



Department of Botany
Keral Verma Subharti College of Science
SWAMI VIVEKANAND SUBHARTI UNIVERSITY

(Established under U.P. Govt. Act no. 29 of 2008 and approved under section 2(I) of UGC Act 1956)
Ph. 0121-2439578, 2439052, 3056031, 3056032; Telefax: 0121



Ref. No. – KVSCOS/BOT/2023/BOS/003

Dated: 26 June 2023

NOTICE


A meeting of Board of Studies will be held on 30 June 2023 at 11:00 AM at the office of Head, Department of Botany. Following are agenda items for the same.

1. **Agenda Item No. 1:** To confirm the minutes of the Board of Studies meeting held on 6 Jan 2023.
2. **Agenda Item No. 2:** To consider the Action Taken Report on the minutes of Board of Studies held on 6 Jan 2023 (Annexure -I).
3. **Agenda Item No. 3:** To discuss about the revision of course structure and syllabus of UG programmes (B.Sc. Environmental Science). (Annexure -II).
4. **Agenda Item No. 4:** To discuss starting MSc. Environmental Science.
5. **Agenda Item No. 5:** To discuss purchasing essential chemicals and reagents for academic session 2023-24.
6. **Agenda Item No. 6:** To finalize the proposed Value Added Course in the programmes of UG and PG for the session 2023-24. (Annexure –III).
7. **Agenda Item No. 7:** To discuss the planning of Industrial/academic visits.
8. **Agenda Item No. 8:** To discuss the establishment of Mini Botanical Garden/Digital Botanical Garden.
9. **Agenda Item No. 9:** To propose the name of the external expert of BOS for the department.
10. **Agenda Item No. 10:** To establish a separate Department of Environmental Sciences in KVSCOS.
11. Any other agenda with the permission of the chair.
You are requested to make it convenient to attend the same.

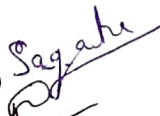




Dr. Sangeeta Dayal
Chairperson

Copy to:

External expert:

1. Dr. Raj Singh 

Internal Members:

2. Dr. Sangeeta Dayal (Professor) 
3. Dr. Anju Rani (Professor)
4. Dr. Permod Kumar (Associate Professor) 
5. Dr. Adesh Kumar (Assistant Professor) 
6. Ekta D/O- Vachan Singh, Batch: 2020-22, Mobile No. 7978581260 (Alumni) 



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Ref. No. – KVSCOS/BOT/2023/BOS/004

Dated: 07 July 2023

Minutes of Meeting

A meeting of Board of Studies was held on 30 June 2023 at 11:00 AM in the office of the Head, Department of Botany.

Following members attended the meeting

1. Dr. Sangeeta Dayal - Chairperson
2. Dr. Raj Singh - External Expert
3. Dr. Anju Rani - Member
4. Dr. Permod Kumar - Member
5. Dr. Adesh Kumar - Member
6. Ekta D/O- Vachan Singh, Batch: 2020-22, Mobile No. 7078581260 (Alumni)

Sangeeta
Raj
Anju
Permod
Adesh

At the onset, the Chairperson BOS welcomed all the members and thanked outside experts for sparing their time. The items were taken up as per agenda.

1. Agenda Item No. 1: To confirm the minutes of the Board of Studies meeting held on 6 Jan 2023.

Resolution: The Board confirmed the minutes.

2. Agenda Item No. 2: To consider the Action Taken Report on the minutes of Board of Studies held on 6 Jan 2023 (*Annexure -I*).

Resolution: The board considered the Action Taken Report.

3. Agenda Item No. 3: To discuss about the revision of course structure and syllabus of UG programs (B.Sc. Environmental Science). (*Annexure -II*).

a. In B.Sc. Environmental Science which was started in 2022-23 session under the NEP scheme, there should be one minor course essential for each academic year, in this regard we have proposed Natural Hazards and Disaster Management (B150207T) as minor subject in first year (II Semester). It was also uploaded on the ERP as minor subject in II Semester, meanwhile English Communication (AEC-01) has been implemented as ordered by present Dean, KVSCOS, Dr. Mahavir Singh. Now we have two minor subjects in a year that is incorrect as per NEP guidelines.

