

**GOVERNMENT DEGREE COLLEGE FOR WOMEN
KARIMNAGAR**



**DEPARTMENT OF BIOTECHNOLOGY
PROFILE**

DEPARTMENT OF BIOTECHNOLOGY

Biotechnology is both a basic and an applied science. These technologies are applied in agriculture, healthcare, forensics, industrial processing, and environmental management in many useful ways.

Graduates take a number of career paths including: work in research labs, graduate training in biology and chemistry, professional careers in the health sciences.

Brief History of the Department:

Department of Biotechnology was started in the academic year 2001-2002 as an offshoot to the Department of Botany after obtaining permission from the Commissioner of Collegiate Education, Hyderabad vide Proc. Rc. No. 641/Admn.1-1/2001-1, dated 26-06-2001. The subject of Biotechnology at B.Sc. level has been started as restructured course on self financed basis with Botany and Chemistry as combination subjects. Subsequently, the above course obtained affiliation from the authorities of Kakatiya University, Warangal. In the beginning of the first academic year i.e., 2001-2002, 34 students were admitted. The permitted student's strength was 40 per section at that time and medium of instruction is English. In the beginning staff from Botany department were deputed to teach Biotechnology. At present there is one sanctioned post for the department of Biotechnology to teach the subject.

VISION:

The course was introduced to provide a platform for Biotechnology education, training and research at the interface of multiple disciplines. The Curriculum was designed to create opportunities for students to engage in multi-disciplinary research where they learn biotech science while integrating technology to provide solutions for human and animal health, agriculture and environmental technologies. The vision is to produce human resource tailored to drive innovation in Biotechnology.

MISSION:

To provide Biotechnology educational Program with impetus to generate quality workforce and create awareness about potentials of Biotechnology with socio-ethical implications. To instill spirit of innovation and creativity in young minds with sound research aptitude. To nurture confident individuals who are effective contributors towards growth of the nation.

OBJECTIVES:

To impart knowledge through teaching, practical and conceptual skills to ensure a solid and sustainable education in the field of Biotechnology. To develop a strong appreciation for understanding rapid development in the advancing field of Biotechnology. To train the students to take up wide variety of roles like researchers, scientists, consultants, entrepreneurs, academicians.

FACULTY:

Sl. No.	Name of the Faculty	Qualification	Designation
1	K. Satheesh Kumar	M.Sc., M.Phil., SET, D.I.S.M.	Lecturer

PROGRAMMES & COURSES OFFERED:

- B.Sc. (Biotechnology-Botany-Chemistry)
- B.Sc. (Biotechnology-Zoology-Chemistry)
- B.Sc. (Biotechnology-Botany-Zoology)
- B.Sc. (Biotechnology-Microbiology-Zoology)
- B.Sc. (Biotechnology-Microbiology-Chemistry)

PROGRAMME SPECIFIC OUTCOMES & COURSE OUTCOMES (CO)**➤ COURSE OUTCOMES OF BIOTECHNOLOGY****SEMESTER-I**

Title of Paper	:	BS 104: Cell Biology and Genetics
Credits	:	4+1=5
Hours Per Week	:	4+3=7

At the end of the course the students will be able to

- Understand the basic unit of the organism.
- Differentiate the organisms by its cell structure.
- Know Components of the Cell and their division and apoptosis
- Discuss and differentiate the basic structure and function of cell components in prokaryotes and eukaryotes cells.
- Analyse the functioning of life at cellular level.
- Explain the mechanism of inheritance, incomplete & Codominance.
- Understand extra nuclear inheritance, linkage, recombination & crossing over.

SEMESTER-II

Title of Paper	:	BS 204: Biological Chemistry and Microbiology
Credits	:	4+1=5
Hours Per Week	:	4+3=7

At the end of the course the students will be able to

- Explain the definition, importance, classification, biological functions, structure and properties of Biomolecules.
- Enzymes nomenclature, classification, importance, mechanism of action and inhibition.
- Explain bioenergetics, oxidative phosphorylation, reactions of amino acids.
- Explain the principle and application of various types of Microscopy.
- Describe the classification, structure, characteristics of microorganisms.
- Disease causing pathogens and symptoms
- Culture and identification, nutrition, growth of microorganisms.
- Prepare various bacteriological, algal, fungal media and buffers.
- Understand qualitative and quantitative techniques of Biomolecules.
- Isolate and stain bacteria and other microorganisms.

SEMESTER-III

Title of Paper	:	BS 305: Molecular Biology and Recombinant DNA Technology
Credits	:	4+1=5
Hours Per Week	:	4+3=7

At the end of the course the students will be able to

- Explain genome organization in prokaryotes, eukaryotes, mitochondria and chloroplast.
- Explain the concepts of DNA replication in eukaryotic and prokaryotic organisms.
- Explain mutations and gene expression in prokaryotes and eukaryotes.
- Explain gene regulation in prokaryotes and eukaryotes
- Explain post transcriptional and post translational modifications.
- Discuss about enzymes of rDNA technology, cloning vectors, gene transfer techniques and applications of rDNA technology.
- Isolate DNA of bacteria and plasmid, quantification of DNA, separate proteins.
- Explain Polymerase chain reaction.

