

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

DEPARTMENT OF BIOTECHNOLOGY

BOARD OF STUDIES MEETING

FOR

I & II SEMESTERS OF 2025-2026 ADMITTED BATCH



Permanently Affiliated to Andhra University



SPACES DEGREE COLLEGE(AUTONOMOUS), PAYAKARAOPETA

DEPARTMENT OF BIOTECHNOLOGY

BOARD OF STUDIES MEETING – 2025-2026 AY

S. No	Content
1.	BOS Proceedings
2.	Biotechnology – Board of Studies Members
3.	Invitation to Board of Studies members
4.	Agenda
5.	Resolutions
6.	Annexure -1: Course curriculum frame work for I and II Semesters
7.	Annexure -2: Changes in the syllabus and Approved syllabus copy for I & II Semesters
8.	Annexure -3: Evaluation Pattern
9.	Annexure -4: Blue print & Model Question paper – Mid-term Exams
10.	Annexure -5: Blue print & Model Question paper – Semester End Exam
11.	Annexure – 6: List of Question paper Setters & Examiners

PROCEEDINGS OF THE PRINCIPAL
SPACES DEGREE COLLEGE (Autonomous), PAYAKARAOPETA
BoS Meetings for the 2025-2026 AY

Procs. No : R.C. No:2 /SPACES/A.C/BOS

Date: 13-10-2025

Sub: SPACES Degree College (A), Payakaraopeta – Academic Council – Conduct of BOS Meetings for the Academic Year 2025-2026- Guidelines issued – Regarding.

ORDER: -

The autonomous colleges, in alignment with their vision, mission, stated objectives, and core values, are mandated to design and develop their own outcome-based curricula. This must be done with due consideration for societal, local, and global industry requirements, employability, and the development of industry-ready and transferable skills. Accordingly, every programme shall prescribe Course Outcomes (COs), Programme Outcomes (POs), and Programme Specific Outcomes (PSOs) along with a suitable learning outcome assessment management system, supported by a robust and transparent evaluation mechanism to measure attainment levels among students.

Further, the A.P. State Council of Higher Education (APSCHE) has introduced a revised curricular framework effective from the Academic Year 2025-26, incorporating Skill Enhancement Courses, Multi-Disciplinary courses, the Indian Knowledge System and a revised credit structure.

In light of the above responsibilities prescribed by the institution's vision and mission, NEP-2020, and the APSCHE's revised and new UG curricular framework, it is imperative to customize, design, and re-orient our academic and research activities to meet the expectations of students, industries, and government stakeholders.

Accordingly, the Chairpersons of the U.G Boards of Studies (BoS) of various departments are hereby requested to make necessary arrangements to convene their BOS meetings before 25 October 2025. The Chairpersons are further instructed to:

1. Prepare the curricula and extracurricular activities for the Academic Year 2025–26 in line with the institution's vision, mission, NEP-2020, and APSCHE norms.
2. Devise an appropriate evaluation system to ensure effective learning outcomes and holistic student development.
3. Ensure that the curriculum design includes 20% revision of the syllabus each year without deviating from the APSCHE prescribed syllabus.
4. If the syllabus is not prescribed by APSCHE/Affiliating University, then the syllabus is to be framed by the BOS committee concerned with duly following the mandate prescribed above.
5. Engage stakeholders viz employers, parents, and alumni, to obtain feedback on the existing curricula and to invite suggestions for improvements.
6. Invite the University nominee, subject experts, industry representatives, student representatives, well in advance. The meeting notice shall clearly specify the date, venue, and agenda, and a soft copy of the agenda and relevant documents shall be circulated for their perusal.
7. Ensure that the subject experts invited preferably hold a Doctorate with at least 10 years teaching experience and have relevant expertise in designing industry-related, market- and job-of oriented curricula.
8. Facilitate thorough deliberations on curriculum design, evaluation methods, incorporation of research components, measures to enhance learning experiences, and optimal utilization of existing human, physical, and ICT resources.
9. Conduct all BOS meetings in offline mode. Online participation shall be permitted only under exceptional circumstances.
10. Prescribe benchmarking and quality initiatives in pedagogy and learning, including strategies for curriculum design and teaching-learning processes, in collaboration with the IQAC Coordinator, prior to the BOS meeting.
11. Ensure that a minimum student attendance of 75% shall be required for eligibility to appear for I & II Mid-Term Examinations under the CIA component; this shall be formally approved in the BoS meeting.
12. Semester End theory examinations will be conducted for 75 marks and 25 marks will be allocated for internal marks. Practical exams will be conducted for 50 Marks

13. Approve any new Certificate courses/ Addon programmes to be introduced for the Academic Year 2025–26, the number and frequency of certificate courses, and SWAYAM MOOCs courses.
14. Submit the approved BOS copies in the prescribed format, in quadruplicate (hard copies) to the Academic Cell for onward submission to the IQAC, Examination Cell, and Library, within three days of the meeting and upload the soft copy in their respective department web pages in the college website.
15. Ensure strict alignment of all recommendations and curriculum changes with the institution's vision and mission.
16. Submit a request to receive advance funds from the Examination cell through Principal for conducting BoS meetings.

The details of honorarium to be paid to the University Nominee and Subject Experts attending the Board of Studies (BOS) meeting are as follows:

UG BOS for AY 2025-26:

S. NO	DESIGNATION	HONORARIUM (RS)	TA
1	University Nominee	4000/-	1000/-
2	Subject Expert	1000/-	500/-
3	Industrialist	1000/-	500/-

Following contents shall be presented in the BOS document in the order

1. Proceedings of the Principal pertaining to BOS
2. Composition of BOS
3. Agenda.
5. Table showing the Allocation of Credits in the following table for both theory and Practical's in case of science subjects.
6. Resolutions adopted in the meeting with detailed discussion that took place during the meeting.

7.Each BOS Chairman shall, immediately after syllabus, tabulate the changes made in the syllabus/ paper along with justification.

8.Attendance of Members present with signatures in the tabular form.

9.List of Examiners & Paper setters

10.Syllabus for each course (both theory & Practical in case of Science subjects) followed by model question papers (theory & practical) and allocation of CIA (50marks) for each course with structure.