After the brief discussion with Hon'ble Vice Chancellor, SVSU and present Dean, KVSCOS Dr. Renu Mavi, it was decided that English Communication (AEC-01) will be continue as minor subject in first year and Natural Hazards and Disaster Management (B150207T) may be shifted to second year as minor subject.

b. As per the other B.Sc. NEP Evolution scheme some common subjects are opted as minor elective but in B.Sc. Environmental Science (NEP) compulsory major subjects have to reconsidered.

Resolution: Both the points Unanimously approved and recommended to faculty board

4. Agenda Item No. 4: To discuss starting MSc. Environmental Science as new programs.

Resolution: Unanimously approved and recommended to Faculty Board.

5. Agenda Item No. 5: To discuss purchasing essential chemicals and reagents for academic session 2023-24.



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6. **Agenda Item No. 6:** To finalize the proposed Value Added Course in the programmes of UG and PG for the session 2023-24. (Annexure III).
Resolution: Following VAC courses unanimously approved and recommended to Faculty Board
Botany Students
1. Advances in Floriculture and Landscaping (VAC-BOI-402)
2. Plant Tissue Culture Techniques (VAC-BOI-4011)
BSc. EVS Students
1. Water and Wastewater treatment (VAC-EVS-115)
2. Solid Waste Management (VAC-EVS-215)
7. **Agenda Item No. 7:** To discuss the planning of Industrial/ academic visits.
Resolution: Unanimously approved and recommended to Faculty Board.
8. **Agenda Item No. 8:** To discuss the establishment of Mini Botanical Garden/Digital Botanical Garden.
Resolution: Unanimously approved and recommended to Faculty Board.
9. **Agenda Item No. 9:** To propose the name of the external expert of BOS for the department.
Resolution: The following members proposed for the approval of the external expert of BOS for the department.
1. Dr. Vijay Malik, Professor and HOD Botany Department, CCS University, Meerut.
2. Dr. Ashok Kumar Associate Professor, Botany Department, CCS University, Meerut.
10. **Agenda Item No. 10:** To establish a separate Department of Environmental Sciences in KVSCOS.
Resolution: Unanimously approved and recommended to Faculty Board

Sangeeta
Dr. Sangeeta Dayal
Chairperson

Submitted to Faculty Board



Department of Botany
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Attendance for the Meeting of Board of Studies was held on 30 June 2023 at
11:00 AM in the office of the Head, Department of Botany

- | | | |
|---|-------------------|------------------|
| 1. Dr. Sangeeta Dayal | - Chairperson | <i>Sangeeta</i> |
| 2. Dr. Raj Singh | - External Expert | <i>Raj Singh</i> |
| 3. Dr. Anju Rani | - Member | <i>Anju</i> |
| 4. Dr. Permod Kumar | - Member | <i>Permod</i> |
| 5. Dr. Adesh Kumar | - Member | <i>Adesh</i> |
| 6. Ekta D/O- Vachan Singh, Batch: 2020-22, Mobile No. 7078581260 (Alumni) | | |

Department of Botany
Keral Verma Subharti College of Science
SWAMI VIVEKANAND SUBHARTI UNIVERSITY



(Established under U.P. Govt. Act No. 22 of 2010 and approved under section 2(B) of UGC Act 1956)
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Ref. No. – KVSCOS/BOT/2023/BOS/005

Dated: 17 July 2023

Action Taken Report

The meeting of the BOS of department was held on 10 June 2023 in the presence of external and internal members. Following agenda are discuss in the meeting the actions taken of the agendas are given below

<u>Agenda Item</u>	<u>Decision/Recommendation</u>	<u>Action taken</u>
Agenda Item No. 1: To confirm the minutes of the Board of Studies meeting held on 6 Jan 2023	Confirmed.	
Agenda Item No. 2: To consider the Action Taken Report on the minutes of Board of Studies held on 6 Jan 2023 (Annexure -I)	Noted the action taken	
Agenda Item No. 3: To discuss about the revision of course structure and syllabus of UG programmes (B.Sc. Environmental Science). (Annexure -II).	It has approved that in (B.Sc. Environmental Science), the major compulsory subjects are opted as B.Sc. Botany/ Microbiology/ Zoology/Biotechnology/Chemistry	The recommendations were referred to the Faculty Board for Approval.
Agenda Item No. 4: To discuss starting MSc. Environmental Science as new programs.	Confirmed.	The recommendations were referred to the Faculty Board for Approval.
Agenda Item No. 5: To discuss purchasing essential chemicals and reagents for academic session 2023-24.	Confirmed.	
Agenda Item No. 6: To finalize the proposed Value Added Course in the	Confirmed.	The recommendations were referred to the