SEMESTER-IV

Title of Paper	:	BS 405: Bioinformatics and Biostatistics
Credits	:	4+1=5
Hours Per Week	:	4+3=7

At the end of the course the students will be able to

- Know about the Interaction of Computer and Biology.
- Understand the Knowledge about Protein and Genome sequence databases.
- Explain sequence alignment basics and types, concepts of phylogeny.
- Understand Bio statistical Analysis of the Biological Experiments.
- Understand central tendency, probability, dispersion, probability distributions.

- Use various methods in experiments and applications of Z-test, t-test, chi-square test, hypothesis testing, ANOVA.
- Explore web portals, sequence retrieval.

SEMESTER-V

Title of Paper : **BS 504: Plant Biotechnology**
Credits : **4+1=5**
Hours Per Week : **4+3=7**

At the end of the course the students will be able to

- Establish different types of plant cultures.
- Prepare media, explain sterilization, organogenesis and somatic embryogenesis.
- Explain and explore applications of plant tissue culture, cryopreservation.
- Explain micro propagation, encapsulation, cell suspension cultures
- Explain production of transgenic plants and methods of direct gene transfer techniques.
- Gain knowledge about genome editing, herbicide resistant, insect resistant, virus resistant, bacterial and fungal resistant transgenic plants and their applications
- Explain about transgenic plants as bioreactors.
- Gain practical knowledge of callus cultures, sterilization of explants, cell suspension cultures, synthetic seeds preparation, media preparation for plant tissue cultures.

SEMESTER-VI

Title of Paper : **BS 604: Environmental Biotechnology**
Credits : **4+1=5**
Hours Per Week : **4+3=7**

At the end of the course the students will be able to

- Apply the concepts of Biotechnology in Environmental Management.
- Describe the concept of pollution management.
- Explain various methods of environmental pollution and pollutants.
- Explain about biofuels and biomass types and applications and production.
- Describe concepts of biopesticides, biofertilization, its types & uses.
- Explains bioremediation of environmental pollutants.
- Explain various waste water treatment methods, composting of organic wastes.
- Describes phytoremediation concepts and applications.
- Gain practical knowledge about BOD, COD, Dissolved solids in water, production of microbial biofertilizer and isolation of microorganisms from polluted soil & industrial effluents.

➤ SYLLABUS

: [View Document](#)

SEMINARS/WORKSHOPS/CONFERENCES/SYMPOSIUMS ORGANIZED

- Department of Biotechnology in collaboration with Physical Education department of the college organized a national level **webinar** on 07.04.2021
- Department of Biotechnology in collaboration with Botany department of the college organized a national level **webinar** on 11.02.2022

Sl. No.	Title of the Webinar	Date
1	Importance of Food and Balanced diet for Different age groups- A Perspective from the COVID Point of View	07.04.2021
2	Applications of Biotechnology	11.02.2022

E-CONTENT DEVELOPED:

II SEM	Biomolecules (Carbohydrates)	https://youtu.be/WVffR7vjPCI
II SEM	Classification of Carbohydrates	https://youtu.be/IGTXeKUffdg
II SEM	Structure of Glucose, Epimers and functions of Glucose and Fructose	https://youtu.be/1AV4wy9uxHk
II SEM	Oligosaccharides-Disaccharides (Part-1)	https://youtu.be/zvYcrgqYYAc
II SEM	Oligosaccharides-Disaccharides (Part-2)	https://youtu.be/fs0U9ghw_Pc
II SEM	Polysaccharides	https://youtu.be/4WcRVS-VsJM
II SEM	Glycolysis	https://youtu.be/NmbEQhnPOjc
II SEM	Citricacid Cycle/ TCA Cycle/ Krebs Cycle	https://youtu.be/LFnbByuvr64
II SEM	Gluconeogenesis (Part-1)	https://youtu.be/6sh2UrDb3r0
II SEM	Gluconeogenesis (Part-2)	https://youtu.be/nEgBz7zmcj4
II SEM	Fattyacid Oxidation-Beta Oxidation	https://youtu.be/e23RBARyTxs
II SEM	Transamination and Oxidative Deamination	https://youtu.be/EhTlsZC55T8
II SEM	Classification of Aminoacids (Part-1)	https://youtu.be/C4bJoVhdHMU
II SEM	Classification of Aminoacids (Part-2) and Physical properties	https://youtu.be/ynhukBWhG-4
II SEM	Aminoacids-Chemical Properties and Peptide Bond Formation	https://youtu.be/XAxAOrXn2LM
II SEM	Proteins-Importance or Functions	https://youtu.be/gKbmPFsIRv8
II SEM	Structure of Proteins (Part-1)	https://youtu.be/IR8DDGdzOHQ
II SEM	Structure of Proteins (Part-2)	https://youtu.be/cIIoj2RoBUo
II SEM	Lipids-Importance and Classification	https://youtu.be/aZ7rKqjGOd8
II SEM	Triacylglycerols and Phospholipids	https://youtu.be/HLHeM5rohIk
III	Molecular Biology Introduction	https://youtu.be/B-FbG8OREhE
III	Molecular Biology Part-2	https://youtu.be/bfEC3RqoGoo
III	Molecular Biology Introduction (Part-3)	https://youtu.be/fs7dbuUCfhU
II	Gluconeogenesis (Part-1)	https://youtu.be/uMqO2TIZyKE
II	Gluconeogenesis (Part-1)	https://youtu.be/uMqO2TIZyKE
II	Gluconeogenesis (Part-2)	https://youtu.be/pSJbSZhNy5A
II	Beta Oxidation	https://youtu.be/KyHp7eIVsfY