CIA structure for Single Major system:

Allotment of Internal marks (25) is followed based on the criteria:

1. Two mid Examinations will be conducted per each semester. Each mid exam will be conducted per 50 marks and scaled down to 10 marks
2. 5 marks will be allotted for student seminar and assignment.

S. No	Examination	Marks	Scaled down
1	Mid -1	50	10
2	Mid -2	50	10
3	Seminar,Assignments&Attendance	-	10

Mid examination to be conducted in offline mode in which the student should attempt 3 Essay Questions out of 6 Questions and 4 short answer questions out of 7 questions. Each essay question carries 10 marks and short answer question carries 5 marks. First mid exam will be conducted for first 2 unites and second mid exam will be conducted for next 2 units.

Section	Category	Marks for each Question	Questions to be given	Questions to be answered	Total Marks
A	Essay Questions	10	6	3	30 M
B	Short Answer Questions	5	7	4	20
Total	-	-	13 Questions	7	50 M

The Chair persons of all Board of Studies are hereby instructed to comply with these directives in letter and spirit to ensure the highest standards of academic and administrative excellence.

Principal



A.R. 16.02.2024
PRINCIPAL
 SPACES DEGREE COLLEGE
 PAYAKARAOPETA

Copy to:

1. Dean
2. BOS Chairpersons of all the departments
3. IQAC Coordinator
4. Controller of Examinations
5. Office.

**PROCEEDINGS OF THE PRINCIPAL, SPACES DEGREE COLLEGE (AUTONOMOUS),
PAYAKARAOPETA**

R.C. NO:1 /A.C/BOS/Members Nomination

dated: 03-10-2025

Sub: SPACES Degree College (Autonomous), Payakaraopeta- UG Board of Studies (BOS)-
Nomination of Members – Orders Issued.

Ref: UG Guidelines for Autonomous Colleges (2018).

ORDER:

The Principal, SPACES Degree College (Autonomous), Payakaraopeta is pleased to constitute UG Board of studies in Biotechnology for Framing the syllabi in Biotechnology subject for I and II semesters of 2025-26 Admitted Batch duly following the norms of the UGC Autonomous guidelines.

S. No	Category of the Member	Name of the Member	Designation
1	University Nominee	Prof. V. Lakshmi	Department of Biotechnology, Andhra University, Visakhapatnam.
2.	Representative from Industry	Sri K. Siva Balan	Sanvira Biosciences Pvt. Ltd. Chatametta, Atchuthapuram, Visakhapatnam.
3.	Subject Expert-1	Mrs. K. Sai Sudha	Asst. Professor, Department of Biotechnology, Govt. College for Women(A), Guntur.
4.	Subject Expert-2	Sri. G. Praveen Chakravarthi	Lecturer, Department of Biotechnology, P.R Govt. College (A), Kakinada
5.	Member	A. Akshitha	Lecturer, Department of Biotechnology, SPACES Degree College(A), Payakaraopeta
6.	Student Alumni	D. Srinivas	-
7.	BOS Chairman	Dr. A.R.K Reddy	HOD, Biotechnology, SPACES Degree College(A), P.R Peta

The above members are requested to attend the BoS meeting on 21-10-2025 and share their valuable reviews, and suggestions on the following functionaries.

•Prepare and review the syllabi for the subject keeping in line of APSCHE and Affiliating University and interest of the stake holders for consideration and approval of the IQAC and Academic Council.

- Suggested methodologies for innovative teaching and evaluation techniques.
- Suggest the panel of Names to the academic council for appointment of Examiners.
- Coordinate research, teaching, extension and other activities in the Department.



A. R. K. Reddy
PRINCIPAL
SPACES DEGREE COLLEGE
PAYAKARAOPETA



SPACES
Degree College
AUTONOMOUS

Accredited by NAAC with 'A' Grade
Permanently affiliated to Andhra University
Approved by AICTE, New Delhi
Under the management of Sri Prakash Educational Society, Tuni



Dt: 18-10-25

To

Prof. V. Lakshmi
Department of Biotechnology,
College of Science and Technology,
Andhra University,
Visakhapatnam.

Respected Madam,

Sub: Meeting of Board of Studies on 21-10-2025

Ref: 1. 1) No. F.2 -10/2025 (AC Policy) dated 27-05-2025 of Deputy Secretary, UGC,
New Delhi.

2) No.C (1) Conferment of Autonomous / SPACES/ 2025dated 01-07-25 of the
Vice- Chancellor, Andhra University, Visakhapatnam.

We are happy to inform you, that you have been nominated as the University Nominee by Andhra University to the Board of Studies in Biotechnology at SPACES Degree College (Autonomous), Payakaraopeta.

The meeting of Board of Studies, Department of Biotechnology is scheduled to be held on 21-10-2025-at 12:00 Noon Through online mode. We request you to kindly make it convenient to participate in the meeting and contribute your valuable expertise.

We would be obelized if you acknowledge this letter at the earliest to confirm your participation in the meeting.

Thanking you

Yours faithfully



A. R. S. Reddy
PRINCIPAL
SPACES DEGREE COLLEGE
PAYAKARAOPETA

Sri Prakash Academy of Computers, Electronics & Sciences



SPACES
Degree College
AUTONOMOUS

Accredited by NAAC with 'A' Grade
Permanently affiliated to Andhra University
Approved by AICTE, New Delhi
Under the management of Sri Prakash Educational Society, Tuni



Dt: 18-10-25

To

Sri. K. Sivabalan,
Chief Technology and Operating Officer (CTOO),
Sanvira Biosciences Pvt. Ltd.
Chatametta Village,
Atchuthapuram

Respected Sir,

Sub: Meeting of Board of Studies on 21-10-2025

Ref: 1. 1) No. F.2 -10/2025 (AC Policy) dated 27-05-2025 of Deputy Secretary, UGC,
New Delhi.

2) No.C (1) Conferment of Autonomous / SPACES/ 2025dated 01-07-25 of the
Vice- Chancellor, Andhra University, Visakhapatnam.

