Board of Studies Meeting Dept.of Microbiology

SEMESTER PATTERN (CBCS)

w.e.f.

THE ACADEMIC YEAR 2017-2018

SRR & CVR GOVERNMENT DEGREE COLLEGE (AUTONOMOUS)

Vijayawada 520004

SRR & CVR GOVERNMENT DEGREE COLLEGE (AUTONOMOUS)
Vijayawada 520004
Minutes of the meeting of the Board of Studies in the subject of

MICROBIOLOGY

The meeting of the Board of Studies in the subject of Microbiology was held on 20th March 2018 in Dept. of Microbiology Laboratory, SRR & CVR Govt . Degree College (Autonomous), Vijayawada 520004.

The following members attended the meeting:

LIST OF BOS MEMBERS

S.NO	NAME	QUALIFICATION	DESIGNATION	ADDRESS
1.	Mrs.D.Jyothi	M.Sc,B.Ed	Chairman	I/c. Dept. of Microbiology SRR&CVR GDC (Autonomous),
2.	Dr. P.V.Brahmachari	M.Sc, Ph.D	University Nominee	HOD, Dept. of Biotechnology, Krishna University Machilipatnam.
3.	Dr.k.Sucharita	M.Sc, , Ph.D	Subject Expert	I/c. Dept. of Microbiology GDC for Women(A)
4.	Mrs.K.Aruna	M.Sc, Ph.D	Subject Expert	Lecturer in Microbiology ASD GDC, Kakinada

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AGENDA FOR BOS MEETING

Type of meeting: Board Of Studies meeting in Microbiology subject.

Facilitator & Note Taker: Mrs.D.Jyothi , i/c Dept. of Microbiology ,SRR&CVR GDC,Vijayawada

Attendees: **BOS** Members.

Time & Date: 2 PM on 20th April 2017, Thursday

Location: To be held at Dept. of Microbiology, SRR&CVR GDC

Agenda Items:

Item 1: Approval of syllabus for Semester I and II for the academic year 2017-18

Item 2: Approval of, blue print and model question paper for Semester Exams.

Item 3: Approval for Internal assessment component, Minimum marks in internal assessment

RESOLUTIONS

The Chairperson, Board of Studies welcomed the members and initiated discussion to evaluate the microbiology syllabus prescribed by affiliating University for I and II semesters for suitability to adopt in the Autonomy mode.She apprised the members of the guidelines of the UGC and the CCE regarding the framing of syllabus, and the recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

Resolutions:

1. Resolved to adopt the present University CBCS syllabus of Microbiology for semester I and II, with minor modifications as suggested.
2. Resolved to approve the division of marks for internal and external examination along with the suggested blue print and model paper.
3. Resolved to approve the list of paper setters and examiners submitted by the department

S.No	Name	Designation	SIGNATURE
1.	Mrs.D.Jyothi	Chairman	D. Jyothi 20/4/17
2.	Dr. P.V.Bramhachari	University Nominee	20/4/17
3.	Dr. K.Aruna	Subject Expert	
4.	Dr.K.Sucharita	Subject Expert	
5	Sri.J.S.Rama Prasad	Member	20/4/17

Principal

SRR & CVR GOVT. DEGREE COLLEGE
(Autonomous)

PHONE NO : 0866-2430060
FAX NO : 0866-2441002

NAAC : B+ (III Cycle with CGPA : 2.80) - Estd: 1937
ISO 9001 - 2015 Certified
Institution is ranked by NIRF in 151 - 200 band at NIRF - 2019

WEBSITE : www.srrcvr.org
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BOARD OF STUDIES MEETING

(2017-2018)

20th April 2017

I B.Sc Microbiology

(With Effect from Admitted Batch 2017-2018)