[Signature]

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and PG for the session 2023-24.		Board for Approval.
Agenda Item No. 7: To discuss the planning of Industrial/ academic visits.	Confirmed.	-
Agenda Item No. 8: To discuss the establishment of Mini Botanical Garden/Digital Botanical Garden.	Confirmed.	-
Agenda Item No. 9: To propose the name of the external expert of BOS for the department.	Confirmed.	The recommendations were referred to the Faculty Board for Approval.
Agenda Item No. 10: To establish a separate Department of Environmental Sciences in KVSCOS.	Confirmed.	The recommendations were referred to the Faculty Board for Approval.

Sangul

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Samsung Quad Camera

CERTIFICATE COURSE IN MICROBIAL TECHNOLOGY & CLASSICAL BOTANY

old

**OR
B.Sc.-I**

CERTIFICATE COURSE IN MICROBIAL TECHNOLOGY & CLASSICAL BOTANY / B.Sc.-I

Programme: <i>Certificate Course in Microbial Technology & Classical Botany</i>	Year: I	Semester: I/Paper-I
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Course Code: BOT-01T	Subject: Botany	Course Title: Microbiology & Plant Pathology
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Course Outcomes: After the completion of the course the students will be able to:

1. Develop understanding about the classification and diversity of different microbes including viruses, Algae, Fungi & Lichens & their economic importance.
2. Develop conceptual skill about identifying microbes, pathogens, biofertilizers & lichens.
3. Gain knowledge about developing commercial enterprise of microbial products.
4. Learn host-pathogen relationship and disease management.
5. Learn Presentation skills (oral & writing) in life sciences by usage of computer & multimedia.
6. Gain Knowledge about uses of microbes in various fields.
7. Understand the structure and reproduction of certain selected bacteria algae, fungi and lichens
8. Gain Knowledge about the economic values of this lower group of plant community.

Credits: 4	Core Compulsory
Maximum Marks: 25+75	Min. Passing Marks:

Total No. of Lectures-Tutorials-Practical (in hours per week): 4-0-0

Unit	Topic	No. of Lectures (60 hrs)
I	<p>A. Introduction to Indian ancient, Vedic and heritage Botany and contribution of Indian Botanists, in context with the holistic development of modern science and technology, has to be taught, practiced and assessed via class interaction/ assignments / self-study mentioned under Continuous Internal Evaluation (CIE).</p> <p>B. Microbial Techniques & instrumentation Microscopy – Light, phase contrast, electron, scanning and transmission electron microscopy, staining techniques for light microscopy, sample preparation for electron microscopy. Common equipment of microbiology lab and principle of their working – autoclave, oven, laminar air flow, centrifuge. Colorimetry and spectrophotometry, immobilization methods, fermentation and fermenters.</p>	8
II	<p>Microbial world Cell structure of Eukaryotic and prokaryotic cells, Gram positive and Gram-negative bacteria, Structure of a bacteria; Bacterial Chemotaxis and Quorum sensing, Bacterial Growth curve, factors affecting growth of microbes; measurement of growth; Batch culture, fed batch culture and continuous culture; Synchronous growth of microbes; Sporulation and reproduction and recombination in bacteria. Viruses, general characteristics, viral culture, Structure of viruses, Bacteriophages, Structure of T4 & λ-phage; Lytic and Lysogenic cycles, viroid, Prions & mycoplasma & phytoplasma, Actinomycetes & plasmids and their economic uses.</p>	8
III	<p>Phycology Range of thallus organization in Algae, Pigments, Reserve food –Reproduction – Classification and life cycle of – <i>Nostoc</i>, <i>Chlorella</i>, <i>Volvox</i>, <i>Hydrodictyon</i>, <i>Oedogonium</i>, <i>Chara</i>; <i>Sargassum</i>, <i>Ectocarpus</i>, <i>Polysiphonia</i>. Economic importance of algae - Role of algae in soil fertility- biofertilizer – Nitrogen fixation- Symbiosis; Commercial products of algae – biofuel, Agar.</p>	7
IV	<p>Mycology General characteristics, nutrition, life cycle, Economic importance of Fungi, Classification upto class. Distinguishing characters of Myxomycota: General characters of Mastigomycotina, Zygomycota: <i>Rhizopus</i>, Ascomycota: <i>Saccharomyces</i>, <i>Penicillium</i>, <i>Peziza</i>. Basidiomycotina: <i>Ustilago</i>, <i>Puccinia</i>, <i>Agaricus</i>; Deuteromycotina: <i>Fusarium</i>, <i>Alternaria</i>. Heterothallism, Physiological specialization, Heterokaryosis & Parasexuality.</p>	7