We are happy to inform you, that you have been nominated as the Member from Industrial Sector to the Board of Studies in Biotechnology at SPACES Degree College (Autonomous), Payakaraopeta.

The meeting of Board of Studies, Department of Biotechnology is scheduled to be held on 21-10-2025 at 12:00 noon Through online mode. We request you to kindly make it convenient to participate in the meeting and contribute your valuable expertise.

We would be obelized if you acknowledge this letter at the earliest to confirm your participation in the meeting.

Thanking you



A. R. S. Reddy
PRINCIPAL
SPACES DEGREE COLLEGE
PAYAKARAOPETA

Sri Prakash Academy of Computers, Electronics & Sciences



SPACES
Degree College
AUTONOMOUS

Accredited by NAAC with 'A' Grade
Permanently affiliated to Andhra University
Approved by AICTE, New Delhi
Under the management of Sri Prakash Educational Society, Tuni



Dt: 18-10-25

To

K. Sai Sudha,
Asst. Professor,
Department of Biotechnology
Govt. College for women(A)
Guntur

Respected Madam,

Sub: Meeting of Board of Studies on 21-10-2025

Ref: 1. 1) No. F.2 -10/2025 (AC Policy) dated 27-05-2025 of Deputy Secretary, UGC,
New Delhi.

2) No.C (1) Conferment of Autonomous / SPACES/ 2025dated 01-07-25 of the
Vice- Chancellor, Andhra University, Visakhapatnam.

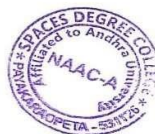
We are happy to inform you, that you have been nominated as the University Nominee by Andhra University to the Board of Studies in Biotechnology at SPACES Degree College (Autonomous), Payakaraopeta.

The meeting of Board of Studies, Department of Biotechnology is scheduled to be held on 21-10-2025-at 12:00 Noon through online mode. We request you to kindly make it convenient to participate in the meeting and contribute your valuable expertise.

We would be obelized if you acknowledge this letter at the earliest to confirm your participation in the meeting.

Thanking you

Yours faithfully



A. R. G. Reddy
PRINCIPAL
SPACES DEGREE COLLEGE
PAYAKARAOPETA

Sri Prakash Academy of Computers, Electronics & Sciences



SPACES
Degree College
AUTONOMOUS

Accredited by NAAC with 'A' Grade
Permanently affiliated to Andhra University
Approved by AICTE, New Delhi
Under the management of Sri Prakash Educational Society, Tuni



Dt: 18-10-25

To

G. Praveen Chakravarthi,
Lecturer In Biotechnology,
P.R Govt. Degree College (A),
Kakinada.

Respected Madam,

Sub: Meeting of Board of Studies on 21-10-2025

Ref: 1. 1) No. F.2 -10/2025 (AC Policy) dated 27-05-2025 of Deputy Secretary, UGC,
New Delhi.

2) No.C (1) Conferment of Autonomous / SPACES/ 2025dated 01-07-25 of the
Vice- Chancellor, Andhra University, Visakhapatnam.

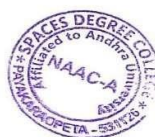
We are happy to inform you, that you have been nominated as the University Nominee by Andhra University to the Board of Studies in Biotechnology at SPACES Degree College (Autonomous), Payakaraopeta.

The meeting of Board of Studies, Department of Biotechnology is scheduled to be held on 21-10-2025-at 12:00 Noon through online mode. We request you to kindly make it convenient to participate in the meeting and contribute your valuable expertise.

We would be obelized if you acknowledge this letter at the earliest to confirm your participation in the meeting.

Thanking you

Yours faithfully



A. R. S. Reddy
PRINCIPAL
SPACES DEGREE COLLEGE
PAYAKARAOPETA

Sri Prakash Academy of Computers, Electronics & Sciences



SPACES
Degree College
AUTONOMOUS

Accredited by NAAC with 'A' Grade
Permanently affiliated to Andhra University
Approved by AICTE, New Delhi
Under the management of Sri Prakash Educational Society, Tuni



Dt: 18-10-25

To

Sri D. Srinivas,
Research Scholar,
University Of Hyderabad,
Hyderabad

Respected Madam,

Sub: Meeting of Board of Studies on 21-10-2025

Ref: 1. 1) No. F.2 -10/2025 (AC Policy) dated 27-05-2025 of Deputy Secretary, UGC,
New Delhi.

2) No.C (1) Conferment of Autonomous / SPACES/ 2025dated 01-07-25 of the
Vice- Chancellor, Andhra University, Visakhapatnam.

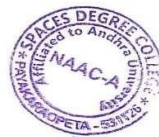
We are happy to inform you, that you have been nominated as the Alumnus member to the Board of Studies in Biotechnology at SPACES Degree College (Autonomous), Payakaraopeta.

The meeting of Board of Studies, Department of Biotechnology is scheduled to be held on 21-10-25 at 12:00 Noon Through online mode.. We request you to kindly make it convenient to participate in the meeting and contribute your valuable expertise.

We would be obelized if you acknowledge this letter at the earliest to confirm your participation in the meeting.

Thanking you

Yours faithfully



A. R. S. Reddy
PRINCIPAL
SPACES DEGREE COLLEGE
PAYAKARAOPETA

Sri Prakash Academy of Computers, Electronics & Sciences

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

DEPARTMENT OF BIOTECHNOLOGY

BOARD OF STUDIES MEETING

AGENDA

DATE: 21-10-2025

TIME: 12:00 PM

1. To Review the curriculum of I and II semesters of B.Sc. Biotechnology as prescribed by APSCHE with effect from academic year 2025-2026.
2. To discuss Whether changes are required in the syllabus.
3. To discuss and propose the criteria and pattern of internal assessment.
4. To discuss and propose the pattern of external assessment.
5. To discuss Model Question papers for The I and II Semesters including Theory and Practicals.
6. To discuss about blueprint for Internal exams and Semester End Examinations.
7. To propose the names for Question paper setters and Examiners.
8. To discuss about remedial classes for Slow learners
9. To discuss about Organizing Guest lectures
10. To discuss about implementation of certificate courses.
11. Any other matter according to the discretion of the Chair person.