DEPARTMENT OF MICROBIOLOGY

Programme Code: 313

PREFACE

SRR & CVR Govt. Degree College (A), Vijayawada, is one of the prestigious educational institutions, located in Vijayawada in Krishna District, Andhra Pradesh. Vijayawada is a place of historical and cultural significance and importance. In the same way SRR & CVR Govt. Degree College, has also acquired its significance and prominence in and around Vijayawada by molding the lives of many students to become great personalities. This college is named after late Sri Raja Rangayyappa Rao and late Sri Chunduru Venkata Reddy, who have been great and noble donors of the city Vijayawada, by whose generosity the college has reached and attained such and this elevated status by way of shaping the lives of many generations of students making them worthy citizens of the country. This college has acquired great standards academically by the contributions of great teachers as well because in the history of any educational institution its teachers play a vital role. The college was established in 1937. It offers 27 undergraduate and 10 post graduate academic programmers with 86 regular faculty members. The college has total strength of around 2,800 students. Which includes 1550 boys and 650 girl students at present. The institution was accredited with grade B+ with C.G.P.A 2.6 during 2017 by NAAC.

The Department of Microbiology was established in the Academic Year 1998-99 when restructured courses were first established in selected Government Colleges. Now Department has offering UG programme Microbiology with allied subjects Biochemistry and Chemistry has sanctioned strength of 30 students. At present the Microbiology laboratory is fully equipped with instruments such as microscopes, laminar air flow, oven, incubator, refrigerator, and sufficient glassware. The department is fully furnished. The department has its own library with books in microbiology both of Indian and foreign authors. The Department is giving importance to the student centric & skill oriented programmes.

DETAILS OF COURSE TITLES & CREDITS

SEM	Course Code	Title of the Course	Course type (T/L)	Hrs./ Week (Science: 4+2)	Credits (Science: 4+2)	Max. Marks Internal	Max. Marks Sem-end Exam	Total Marks
I	MB - 1324	INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY	T	4	4	40	60	100
	MB - 1324 P	INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY	L	2	2	25	25	50
II	MB - 2324	MICROBIAL BIOCHEMISTRY AND METABOLISM	T	4	4	40	60	100
	MB - 2324 P	MICROBIAL BIOCHEMISTRY AND METABOLISM	L	2	2	25	25	50

Note: *Course type code: T: Theory, L: Lab

SRR &CVR GOVT DEGREE COLLEGE (A) VIJAYAWADA: 520004
KRISHNA DISTRICT: ANDHRA PRADESH

DEPARTMENT OF MICROBIOLOGY

B.Sc Microbiology (MBC &MBF) Programme Objectives and Outcomes

Aim and objectives of UG program BSc Microbiology:

The programme BSc Microbiology introduces students to the vast array of microbes *VIZ* bacteria, archaea, viruses, fungi and protozoa around us, their diversity and applications. The programme has a strong practical emphasis, providing students with the basic laboratory skills required for a career in either applied or research microbiology.

Programme outcome

Graduates will acquire adequate knowledge and basic laboratory skills required for career in either applied or research microbiology

Programme specific outcomes

Microbiology students who graduate with a Bachelor of Science with Microbiology will

PSO1: Acquire knowledge on fundamentals of Microbiology, expertise in pure culture techniques & preservation of cultures and understand microbial physiology and biochemistry

PSO2: Gain insight into the various aspects of Microbial Genetics and r DNA technology.

PSO3: Grasp the fundamental concepts of immunity, immune response and epidemiology of microbial diseases. Demonstrate on collection and handling of laboratory specimens.

PSO4: Understand the role of microbes in nutrient recycling, sustainable agriculture culture, Microbial spoilage of food, principles of food preservation and Microbial production of Industrial products.

PSO5: Realize the application-oriented aspects of Microbiology and significance of Intellectual Property Rights

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA
B.Sc MICROBIOLGY (CBSC) SYLLABUS
(With Effect from Admitted Batch 2017-2018)

BSc	MICROBIOLOGY (Semester: I)	Credits: 4
MB -1324	INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY	Hrs/Wk: 4

Aim and objectives of Course

To understand History & Development of Microbiology, Microscopy, staining and sterilization techniques, Ultra-structure of cell, Different methods of microbial characterization

To study nature of viruses, viral classification, cultivation of viruses and Type study of TMV & HIV

Learning outcomes of Course (COs)

Up on completion of the course students able to

CO1: Students will be able to illustrate the contributions made by the prominent Scientists for development of Microbiology

CO2: Students will able to differentiate a large number of bacteria by their salient characteristics

CO3: Perform pure culture techniques and techniques for preservation and maintenance of stock cultures

CO4: Understand Principles of Microscopy, handling and uses of microscopes

CO5: Analyse various techniques used for Sterilization and Disinfection techniques.

