1. Mrs. Rekha Gupta 2. Mrs. Neetu Das 3. Ms. Mrinalini Soni 4. Ms. K.K. Yashoda
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GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM 2025-26

PART – A: INTRODUCTION			
Program: B.Sc.		Semester - VI	Session: 2025-26
1	Course Code	BMB-603	
2	Course Title	Immunology	
3	Course Type	Discipline Specific Elective (DSE)	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	At the end of this course, students will be able to – CO 1 define the functions of the immune system CO 2 distinguish innate immunity and acquired immunity CO 3 relate the structure and function immune cells and organs CO 4 discuss cell mediated and antibody-mediated immunity CO 5 explain immunological techniques	
6	Credit Value	03 Credits	Credit = 15 Hours - Learning & Observation
7	Total Marks	Max. Marks: 100	Minimum Passing marks: 40

PART – B: CONTENT OF THE COURSE

Total No. of Teaching-Learning Periods - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	Immunity and Immune system – History: Contribution of G.P. Talwar, M.C. Vaidya and Indira Nath; Concept of Innate and acquired immunity, Host defense mechanism- First, second and third line of host defense.	9
II	Haematopoiesis - Definition, types and process, structure, functions and properties of Immune Cells; Stem cell, T cell, B cell, NK cell, Macrophage, Neutrophil, Eosinophil, Basophil, Mast cell, Dendritic cell; Organs of Immune; Bone Marrow, Thymus, Lymph Node, Spleen.	9
III	Antigens and Antibodies - Characteristics of an antigen (Foreignness, Molecular size and Heterogeneity); Epitopes, Haptens, Adjuvants. Structure, Types, Functions and Properties of Immunoglobulins (Antibody); Antigenic determinants on antibodies (Isotypic, allotypic, idiotypic).	9
IV	Immune Response - Primary and Secondary Immune Response; Generation of Humoral Immune Response; Generation of Cell Mediated Immune Response; Killing Mechanisms by CTL (Cytotoxic T lymphocytes) and NK cells. Structure and Functions of MHC I & II molecules, Components and biological activities of Complement.	9
V	Antigen and Antibody Reactions and Immunological Techniques - Principles of Agglutination, precipitation, Complement Fixation test, Immunodiffusion, Immuno electrophoresis, Hemagglutination, Immunofluorescence, ELISA, RIA, Coombs test.	9

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni Subject Expert - Dr. Anita Mahiswar Subject Expert - Dr. Sonal Mishra VC Nominee – Dr. Prakash Saluja Member of Other Department- Dr. G.S. Thakur	Industrial Representative- Shri Amitesh Mishra Student Nominee – Ms. Yogita Lokhande Departmental members 1. Mrs. Rekha Gupta 2. Mrs. Neetu Das 3. Ms. Mrinalini Soni 4. Ms. K.K. Yashoda
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PART – C: LEARNING RESOURCES**Text Books, Reference Books and Others****Text Books Recommended:**

1. Text book of Microbiology; R. Anantharayanan, C.K. Jayaram Panikar, Orient Longman.
2. Medical microbiology; Chakraborty P.
3. A text book of Microbiology; Dubey & Maheshwari.
4. Immunology, A Textbook; C.V. Rao.
5. Immunology; J. Kuby.

Reference Books:

1. Fundamental Immunology; W.E. Paul.
2. Essentials of Immunology; Roitt, I.M.

Online Resources – e-Resources/ e-Books and e- learning portals

- https://repository.stikesbcm.ac.id/id/eprint/168/1/books_5453_0.pdf
- <https://www.mbbcollege.in/db/notes/474.pdf>
- <http://www.helmburg.at/immunology.pdf>
- <https://www.utep.edu/eerael/immunology.htm>
- <https://conursing.uobaghdad.edu.iq/wp-content/uploads/sites/20/2019/09/Microbiology-L10-Immunity-and-immune-system.pdf>

PART – D: ASSESSMENT AND EVALUATION**Suggested Continuous Evaluation Methods:****Maximum Marks:** 100 Marks**Continuous Internal Assessment (CIA):** 20 Marks**End Semester Exam (ESE):** 80 Marks**Internal Assessment:**