SPACES DEGREE COLLEGE(AUTONOMOUS), PAYAKARAOPETA

DEPARTMENT OF BIOTECHNOLOGY

BOARD OF STUDIES MEETING – RESOLUTIONS

Date: 21-10-2025

Time: 12:00 Noon to 1:30 PM

Mode: Online mode/ Virtual

Members Attended:

1. Prof. V. Lakshmi, Department of Biotechnology, Andhra University, Visakhapatnam.
2. Sri K. Sivabalan, CTOO, Sanvira Biosciences Pvt. Ltd, Visakhapatnam.
3. Ms. K. Sai Sudha, Asst. Professor, Govt. College for Women(A), Guntur.
4. Sri. G. Praveen Chakravarthi, Lecturer, P.R Govt College (A), Kakinada.
5. Miss. P. Akshitha, Lecturer, SPACES Degree College(A), Payakaraopeta.
6. Sri. D. Srinivas, Alumnus, University of Hyderabad, Hyderabad.
7. Dr. A.R.K Reddy, HOD, SPACES Degree College, Payakaraopeta

The Chairperson of BOS welcomed all members and introduced them. The agenda points were discussed thoroughly and the following resolutions were made.

Resolution1:

It was resolved that the allotted credits and workload particulars for two Major papers in semester I - Cell Biology and Genetics & Biological Chemistry, and for the two major subjects in semester -II such as Microbiology & Basic immunology will remain unchanged and continue to follow the APSCHE norms. Each subject carries 3 credits for theory and 1 credit for practicals, with 3 hours of theory and 2 hours of practicals per week. The detailed paper titles, curriculum framework including credits and hours/ week were presented in **Annexure -1**.

Resolution2:

It was resolved to make certain changes to the existing syllabus issued by APSCHE. The modifications are as follows:

Semester -1

Major-1: Cell Biology and Genetics – Theory Paper

Two additional concepts, linkage and Crossing Over, were added in continuation of the genetics portion in Unit-3. The topics, Eukaryotic chromosome organization, histone proteins from unit 3 were shifted to the Third semester – Molecular Biology paper.

Major -1: Cell Biology and Genetics – Practical

No changes were proposed; it was resolved to adopt the syllabus as it is issued by APSCHE.

Major -2: Biological Chemistry – Theory Paper:

Sri G.P Chakravarthy suggested modifications in Unit -5. The metabolic portion which includes Carbohydrate metabolism will be considered as only additional input in the syllabus but will not be considered for examination.

Major-2: Biological Chemistry – Practical Paper

No changes were proposed; it was resolved to adopt the syllabus as it is issued by APSCHE.

Semester-2:

Major-1: Microbiology – Theory Paper

No changes were proposed; it was resolved to adopt the syllabus as it is issued by APSCHE.

Major-1: Microbiology – Practical

Sri D. Srinivas suggested to include Disc diffusion assay in the practical syllabus as an additional input.

Major -2: Basic Immunology – Theory Paper

No changes were proposed; it was resolved to adopt the syllabus as it is issued by APSCHE.

Major-2: Basic Immunology – Practical

No changes were proposed; it was resolved to adopt the syllabus as it is issued by APSCHE.

The changes made in the syllabus, along with their justifications were presented in **Annexure -2**.

Resolution3:

It was resolved that the evaluation of each paper will be 100 marks in theory and 50 marks in practical. The theory component includes both internal and external assessments. The mode of internal and external assessment shall be followed as per the guidelines of the affiliating Andhra University. As per the University's current norms, 30 marks will be allotted for Internal assessment and 70 marks will be allotted for external assessment. Students should secure a minimum of 40%

in both internal and external assessments to qualify for a pass. The details of internal and external assessments along with qualifying marks, were presented in [Annexure -3](#).

Resolution4:

It was resolved that the internal assessment of students will be based on the performance in mid examinations, student seminars, assignments, and attendance. Two mid examinations will be conducted in each semester for 50 marks each and scaled down to 10 marks. The breakup of internal marks is as follows:

Mid-1: 10 marks, Mid 2: 10 Marks, Seminar and assignment-5 marks and attendance -5 marks.

Resolution5:

The blue print and Model question paper for internal assessment were reviewed, discussed and approved for implementation. It was resolved that the first mid examination is to be conducted for first two units and second mid examination is to be conducted for next 2 units. The detailed blue print and model question paper were presented in [Annexure- 4](#).

Resolution6:

The blue print and Model paper for Semester End examination were reviewed, discussed and approved for implementation. It was resolved to conduct semester end examination for 70 marks consisting of essay type questions and short answer questions. The detailed blue print and model question paper were presented in [Annexure- 5](#).

Resolution7:

It was resolved to introduce certificate course in the following specializations: Plant Biotechnology, Industrial Biotechnology and Food Biotechnology. The certificate course may be offered in the sixth semester of their course and it should be designed to enhance Hands-On experience and industrial skills for industrial readiness.

Resolution8:

It was resolved to conduct remedial classes for slow learners after Mid -1 Examinations to help improve their academic performance.

Resolution9:

The BOS resolved to organize guest lectures by inviting subject experts from reputed institutions and industries to enhance student's exposure and knowledge.

Resolution10:

The list of question paper setters and examiners for Biotechnology was presented, discussed and approved by the board. The list of question paper setters and examiners, were presented in **Annexure -6.**

The Chairperson thanked all members for their active participation and valuable inputs. The meeting concluded with all the above resolutions being passed unanimously.

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA
DEPARTMENT OF BIOTECHNOLOGY
BOARD OF STUDIES MEETING – RESOLUTIONS.