UNIT-I **No. of hours: 12**

History and mile stones in microbiology.
Contributions of Anton von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Ivanowsky and Winogradsky.
Importance and applications of microbiology.
Classification of microorganisms – Haeckel's three Kingdom concept, Whittaker's five kingdom concept, three domain concept of Carl Woese.
Outline classification of bacteria as per the second edition of Bergey's Manual of Systematic Bacteriology.

UNIT – II **No. of hours: 10**

General characteristics of Bacteria, Archaea, Mycoplasmas and Cyanobacteria.
Ultra structure of Prokaryotic cell- Variant components and invariant components.
General characteristics of viruses.
Morphology, Structure and replication of TMV and HIV.

UNIT-III **No. of hours: 10**

General characteristics and outline classification of Fungi, Algae and Protozoa.
Principles of microscopy - Bright field and Electron microscopy (SEM and TEM).

UNIT-IV **No. of hours: 8**

Staining Techniques –Simple and Differential (Gram Staining and Spore Staining).
Sterilization and disinfection techniques - Physical methods – autoclave, hot- air oven, pressure

cooker, laminar air flow, filter sterilization, Radiation methods – UV rays, Gamma rays and ultra sonic methods.
Chemical methods – alcohols, aldehydes, fumigants, phenols, halogens, heavy metals, quaternary ammonium compounds and hypochlorites.

UNIT –V **No. of hours: 8**

Isolation of Microorganisms from natural habitats.
Pure culture techiques – dilution-plating, Streak-plate, Spread-plate, Pour-Plate and micromanipulator. Enrichment culturing.
Preservation of microbial cultures – subculturing, overlaying cultures with mineral oils, lyophilization, sand cultures, storage at low temperature.

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Additional Inputs:

In unit-I: Contributions of Paul Ehrlich

In Unit –V: Heavy metals under chemical methods of sterilization

MB N-1324 P: INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY

TOTAL HOURS: 30 **CREDITS: 2**

1. Microbiology Good Laboratory Practices and Biosafety.
2. Preparation of culture media for cultivation of bacteria- Nutrient broth & Nutrient agar
3. Preparation of culture media for cultivation of fungi – Sabourauds agar
4. Sterilization of medium using Autoclave
5. Sterilization of glassware using Hot Air Oven
6. Light compound microscope and its handling
7. Microscopic observation of bacteria (Gram +ve bacilli and cocci, Gram -ve bacilli), Algae and Fungi.
8. Simple staining
9. Gram's staining
10. Hanging-drop method& temporary wet mount (TWM) for observation of living microrganisms.
11. Isolation of pure cultures of bacteria by serial dilution and Streak/Spread/Pour Plate Method.
12. Preservation of bacterial cultures by Serial subculturing & Slant Preparation with mineral oil overlay.
13. Observation of electron micrographs of bacterial cells

Recommended Text Books &Reference books:

Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. (1993). Microbiology. 5th Edition, Tata McGraw Hill Publishing Co., Ltd., New Delhi.

Dube, R.C. and Maheswari, D.K. (2000) General Microbiology. S Chand, New Delhi. Edition), Himalaya Publishing House, Mumbai.
Power, C.B. and Daginawala, H.F. (1986). General Microbiology Vol I & II

Prescott, M.J., Harley, J.P. and Klein, D.A. (2012). Microbiology. 5th Edition, WCB McGrawHill, New York.

Reddy, S.M. and Reddy, S.R. (1998). Microbiology Practical Manual, 3 rd Edition, Sri Padmavathi Publications, Hyderabad.

Singh, R.P. (2007). General Microbiology. Kalyani Publishers, New Delhi.

Stanier, R.Y., Adelberg, E.A. and Ingram, J.L. (1991). General Microbiology, 5th Ed., Prentice Hall of India Pvt. Ltd., New Delhi.

Microbiology Edited by Prescott
Jaya Babu (2006). Practical Manual on Microbial Metabolisms and General Microbiology. Kalyani Publishers, New Delhi.