V	Mushroom Cultivation, Lichenology & Mycorrhiza Mushroom cultivation. General account of lichens, reproduction and significance; <i>Mycorrhiza: ectomycorrhiza</i> and <i>endomycorrhiza</i> and their significance.	7
VI	Plant Pathology Disease concept, Symptoms, Etiology & causal complex, Primary and secondary inoculum, Infection, Pathogenicity and pathogenesis, Koch's Postulates. Mechanism of infection (Brief idea about Pre-penetration, Penetration and Post-penetration), Disease cycle (monocyclic, polycyclic and polyetic). Defense mechanism with special reference to Phytoalexin, Resistance- Systemic acquired and Induced systemic fungicides- Bordeaux mixture, Lime Sulphur, Tobacco decoction, Neem cake & oil	7
VII	Diseases and Control Symptoms, Causal organism, Disease cycle and Control measures of – Early & Late Blight of Potato, False Smut of Rice/ Brown spot of rice, Black Stem Rust of Wheat, <i>Alternaria</i> spot' and 'White rust of Crucifers, Red Rot of Sugarcane, Wilting of Arhar, Mosaic diseases on tobacco and cucumber, yellow vein mosaic of bhindi; Citrus Canker, Little leaf of brinjal; Damping off of seedlings, Disease management: Quarantine, Chemical, Biological, Integrated pest disease management	8
VIII	Applied Microbiology Food fermentations and food produced by microbes, amino acids, Production of antibiotics, enzymes, vitamins, alcoholic beverages, organic acid & genetic recombinant vaccines. Mass production of bacterial biofertilizers, blue green algae, <i>Azolla</i> and <i>mycorrhiza</i> . Plant growth promoting rhizobacteria & biopesticides— <i>Trichoderma sp.</i> and <i>Pseudomonas</i> , Single cell proteins, Organic farming inputs, Microbiology of water, Biopolymers, Bioindicators, biosensors, Bioremediation, Production of biofuels, biodegradation of pollutants and biodeterioration of materials & Cultural Property.	8

Suggested Readings:

Course Books published in Hindi may be prescribed by the Universities.

1. वनस्पति विज्ञान (वनस्पति विज्ञान) वनस्पति, इतिहास व वर्गीकरण, वनस्पति विज्ञान, वनस्पति विज्ञान, वनस्पति विज्ञान, वनस्पति विज्ञान - वनस्पति विज्ञान : वनस्पति - वनस्पति, वनस्पति व वनस्पति विज्ञान : वनस्पति विज्ञान, वनस्पति विज्ञान
2. वनस्पति विज्ञान (वनस्पति विज्ञान) इतिहास व वर्गीकरण वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान vrd publisher 2019
3. वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान 2018 वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान
4. वनस्पति विज्ञान वनस्पति विज्ञान : वनस्पति विज्ञान वनस्पति विज्ञान 2012
5. वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान 2018. वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान
6. वनस्पति विज्ञान व 2020. वनस्पति विज्ञान वनस्पति विज्ञान, इतिहास व वर्गीकरण वनस्पति विज्ञान वनस्पति विज्ञान
7. वनस्पति विज्ञान वनस्पति 2020. वनस्पति विज्ञान : वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान वनस्पति विज्ञान
8. Microbiology Fundamental and Applications (hindi) (pb)
9. ISBN: 9788188826230 Edition: 03Year : 2016Author : Dr. Purohit SS , Dr. Deo Publisher : Student Edition Language : Hindi
10. वनस्पति विज्ञान वनस्पति विज्ञान -वनस्पति : Definitional Dictionary of Plant Pathology. Commission for Scientific and Technical Terminology.
11. Modern Microbiology (hindi) (hb) ISBN: 9788177543599Edition : 1Year : 2018Author : Dr. Purohit SS , Dr. Singh T Publisher : Agrobios (India)
12. Suggested books "Plant pathology by R.S. Mehrotra, Tata McGraw-Hill Education" are included in reading resources list