ANNEXURE-1

Course structure & curricular frame work for 1 & 2 semesters

Year	Semester	Course	Paper Title	No. Of Hours/ week	No. of Credits
I	I	1	Introduction to Cell Biology and Genetics	3	3
			Introduction to Cell Biology and Genetics - Practical	2	1
		2	Biological Chemistry	3	3
			Biological Chemistry - Practical	2	1
	II	3	Microbiology	3	3
			Microbiology - Practical	2	1
		4	Basic Immunology	3	3
			Basic Immunology - Practical	2	1

Annexure -2

List of additions / deletions made in the syllabus

Year	Semester	Course	Paper	Units	Additions	Deletions	Justification
1	I	1	Introduction to Cell Biology and Genetics	1	Nil	Nil	NA
				2	Nil	Nil	NA
				3	Linkage & Crossing Over	Eukaryotic chromosome organization and Histone proteins.	In continuation with Genetics. Deleted concepts shifted to Sem -III
				4	Nil	Nil	NA
				5	Nil	Nil	NA
			Introduction to Cell biology and Genetics- Practical		Nil	Nil	NA
		2	Biological Chemistry	1	Nil	Nil	NA
				2	Nil	Nil	NA
				3	Nil	Nil	NA
				4	Nil	Nil	NA
				5	Nil	Carbohydrate metabolism will be an additional input, but will not be considered for examination.	Only Carbohydrate metabolism is included in entire B.Sc. Syllabus
	II	3	Microbiology	1	Nil	Nil	NA
				2	Nil	Nil	NA
				3	Nil	Nil	NA
				4	Nil	Nil	NA
				5	Nil	Nil	NA
		4	Microbiology - Practical		Disc Diffusion Assay	Nil	Students can able to identify the Sensitivity.
			Basic Immunology	1	Nil	Nil	NA
				2	Nil	Nil	NA
				3	Nil	Nil	NA
				4	Nil	Nil	NA
			Basic Immunology-Practical		Nil	Nil	NA

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

DEPARTMENT OF BIOTECHNOLOGY

Semester- 1

SYLLABUS w.e.f 2025-2026 AY

Introduction to Cell Biology and Genetics

Theory

Credits:3

3 Hrs./ Week

Course Objectives:

1. To introduce students to the structure and function of prokaryotic and eukaryotic cells.
2. To provide knowledge on cellular organelles and their roles in cell physiology.
3. To explain the principles of genetics, including Mendelian laws and chromosome organization.
4. To describe mutagenesis, DNA damage, and repair mechanisms.
5. To create awareness about the cell cycle, cancer biology, and cell signaling processes.

Learning Outcomes:

After completing this course, students will be able to:

1. Identify and describe the structure of different types of cells and their components.
2. Explain the functions of cell organelles and mechanisms of cell transport.
3. Apply Mendelian principles and recognize deviations in inheritance patterns.
4. Analyze causes of mutations and describe DNA repair mechanisms.
5. Compare normal and cancer cells, and explain the regulation of cell cycle and apoptosis.

Syllabus

Unit I

Cell as a basic unit of living organism; Cell wall Structure, chemical composition and function. Glycocalyx. Structure and Function of Cell membranes; Brief description of viral, bacterial, fungal, plant and animal cells.

Unit II

Sub-cellular organization of eukaryotic cell: Nucleus, nuclear envelope, transport across nuclear membrane; Nucleolus; cytosol, endoplasmic reticulum, chloroplast, mitochondria,

vacuoles, ribosomes, peroxisomes, lysosome and golgi complex; Cell Transport: Active and Passive transport, phagocytosis, pinocytosis, exocytosis. Chromosomes: Morphology, Structural Organization; Specialized chromosomes- Salivary gland & lamp brush chromosomes.

Unit III

Mendel Experiments, Mendel Laws and Deviations: Incomplete Dominance and Codominance; Linkage; Crossing Over; Concept of multiple alleles. Structure of Prokaryotic and Eukaryotic chromosomes.

Unit IV

Mutagenesis - Spontaneous and induced (Chemical and physical) mutations; Mutations- point mutations, frameshift mutations; Factors affecting DNA damage; Repair Mechanisms - Light induced repair, Excision repair and mismatch repair and SOS repair.

Unit V

Phases of the eukaryotic cell cycle - Mitosis and Meiosis; Regulation of cell cycle checkpoints. Basics of Cancer Development (Concept of Angiogenesis and Metastasis) and Cancer causative agents. Proto- oncogenes, oncogenes. Differences between cancer cell and normal cell. Programmed Cell Death. Introduction to cell signaling.

Reference books:

- Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts and Peter Walter – Molecular Biology of the Cell – Garland Science.
- Geoffrey M. Cooper and Robert E. Hausman – The Cell: A Molecular Approach – ASM Press & Sinauer Associates.
- Gerald Karp – Cell and Molecular Biology: Concepts and Experiments – John Wiley & Sons.
- De Robertis, E.D.P. and De Robertis, E.M.F. – Cell and Molecular Biology – Saunders College Publishing.
- Snustad, D.P. and Simmons, M.J. – Principles of Genetics – John Wiley & Sons.
- Gardner, E.J., Simmons, M.J. and Snustad, D.P. – Principles of Genetics – John Wiley & Sons.
- Lodish, H., Berk, A., Kaiser, C.A., Krieger, M., Scott, M.P., Bretscher, A., Ploegh, H. and Matsudaira, P. – Molecular Cell Biology – W.H. Freeman and Company

Semester – 1

Course: Introduction to Cell biology and Genetics

Practical	Credits:1	Hrs./ Week:2
------------------	------------------	---------------------

Practical Component:

1. Principle and utilization of microscope
2. Preparation of blood smear and observation of cells
3. Study of divisional stages in mitosis
4. Study of divisional stages in meiosis
5. Observation of differences between stained bacterial cells and cells in onion peels
6. Observation of permanent slides of bacterial, fungal, plant and animal cells
7. Problem solving in genetics
8. Human Karyotype analysis
9. Simple Mendelian traits in humans and pedigree analysis.

Semester – 1

Course 2: Biological Chemistry

Theory

Credits: 3

Hrs./Week:3

Course Objectives:

1. To introduce students to the structure and properties of nucleic acids and their biological significance.
2. To explain the chemistry and classification of carbohydrates, lipids, porphyrins, heme, and chlorophylls.
3. To provide knowledge on amino acids, protein structure, and conformational analysis.
4. To develop understanding of enzyme classification, kinetics, inhibition, and mechanisms of action.
5. To describe bioenergetics, ATP, and central metabolic pathways including glycolysis, TCA cycle, and oxidative phosphorylation.