Gopal Reddy *et al.*, Laboratory Experiments in Microbiology

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA
B.Sc MICROBIOLGY (CBSC) SYLLABUS
(With Effect from Admitted Batch 2017-2018)

BSc	MICROBIOLOGY (Semester: II)	Credits: 4
MB -2324	MICROBIAL BIOCHEMISTRY AND METABOLISM	Total hours:50

Aim and objectives of Course

To understand different bio molecular, bacterial nutrition, bacterial growth and metabolism

Learning outcomes of Course (COs)

Up on completion of this course students should able to:

CO1: Students able to describe the nutritional forms of bacteria and bacterial growth kinetics and methods to measure bacterial growth

CO2: Students will understand bacterial respiration, metabolism, photosynthesis and fermentations

CO3: Knowledge on classification of carbohydrates as structural and storage components, Classification of lipids and amino acids

CO4: Students will able to understand structure and functions of nucleic acids

CO5: Students will able to understand enzyme catalysis and kinetics

UNIT-I **No. of hours: 10**

Outline classification and general characteristics of carbohydrates (monosaccharides, disaccharides and polysaccharides).
General characteristics of amino acids and proteins.
Structure of nitrogenous bases, nucleotides
Fatty acids (saturated and unsaturated)
lipids (spingolipds, sterols and phospholipids).

UNIT-II **No. of hours: 8**

Principle and applications of -Colorimerty
Chromatography (paper and thin-layer)
Spectrophotometry (UV & visible),

UNIT-III **No. of hours: 10**

Properties and classification of Enzymes.
Biocatalysis- induced fit and lock and key models.
Coenzymes and Cofactors.
Factors affecting catalytic activity.
Inhibition of enzyme activity- competitive, noncompetitive, uncompetitive and allosteric.

UNIT-IV **No. of hours: 10**

Microbial Nutrition –Nutritional requirements and uptake of nutrients by cells.
Nutritional groups of microcroorganisms- autotrophs, heterotrophs, mixotrophs.
Growth media- synthetic, complex, selective, enrichment and differential media.
Microbial Growth- different phases of growth in batch cultures, Synchronous, continuous, biphasic growth.
Factors influencing microbial growth.
Methods for measuring microbial growth – Direct microscopy, viable count estimates, turbiodometry and biomass.

UNIT-V **No. of hours: 10**

Aerobic respiration -Glycolysis, HMP path way, ED path way, TCA cycle, Electron transport, oxidative and substrate level phosphorylation.
Anaerobic respiration (Nitrate).
Fermentation - Alcohol and lactic acid fermentations.
Outlines of oxygenic and anoxygenic photosynthesis in bacteria.

Additional Inputs

Unit-V: Glyoxilate pathway and its significance

MB -2324 P: MICROBIALBIOCHEMISTRY AND METABOLISM

TOTAL HOURS: 38 **CREDITS: 2**

1. Qualitative Analysis of Carbohydrates
2. Qualitative Analysis of Aminoacids
3. Colorimetric estimation DNA by diphenylamine method
4. Colorimetric estimation of proteins by Biuret/Lowry method
5. Paper chromatographic separation of sugars and amino acids
6. Preparation of different media- Synthetic and Complex Media
7. Setting and observation of Winogradsky column.
8. Estimation of CFU count by spread plate method/pour plate method.
9. Bacterial growth curve.
10. Factors affecting bacterial growth – pH.
11. Factors affecting bacterial growth – Temperature.
12. Factors affecting bacterial growth –Salts

SUGGESTED READING:

Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H.Freeman and Company

Caldwell, D.R. (1995). Microbial Physiology and Metabolism, W.C. Brown Publications, Iowa, USA.

Lehninger, A.L., Nelson, D.L. and Cox, M.M. (1993). Principles of Biochemistry, 2 nd Edition, CBS Publishers and Distributors, New Delhi.

Sashidhara Rao, B. and Deshpande, V. (2007). Experimental Biochemistry: A student Companion. I.K. International Pvt. Ltd.

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA

Practical Examination pattern for Semester End Examinations

Practical examination in Department of MICROBIOLOGY is held before end of semester exams twice in a year to test practical skills among the students.