Unit-I A:

- <https://indianculture.gov.in/rarebooks/economic-botany-india>
https://www.infinityfoundation.com/mandala/t_es/t_es_tiwari_botany_frameset.htm
- https://www.researchgate.net/publication/335715457_Ancient_Indian_rishi's_Sages_knowledge_of_botany_and_medicinal_plants_since_Vedic_period_was_much_older_than_the_period_of_Theophrastus_A_case_study-who_was_the_actual_father_of_botany
- <https://www.scribd.com/presentation/81269920/Botany-of-Ancient-India>
- https://insa.nic.in/writereaddata/UploadedFiles/IJHS/Vol17_2_17_PKBhattacharyya.pdf

**CERTIFICATE COURSE IN MICROBIAL TECHNOLOGY & CLASSICAL BOTANY
OR
B.Sc.-I**

CERTIFICATE COURSE IN MICROBIAL TECHNOLOGY & CLASSICAL BOTANY / B.Sc.-I

Programme: <i>Certificate Course in Microbial Technology & Classical Botany</i>	Year: I	Semester: I/Paper-I
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Subject: **Botany**

Course Title: **Microbiology & Plant Pathology**

Course Code:
B040101T

- Course outcomes:** After the completion of the course the students will be able to:
1. Develop understanding about the classification and diversity of different microbes including viruses, Algae, Fungi & Lichens & their economic importance.
 2. Develop conceptual skill about identifying microbes, pathogens, biofertilizers & lichens.
 3. Gain knowledge about developing commercial enterprise of microbial products.
 4. Learn host-pathogen relationship and disease management.
 5. Learn Presentation skills (oral & writing) in life sciences by usage of computer & multimedia.
 6. Gain Knowledge about uses of microbes in various fields.
 7. Understand the structure and reproduction of certain selected bacteria algae, fungi and lichens
 8. Gain Knowledge about the economic values of this lower group of plant community.

Credits: 4

Core Compulsory

Max. Marks: 25+75

Min. Passing Marks:

Total No. of Lectures-Tutorials-Practical (in hours per week): 4-0-0

Unit	Topic	No. of Lectures (60 hrs)
I	<p>A. Introduction to Indian ancient, Vedic and heritage Botany and contribution of Indian Botanists, in context with the holistic development of modern science and technology, has to be taught, practiced and assessed via class interaction/ assignments / self-study mentioned under Continuous Internal Evaluation (CIE).</p> <p>B. Microbial Techniques & instrumentation Microscopy – Light, phase contrast, electron, scanning and transmission electron microscopy, staining techniques for light microscopy, sample preparation for electron microscopy. Common equipment of microbiology lab and principle of their working – autoclave, oven, laminar air flow, centrifuge. Colorimetry and spectrophotometry, immobilization methods, fermentation and fermenters.</p>	8
II	<p>Microbial world Cell structure of Eukaryotic and prokaryotic cells, Gram positive and Gram-negative bacteria, Structure of a bacteria; Bacterial Chemotaxis and Quorum sensing, Bacterial Growth curve, factors affecting growth of microbes; measurement of growth; Batch culture, fed batch culture and continuous culture; Synchronous growth of microbes; Sporulation and reproduction and recombination in bacteria. Viruses, general characteristics, viral culture, Structure of viruses, Bacteriophages, Structure of T4 & λ-phage; Lytic and Lysogenic cycles, viroid, Prions & mycoplasma & phytoplasma, Actinomycetes & plasmids and their economic uses.</p>	8
III	<p>Mycology General characteristics, nutrition, life cycle, Economic importance of Fungi, Classification upto class. Distinguishing characters of Myxomycota: General characters of Mastigomycotina, Zygomycota: <i>Rhizopus</i>, Ascomycota: <i>Saccharomyces</i>, <i>Penicillium</i>, <i>Peziza</i>. Basidiomycotina: <i>Ustilago</i>, <i>Puccinia</i>, <i>Agaricus</i>; Deuteromycotina: <i>Fusarium</i>, <i>Alternaria</i>. Heterothallism, Physiological specialization, Heterokaryosis & Parasexuality.</p>	8