Internal Test of 15 Marks and Assignment of 15 Marks

Continuous Comprehensive Evaluation (CCE)

Semester End Exam (SEE)	Pattern -FOUR Questions (A, B, C, D) from each Unit
	Question - A & B: (Compulsory) Very short answer type (02 each) 04 x 5 = 20 Marks
	Question - C: Short answer type question 05 x 5 = 25 Marks
	Question - D: Long answer type question 07 x 5 = 35 Marks
	Total = 80 Marks

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni	Industrial Representative- Shri Amitesh Mishra
Subject Expert - Dr. Anita Mahiswar	Student Nominee – Ms. Yogita Lokhande
Subject Expert - Dr. Sonal Mishra	Departmental members
VC Nominee – Dr. Prakash Saluja	1. Mrs. Rekha Gupta
Member of Other Department- Dr. G.S. Thakur	2. Mrs. Neetu Das
	3. Ms. Mrinalini Soni
	4. Ms. K.K. Yashoda

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE DURG
FOUR YEAR UNDERGRADUATE PROGRAM
DEPARTMENT OF MICROBIOLOGY
LAB COURSE

PART A: INTRODUCTION			
Program: B.Sc.		Semester III	
		Session: 2025-26	
1	Course Code	BMBL-302	
2	Course Title	Lab. Course	
3	Course Type	Laboratory Course	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	This Course will enable the students to- CO 1 identify blood group and estimate of haemoglobin CO 2 perform Gel Diffusion assays used to examine antigen-antibody reactions CO 3 perform DOT ELISA test CO 4 understand the Flocculation and Agglutination reaction	
6	Credit Value	1 Credit	Credit = 30 Hours. - Learning & Observation
7	Total Marks	Max. Marks: 50	Min. Passing marks: 20
PART B: CONTENT OF THE COURSE			
Total No. of learning-Training/ Performance Periods: 30 Periods (30 Hours)			
S. No.	List of Exercises		
1	Identification of human blood groups.		
2	Estimation of haemoglobin.		
3	Perform Total Leukocyte Count of the given blood sample.		
4	Separate serum from the blood sample.		
5	Flocculation reactions - VDRL Agglutination, Widal test, Blood Grouping.		
6	Immuno-diffusion techniques- ODD and RID.		
7	To Perform DOT ELISA.		
8	Examination of skin microflora.		
PART – C: LEARNING RESOURCES			
Text Books, Reference Books and Others			
Text Books Recommended:			
1. Practical Immunology, Frank C. Hay, Olwyn M.R. Westwood & Paul N. Nelson. 4 th Edition, 1 January			
2. Handbook of Practical and Clinical Immunology, 2e, Vol. II 2nd Edition, Kindle Edition			
3. Immunological Techniques Interpretations Validation and Safety Measures; Ankita Joshi & R S Chauhan			
Online Resources:			
https://doi.org/10.1002/9780470757475.index http://www.lucp.net/books-pdf/Lab%20Manual%20Dr.%20Idris%20Adewale%20Ahmed/15.%20BASIC%20IMMUNOLOGY.pdf https://webstor.srmist.edu.in/web_assets/downloads/2021/18BTC106J-lab-manual.pdf			
PART – D: ASSESSMENT AND EVALUATION			
Suggested Continuous Evaluation Methods:			
Maximum Marks:		50 Marks	
(Will include Internal assessment, Lab records and End Semester Viva/Voce and performance)			
Semester End Exam (SEE)		Laboratory performance: As per Dept. (LOCF)	

Name and Signatures

Chairperson/ HOD- Dr. Pragya Kulkarni Subject Expert - Dr. Anita Mahiswar Subject Expert - Dr. Sonal Mishra VC Nominee – Dr. Prakash Saluja Member of Other Department- Dr. G.S. Thakur	Industrial Representative- Shri Amitesh Mishra Student Nominee – Ms. Yogita Lokhande Departmental members - Mrs. Rekha Gupta - Mrs. Neetu Das - Ms. Mrinalini Soni - Ms. K.K. Yashoda
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