Learning Outcomes:

After completing this course, students will be able to:

1. Describe the chemical structure and structural variations of nucleic acids.
2. Classify and explain the structures and functions of carbohydrates, lipids, and porphyrins.
3. Explain the properties and structural organization of proteins using the Ramachandran plot.
4. Analyze enzyme kinetics, substrate specificity, and different types of enzyme inhibition.
5. Understand the principles of bioenergetics and summarize major energy-yielding metabolic pathways.

Syllabus

UNIT I

Nucleic Acids: Chemical structure and base composition of nucleic acids (DNA and RNA). Chargaff's rules. Watson Crick Model (B-DNA), deviations from Watson-Crick model. Alternative forms of DNA (A-DNA and Z-DNA). Forces stabilizing nucleic acid structures, (hydrogen bonds and hydrophobic associations).

UNIT II

Carbohydrates: Definition, classification, nomenclature of carbohydrates, structures of monosaccharides, disaccharides and polysaccharides. Concept and examples of heteropolysaccharides. Lipid: Structure of saturated and unsaturated fatty acids, triglycerides, phospholipids, Chemistry of Porphyrines, Heme and Chlorophylls.

UNIT III

Amino acids and Proteins: Structure of amino acids occurring in proteins, classification of amino acids (pH based, polarity based and nutrition based) physico-chemical properties of amino acids. Primary, Secondary, Tertiary & Quaternary structure of proteins. Ramachandran Plot.

UNIT IV

Enzymes: Terminology: Active site, allosteric site, Holoenzyme, apoenzyme, coenzyme, substrate, inhibitor, activator, modulator etc. Classification and nomenclature of enzymes. Substrate Specificity (bond specificity, group specificity, absolute specificity, stereospecificity), lock and key and induced fit models. Enzyme kinetics: Michaelis-Menten equation, effect of substrate concentration, effect of enzyme concentration, effect of pH and temperature, temperature. Enzyme inhibition (reversible inhibition types – competitive, uncompetitive and non-competitive), brief idea of irreversible inhibition.

UNIT V

Bioenergetics: Concept of free energy, Entropy, Enthalpy & Redox Potential. Concept of high energy bonds (structure of ATP). **Glycolysis, Kreb's cycle, Gluconeogenesis: Bypass reactions., Electron transport chain, Oxidative phosphorylation. (Additional inputs).**

Reference books:

- Lehninger, A.L., Nelson, D.L. and Cox, M.M. – Principles of Biochemistry – W.H. Freeman and Company.
- Voet, D. and Voet, J.G. – Biochemistry – John Wiley & Sons.
- Stryer, L. – Biochemistry – W.H. Freeman and Company.
- Satyanarayana, U. and Chakrapani, U. – Biochemistry – Elsevier / Books and Allied (Indian edition).
- Zubay, G. – Biochemistry – Wm. C. Brown Publishers.
- Garrett, R.H. and Grisham, C.M. – Biochemistry – Brooks/Cole, Cengage Learning.
- Conn, E.E. and Stumpf, P.K. – Outlines of Biochemistry – John Wiley & Sons.

Semester -1

Course 2: Biological Chemistry

Practical

Credits:1

Hrs./ Week: 2

Practical Component:

1. Introduction to basic instruments (Principle standard operation procedure) demonstration and record
2. Calculation of molarity, normality, and molecular weight of compounds.
3. Qualitative analysis of carbohydrates (sugars)
4. Quantitative analysis of carbohydrates
5. Quantitative estimation of protein - Lowery method
6. Estimation of DNA by diphenylamine reagent
7. Estimation of RNA by orcinol reagent
8. Assay of protease activity
9. Preparation of starch from potato and its hydrolyzation by salivary amylase.

Semester -II
Course-3: Microbiology

Theory

Credits: 3

Hrs./Week:3

Course Objectives:

1. To introduce the history and development of microbiology along with contributions of key scientists.
2. To explain the principles and applications of different types of microscopy.
3. To study the structure, morphology, and special features of bacteria, including staining techniques.
4. To provide knowledge on microbial nutrition, growth, cultivation, and methods of microbial control.
5. To introduce viruses, their structure, replication, classification, and transmission with examples of human diseases.

Learning Outcomes:

After completing this course, students will be able to:

1. Summarize the historical contributions of Pasteur, Koch, and Jenner in microbiology.
2. Differentiate between light, phase contrast, dark field, fluorescent, and electron microscopy.
3. Describe bacterial morphology, cell structures, plasmids, endospores, and staining methods.
4. Identify nutritional requirements, growth phases, and apply sterilization and disinfection techniques.
5. Explain the structural organization, replication strategies, and transmission of viruses including modern examples.

Syllabus

UNIT I

History, Development and Microscopy History and development of microbiology: contributions of Louis Pasteur, Robert Koch and Edward Jenner. Microscopy: Compound microscopy: Numerical aperture and its importance, resolving power, oil immersion objectives and their significance. Principles and applications of dark field, phase contrast, fluorescent microscopy. Electron microscopy: Principle, ray diagram and applications, TEM and SEM, comparison between optical and electron microscope, limitations of electron microscopy.

UNIT II

Bacteria: Bacterial morphology and subcellular structures, general morphology of bacteria, shapes and sizes, generalized diagram of typical bacterial cell. Slime layer and capsule,

difference between the structure and function. Cell wall of Gram +ve and Gram -ve cells. General account of flagella and fimbriae. Chromatin material, plasmids; definition and kind of plasmids (conjugative and non-conjugative) F, R, and Col plasmids. Endospores: Detailed study of endospore structure and its formation, germination, basis of resistance. Staining: Acidic, Basic and Neutral stains. Simple and Gram Staining, Acid fast staining, Flagella staining, Endospore staining.

Unit III

Microbial Nutrition: Basic nutritional requirements. Composition of Natural and Synthetic Media. Selective and Differential media, Enriched media, Enrichment media. Factors Affecting Growth of Microbes: pH, Temperature, Salinity. Classification of microorganisms based on nutrition and temperature.