	<p>Mushroom Cultivation, Lichenology & Mycorrhiza Mushroom cultivation. General account of lichens, reproduction and significance; <i>Mycorrhiza: ectomycorrhiza and endomycorrhiza</i> and their significance.</p>	8
	<p>Plant Pathology Disease concept, Symptoms, Etiology & causal complex, Primary and secondary inoculum, Infection, Pathogenicity and pathogenesis, Koch's Postulates. Mechanism of infection (Brief idea about Pre-penetration, Penetration and Post-penetration), Disease cycle (monocyclic, polycyclic and polyetic). Defense mechanism with special reference to Phytoalexin, Resistance- Systemic acquired and Induced systemic fungicides- Bordeaux mixture, Lime Sulphur, Tobacco decoction, Neem cake & oil</p>	8
VI	<p>Diseases and Control Symptoms, Causal organism, Disease cycle and Control measures of – Early & Late Blight of Potato, False Smut of Rice/ Brown spot of rice, Black Stem Rust of Wheat, <i>Alternaria</i> spot' and 'White rust of Crucifers, Red Rot of Sugarcane, Wilting of Arhar, Mosaic diseases on tobacco and cucumber, yellow vein mosaic of bhindi; Citrus Canker, Little leaf of brinjal; Damping off of seedlings, Disease management: Quarantine, Chemical, Biological, Integrated pest disease management</p>	10
VII	<p>Applied Microbiology Food fermentations and food produced by microbes, amino acids, Production of antibiotics, enzymes, vitamins, alcoholic beverages, organic acid & genetic recombinant vaccines. Mass production of bacterial biofertilizers, blue green algae, <i>Azolla</i> and <i>mycorrhiza</i>. Plant growth promoting rhizobacteria & biopesticides— <i>Trichoderma sp.</i> and <i>Pseudomonas</i>, Single cell proteins, Organic farming inputs, Microbiology of water, Biopolymers, Bioindicators, biosensors, Bioremediation, Production of biofuels, biodegradation of pollutants and biodeterioration of materials & Cultural Property.</p>	10

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Programme/Class: Certificate	Year: First	Semester: First
Subject: MICROBIOLOGY		
Course Code: B080101T	Course Title: General Microbiology	

Course Outcomes:

The student at the completion of the course will be able to:

- To understand the history, relevance of microbiology and classification of microbes.
- To learn and understand the microbial diversity in the living world.
- To understand the working of various microscopes and their applications.
- To gain knowledge of various (physical and chemical) methods of control of microorganisms and safety measures to be followed while handling microbes.
- To demonstrate and understanding of bacterial, fungal, cyanobacterial, algal, viral and rickettsial classification, culturing, reproduction and significance.
- To learn different methods of staining of microbes.
- To understand, learn and gain skill of isolation, culturing and maintenance of pure culture.
- To enable the students to get sufficient knowledge in principles and applications of bio-instruments.
- To help students gain knowledge about antibiotics and other chemotherapeutic agents.

Credits: 4	Core: Compulsory
Max. Marks: 25+75	Min. Passing marks: as per rules

Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0

Unit	Topics	Total No. of Lectures/ Hours (60)
I	Introduction, history and scope of Microbiology History, scope, branches of microbiology and relevance of microbiology; Contribution of Antony Van Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming, Ivanowsky, Waksman, Subba Rao, Sambhunath De; Position of microorganisms in the living world. 5 kingdom classification of Whittaker and 3 kingdom classification, comparison of the 3 domain of microorganisms- bacteria, archaea, eukarya; Bergey's manual and introduction to classification of bacteria.	8
II	Bacterial morphology Ultrastructure of bacterial cell, cell wall, plasma membrane, capsule, flagella, nucleoid, and reserve material. Differences between archaebacterial and eubacterial cell. General features of Rickettsia, Chlamydia, Mollicutes, Actinomycetes and Cynobacteria. The viruses General properties and structure of animal viruses: Influenza, HIV; plant viruses: TMV; bacterial viruses: Lambda Phage and T4 bacteriophage; general features of Prions and Viroids. Fungi General characteristics, classification & reproduction of Saccharomyces, Aspergillus. Protozoa General characteristics, classification & reproduction of Giardia, Entamoeba	10