Total marks allotted for practical are **50** marks which are divided as 25 for internal and 25 for external for the duration of **two** hours in each semester

The division of marks is as follows

External

Major Experiment	Minor Experiment	To identify the instrument to give the working principle	Record	Viva-Voce
8 Marks	4 Marks	2 X 2 ½ =5 Marks	5Marks	3Marks

Internal

Record	Project viva	Continuous assessment
10 Marks	10 Marks	5 Marks

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA

Student Evaluation Policy and Procedure

1. EVALUATION POLICY AND PROCEDURE

Students are evaluated for 100 marks in each course. These 100 Marks are spitted into Continuous Internal Assessment (CIA) and Semester End Evaluation (SEE). 40 marks are allocated to CIA and 60 marks for SEE.

CONTINUOUS INTERNAL ASSESSMENT (CIA) FOR 40 MARKS

Out of a maximum of 100 marks in each theory paper, 40 marks shall normally be allotted for continuous internal assessment. The Assessment shall be made by the teacher handling that paper in the manner prescribed here under. Where the same paper is handled by two or more teachers, the Head of the Department shall decide upon the teacher, who shall make the internal assessment or fix the proportion of the marks among the teachers for the internal assessment of the students.

Out of these 40 marks, 10 marks are allotted to Continuous Internal Exams. Two Continuous Internal exams are conducted for 20 marks in each exam and the average of these two exams scale down to 10 marks shall be deemed as the marks obtained by the student in Continuous Internal Exams.

Out of these 40 marks, 10 marks are allotted to Assignments. Two assignments are given to the students during the course. 5 marks are allotted for each assignment and total of these two assignments are included in Continuous Internal Assessment.

Out of these 40 marks, 10 marks are allotted to Project Work/ Group Discussion. Students will be assigned student study project for 10 Marks under CIA. Then the student has to submit a project report under the supervision of Faculty Member. These 10 marks may also be assigned to group discussion also. Student will be evaluated here based on his/her way of expression, conceptual strength, attitude, listening -understanding skills and level of participation in the discussion.

Out of these 40 marks, 5 marks are allotted to Student Seminar and 5 marks for Viva-Voce. Each Student may give student seminar to the peer team. This student seminar will carry 5 marks. Here feedback will be collected on 5 points scale from the participants in the student seminar [or] Viva- Voce will be conducted by the concerned subject faculty for 5marks.

The summarized continuous internal assessment is

1. Average of Two Continuous Internal exams	**-**	**10 Marks**
2. Total of Two Assignments	**-**	**10 Marks**

3. Project Work/Group Discussion	**-**	**10 Marks**
4. Student Seminar	**-**	**5 Marks**
5. Feedback/Viva-Voce	**-**	**5 Marks**

1.2 CIA IN PROJECT WORK AND COMPREHENSIVESEMINAR

Each student has to conduct Industry/Laboratory oriented Research work in his/her interested area and has to prepare Project Report by using either primary data or secondary data. This is different from student study project. It is research oriented Industrial/laboratory project conducted under the supervision of Faculty Member of the department. The students have to submit the project work report to the supervision of Faculty at the end of VI Semester End Evaluation process. After submitting project work report, the students have to give Comprehensive Seminar by explaining their research in the industry/Lab. Project Work carries 40 Marks and Comprehensive Seminar carries 10 Marks.

Every student is required, to take every test for Continuous internal Assessment, unless he/she is permitted by the Principal to write at a later date on valid reasons, before the test is conducted. In case where permission is not obtained, the decision of the Principal to hold or not to hold separate examination for such candidate is final.

Permission to write Internal Assessment test at the end of corresponding Semester – end exams may be given on medical grounds and other valid grounds. For such candidates, test/s is/are conducted by the faculty member concerned in consultation with the Head of the Department with a different question paper.

The Student has to get minimum 40 per cent (16 Marks) marks in the Continuous Internal Assessment to complete the Course Paper.

Suggestive Question paper pattern for CIA/SEE (Based on Bloom Taxonomy)

Though the faculty concerned is empowered to adopt their own pattern for question paper, a general and suggestive model for question paper is given below based on Blooms Taxonomy.

S. No	Learning Objective	Percentage of Marks
1	Memory based (Remember)	10
2	Understand (Comprehension)	10
3	Application	15
4	Analysis	15
5	Evaluation	25
6	Creativity	25
Total		**100**