UNIT IV

Microbial growth and control: Growth rate and generation time, details of growth curve and its phases. Measurement of growth. Pure cultures and cultural characteristics. Maintenance of pure culture. Microbial Control: Sterilization (Physical and chemical methods of sterilization), disinfection, sanitization, germicide, microbistasis, antiseptics and antimicrobials.

UNIT V:

Viruses: Properties and General characteristics of Viruses. Classification of viruses on the basis of nucleic acids composition. Basic Structure of Lamda and M13 DNA Virus. Brief idea of lytic cycle and lysogeny. Viral Transmission: Different modes (dengue, SARS-CoV2) and their preventive measures.

Reference books:

- Pelczar, M.J., Chan, E.C.S. and Krieg, N.R. – Microbiology – Tata McGraw-Hill Publishing Company.
- Prescott, L.M., Harley, J.P. and Klein, D.A. – Microbiology – McGraw-Hill Higher Education.
- Cappuccino, J.G. and Sherman, N. – Microbiology: A Laboratory Manual – Pearson Education.
- Willey, J.M., Sherwood, L.M. and Woolverton, C.J. – Prescott's Principles of Microbiology – McGraw-Hill.
- Tortora, G.J., Funke, B.R. and Case, C.L. – Microbiology: An Introduction – Pearson Education.
- Powar, C.B. and Dagainawala, H.F. – General Microbiology – Himalaya Publishing House.
- Ananthanarayanan, R. and Paniker, C.K.J. – Textbook of Microbiology – Universities Press (for medical aspects).

Semester-II
Course 3: Microbiology

Practical	Credits: 1	Hrs./Week: 2
Practical Component:		
1. Cleaning and preparation of glassware		
2. Observation of permanent slides using microscope		
3. Preparation of nutrient agar medium for bacteria		
4. Preparation of PDA medium for fungal culture		
5. Sterilization techniques (autoclave, hot air oven, filter)		
6. Isolation of bacteria from soil		
7. Simple staining technique		
8. Differential staining technique		
9. Microbial counting by Haemocytometer		
10. Identification of different bacteria		
11. Motility test by hanging drop		
12. Biochemical identification of bacteria		
13. Preparation of pure culture by slab, slant, streak culture		
14. Disc diffusion assay.		

Semester- 2

Course-4: Basic Immunology

Theory	Credits:3	Hrs./Week:3
--------	-----------	-------------

Course Objectives:

1. To introduce the fundamentals of the immune system, immune cells, and immune organs.
2. To explain the structure, types, and diversity of antibodies and the nature of antigens.
3. To describe mechanisms of humoral and cell-mediated immunity, cytokines, and MHC molecules.
4. To provide knowledge about hypersensitivity, autoimmunity, vaccination, and different types of vaccines.
5. To familiarize students with immunological techniques and applications of monoclonal antibodies.

Learning Outcomes:

After completing this course, students will be able to:

1. Explain the organization of the immune system and differentiate innate and acquired immunity.
2. Describe antibody structure, types, and antigenic determinants.
3. Analyze mechanisms of humoral, cell-mediated, and NK cell-mediated immune responses.
4. Differentiate between types of hypersensitivity and explain the principles and applications of vaccination.
5. Apply knowledge of immunological techniques for antigen-antibody interactions and monoclonal antibody production.

Syllabus

UNIT I

Immune System: History and Scope of Immunology. Types of Immunity: Innate and Acquired. Cells of immune system: T cells, B cells. Organs of the Immune system: Bone marrow, spleen, thymus, MALT, lymph node.

UNIT II

Antibody and Antigen: Antibodies: Structure and Types of Antibodies (IgG, IgM, IgA, IgE, IgD). Monoclonal and Polyclonal antibodies. Antibody diversity. Antigens: Types of Antigens. Antigenicity (factors affecting antigenicity). Antigenic determinants – adjuvants and haptens, epitopes.

UNIT III

Immunity: Humoral immunity. Cell-mediated immunity – T Cell-mediated immunity, NK cell-mediated immunity, ADCC. Brief description of cytokines and interleukins. Major Histocompatibility Complex (MHC) – Structure and functions of Class I and Class II MHC molecules.

UNIT IV

Hypersensitivity and Vaccination: General features of hypersensitivity, various types of hypersensitivity. Autoimmunity. Vaccination: Discovery, principles, and significance. Types of Vaccines – Live, attenuated, killed, toxoids, recombinant-based (mRNA and Protein).

UNIT V

Immunological Techniques: Antigen-antibody reactions: Precipitation, agglutination, complement fixation, immunodiffusion – Radial immune diffusion, Ouchterlony double immune diffusion, ELISA, RIA, immunoelectrophoresis, Rocket electrophoresis. Hybridoma technology: Monoclonal antibodies and their applications in immunodiagnostics.

Reference books:

- Kuby, J. – Immunology – W.H. Freeman & Company.
- Abbas, A.K., Lichtman, A.H. and Pillai, S. – Cellular and Molecular Immunology – Elsevier.
- Roitt, I., Brostoff, J. and Male, D. – Immunology – Mosby Publications.
- Ananthanarayanan, R. and Paniker, C.K.J. – Textbook of Microbiology – Universities Press (for immunology basics).
- Kindt, T.J., Goldsby, R.A. and Osborne, B.A. – Kuby Immunology – W.H. Freeman.
- Delves, P.J., Martin, S.J., Burton, D.R. and Roitt, I.M. – Roitt's Essential Immunology – Wiley-Blackwell.

Semester-2

Course -4: Basic Immunology

Practical

Credits: 1

Hrs./Week: 1

Practical Component:

1. Antigen–antibody reaction–determination of Blood group, Cross reactivity
2. Pregnancy test
3. Widal test
4. Ouchterlony immunodiffusion
5. Radial immuno diffusion
6. ELISA
7. Production of antibodies and their titration.