III	Techniques in microbiology I Principles of microscopy, construction and application of- Compound Microscope (monocular and binocular), Bright field Microscopy, Dark field Microscopy, Phase Contrast Microscopy, Fluorescence Microscopy, Electron Microscopy- TEM and SEM	6
IV	Techniques in microbiology II Principles, construction and application of centrifuge, bacteriological Incubator & Incubator Shaker, Laminar flow, Colourimeter & Spectrophotometer (UV-Vis)	6
V	Sterilization techniques and control of microorganisms Definitions of terms- sterilization and disinfection; Sterilization by Physical methods- Use of moist heat- heat under pressure, autoclave, boiling, pasteurization, fractional sterilization, tyndallization, Use of dry heat- hot air oven, incineration; Filtration- Seitz filter, membrane filter, HEPA filter; Radiation- Ionizing and non- ionizing; Chemical methods- Alcohols, aldehydes, phenols, halogens, metallic salts, ethylene oxide.	7
VI	Isolation, cultivation and preservation of microorganisms Culture media and its types; Methods for enumeration & isolation of microorganisms using pour plate, spread plate technique, and streak plate; Isolation of anaerobic microorganisms; Maintenance and preservation of pure Culture	8
VII	Stains and staining techniques Staining techniques, principles, procedures and applications of Simple staining, negative staining; Differential staining- Gram's staining, acid fast staining, Leishman's staining, Giemsa's staining, Ziehl Neelsen staining; Structural staining- cell wall, capsule, endospore and flagella staining.	7
VIII	Biostatistics Introduction to biostatistics – definition statistical methods, biological measurement, kinds of biological data; Measure of central tendency – Mean, median, mode, standard deviation; Collection of data, sampling and sampling design, classification and tabulation, types of representation, graphic biodiagrams.	8

Suggested Readings:

- Alexopoulos C.J. and Mims C.W., Introductory Mycology, New Age International, New Delhi.
- Aneja K.R., Experiments in Microbiology, plant pathology, Tissue culture and Mushroom cultivation, New Age International, New Delhi.
- Atlas R.M., Microbiology- Fundamentals and applications, Macmillan Publishing Company, New York.
- Benson Harold J., Microbiological Applications, WCB Mcgraw-Hill, New York.
- Bold H.C. and Wynne M.J., Introduction to Algae, Prentice Hall of India Private Limited, New Delhi.
- Baveja C.P., Textbook of microbiology APC 6th edition.
- Dubey R.C. and Maheshwari D.K., Textbook of microbiology, S Chand Publications.
- Pelczar M.J., Chan E.C.S and Kreig N.R., Microbiology, Mcgraw-Hill Book Company, New York.
- Prescott Lansing M., Harley John P. and Klein Donald A., Microbiology, WCB Mcgraw- Hill, New

New

Shot with my Samsung Quad Camera Galaxy A12

Programme/Class: Certificate		Year: First	Semester: First
Subject: MICROBIOLOGY			
Course Code: B080101T		Course Title: General Microbiology	
Course Outcomes:			
The student at the completion of the course will be able to:			
<ul style="list-style-type: none"> • To understand the history, relevance of microbiology and classification of microbes. • To learn and understand the microbial diversity in the living world. • To understand the working of various microscopes and their applications. • To gain knowledge of various (physical and chemical) methods of control of microorganisms and safety measures to be followed while handling microbes. • To demonstrate and understanding of bacterial, fungal, cyanobacterial, algal, viral and rickettsial classification, culturing, reproduction and significance. • To learn different methods of staining of microbes. • To understand, learn and gain skill of isolation, culturing and maintenance of pure culture. • To enable the students to get sufficient knowledge in principles and applications of bio-instruments. • To help students gain knowledge about antibiotics and other chemotherapeutic agents. 			
Credits: 4		Core: Compulsory	
Max. Marks: 25+75		Min. Passing marks: as per rules	
Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0			
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