Annexure-3

Evaluation pattern

S. No	Theory / Practical	Marks
1	Theory Component	100
2	Practical Component	50

Internal & External Assessment

S. No	Assessment	Marks
1	Internal Assessment	30
2	Semester End Examination	70

Assessment and Qualifying Marks

S. No	Assessment	Total Marks	Qualifying Marks
1	Internal Assessment	30	12
2	Semester End Exam - Theory	70	28
3	Semester End Exam- Lab	50	20

Internal Assessment Breakup

S. No	Activity	Marks Allotted
1	Mid -term Examination 1	10
2	Mid -term Examination 2	10
3	Student Seminars & Assignments	05
4	Attendance	05

Rubrics for Awarding Attendance marks

S. No	Attendance Percentage	Marks allotted
1	75%	1
2	76 – 80 %	2
3	81 – 85 %	3
4	86 – 90 %	4
5	90.01 to 100 %	5

Annexure – 4

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

I B.Sc. Semester -I

PAPER – 1 (Introduction to Cell Biology & Genetics)

W.e.f 2025- 2026 Admitted Batch

Blue Print for Internal Examinations – Mid-term Exams

Time: 2 Hrs.

Max. Marks: 50

Section	Category	Marks for Each Question	Question to be given	Questions to be Answered	Marks
A	Essay Questions	10	6 Questions	3 Questions	3 x10 = 30M
B	Short Answer Questions	5	7 Questions	4 Questions	5 x 4 =20M
Total	-	-	13 Questions	10 Questions	50 M

Model Question Paper

Section – A

I. Answer the following Questions

3 x 10 = 30M

1. Essay question

(Or)

2. Essay question

3. Essay question

(Or)

4. Essay question

5. Essay question

(Or)

6. Essay question

II. Write any four of the following

5 x 4 = 20M

1. Short answer

2. Short answer

3. Short answer

4. Short answer

5. Short answer

6. Short answer

7. Short answer

Annexure – 5

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

I B.Sc. SEMESTER – I

PAPER – 1 (Introduction to Cell Biology & Genetics)

W.e.f 2025- 2026 Admitted Batch

Blue Print for Semester End Examinations – Theory Paper

Time: 3 Hrs

Max. Marks: 70

Section	Category	Marks for Each Question	Question to be given	Questions to be Answered	Marks
A	Essay Questions	10	10 Questions	5 Questions	5 x10 = 50M
B	Short Answer Questions	5	8 Questions	5 Questions	5 x 4 =20M
Total	-	-	18 Questions	10 Questions	70 M

Distribution Pattern of Essay and Short Answer Questions among the 5 Units

Unit	Essay Questions to be Given	Essay Questions to be answered	Short Answer Questions to be given	Short Answer questions to be answered
1	2	1	2	5 Questions
2	2	1	2	
3	2	1	2	
4	2	1	1	
5	2	1	1	

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

I B.Sc. SEMESTER – I

PAPER – 1 (Introduction to Cell Biology & Genetics)

W.e.f 2025- 2026 Admitted Batch

Model Question Paper - Theory

Time: 3 Hrs.

Max. Marks: 70

SECTION – A

I. Answer all the questions.

5 x 10 = 50M

1. Essay Question from unit 1

(Or)

2. Essay Question from Unit 1

3. Essay Question from Unit 2

(Or)

4. Essay Question from Unit 2

5. Essay Question from Unit 3

(Or)

6. Essay Question from Unit 3

7. Essay Question from Unit 4

(Or)

8. Essay Question from Unit 4

9. Essay Question from Unit 5

(Or)

10. Essay Question from Unit 5

SECTION – B

II. Answer any five of the following questions

5 x 4 = 20M

1. Short Answer question from Unit 1

2. Short Answer question from Unit 1

3. Short Answer question from Unit 2

4. Short Answer question from Unit 2

5. Short Answer question from Unit 3

6. Short Answer question from Unit 3

7. Short Answer question from Unit 4

8. Short Answer Question from Unit 5

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAOPETA

I B.Sc. SEMESTER – I

PAPER – 1 (Introduction to Cell Biology & Genetics)

W.e.f 2025- 2026 Admitted Batch

Model Question Paper - Practical

Time: 3 Hrs.

Max. Marks: 50

1.Major Experiment	- 20 M
2.Minor Experiment	- 10 M
3.Spotter	- 05 M
4.Spotter	- 05 M
5.Viva	- 05 M
6. Record	- 05 M

Annexure -6

SPACES DEGREE COLLEGE (AUTONOMOUS), PAYAKARAO PETA

DEPARTMENT OF BIOTECHNOLOGY

QUESTION PAPER SETTERS & EXAMINERS - PANEL

1. Dr. A. Veerabrahmam,
Asst. Professor
Department of Biotechnology
St. Joseph Degree College,
Visakhapatnam
Ph. No: 9985312844
ID: veerabrahmam@stjosephvizag.com
2. Dr. K. Rekha
Principal,
Govt. Degree College,
Vijayanagaram
Ph. No: 9652069674
ID: rekhabiotech2000@gmail.com
3. Dr. Sravan Kumar
Asst. Professor
Department Of Biotechnology
Gayatri Vidya Parishad Degree & PG College
Visakhapatnam.
Ph. No: 9885025697
ID:
4. Dr. K. Vanaja
Asst. Professor,
Department of Biotechnology
St. Anns Degree College, Gorantla
Guntur
Ph. No: 9441619224
ID: vanajakatta27@gmail.com
5. Dr. M. Pradeep
Asst. Professor
Department of Biotechnology
Govt. Degree College,
Srikakulam

Ph. No: 8985745820

ID:

6. Dr. Manyasree
Asst. Professor
Department of Biotechnology
Dr L.B College,
Visakhapatnam.
Ph.No: 7382293490
ID: manyasree.dekonda@gmail.com
7. Dr Ramesh
Asst. Professor,
Department of Biotechnology
PRISM Degree College
Visakhapatnam
Ph. No: 8331001247
ID:
8. K. Saisudha
Asst. Professor
Department of Biotechnology
Govt. Degree College for Women (A)
Guntur
Ph. NO: 9493128470
ID: saisudhakella@gmail.com
9. G. Praveen Chakravarthi
Lecturer
Department of Biotechnology
P.R Govt. Degree College (A)
Kakinada.
Ph. No: 9502191501
ID: biotechnology@prgc.edu.in