II	Citricacid Cycle (TCA Cycle) (Krebs Cycle)	https://youtu.be/AeY0GB8X56A
II	Glycolysis (EMP Pathway)	https://youtu.be/hdq2j76pDV8
II	Transamination and Oxidative Deamination	https://youtu.be/IE3yFcwYIaw
III	Replication (Part-1)	https://youtu.be/ysR8s_EJjJw
III	Replication (Part-2)	https://youtu.be/Wo348M8omII
III	Replication (Part-3)	https://youtu.be/JNZJ1xpjlQw
III	Transcription (Part-1)	https://youtu.be/ltQdt_VakhM
III	Transcription (Part-2)	https://youtu.be/ywu6s0haiBM
III	Transcription (Part-2)	https://youtu.be/ywu6s0haiBM
III	Transcription (Part-3)	https://youtu.be/h34QAtn-7bs
III	Genetic Code	https://youtu.be/PhlcadZn0oA
III	Translation Introduction and Initiation	https://youtu.be/COkWnBap40c
III	Translation- Elongation, Termination and Post translational modifications	https://youtu.be/VVmQL4Eunb8
V	Monoclonal Antibodies	https://youtu.be/1oGmyMKvwPc
V	Monoclonal Antibodies Applications	https://youtu.be/358lkfuY0p4
V	Monoclonal Antibodies Applications (Part-2)	https://youtu.be/IJEn3nU_Dzg
V	Microbial Fermentation	https://youtu.be/LaJhVlcX_jo
V	Microbial Fermentation (Part-2)	https://youtu.be/zALrjzPIQZY
V	Fermentation Media	https://youtu.be/UD4NjugCjtM
V	Types of Fermentation	https://youtu.be/7pBR5-sKlqo
V	Cheese and Yoghurt Production	https://youtu.be/vIreFLtesdE

ACTIVITIES CONDUCTED:

STUDENT SEMINARS



Heeba Unnisa- Genetic code



Arshiya Tabassum- Lac Operon



G.Dimple Kashyap-Environmental Biotechnology



GROUP DISCUSSION

SWACCH BHARAT Programme



HARITHA HARAM Programme



CLEAN and GREEN Programme



QUIZ Programme



BEST PRACTICES:



FOOD DISTRIBUTION AT OLD AGE HOME



PLANTATION BY STAFF MEMBERS

RESULT ANALYSIS-2020-21

SEMESTER-I

Course	Semester	Appeared	Passed	%
B.Sc. (Bt.B.C)	I	16	14	87.50
B.Sc. (Bt.B.Z.)	I	13	11	84.62
B.Sc. (Bt.Z.C.)	I	9	9	100
B.Sc. (Mb.Z.Bt.)	I	1	1	100
Total		39	35	89.74

SEMESTER-III

Course	Semester	Appeared	Passed	%
B.Sc. (Bt.B.C)	III	12	12	100.00
Total		12	12	100.00

SEMESTER-II

Course	Semester	Appeared	Passed	%
B.Sc. (Bt.B.C)	II	16	15	93.75
B.Sc. (Bt.B.Z.)	II	13	12	92.31
B.Sc. (Bt.Z.C.)	II	8	7	87.50
B.Sc. (Mb.Z.Bt.)	II	1	1	100
Total		38	35	92.11

SEMESTER-IV

Course	Semester	Appeared	Passed	%
B.Sc. (Bt.B.C)	IV	10	10	100.00
Total		10	10	100.00

RESULT ANALYSIS-2021-22**SEMESTER-I**

Course	Semester	Appeared	Passed	%
B.Sc. (Bt.B.C)	I	7	7	100.00
B.Sc. (Bt.B.Z.)	I	11	11	100.00
B.Sc. (Bt.Z.C.)	I	1	1	100.00
B.Sc. (Mb.C.Bt.)	I	2	2	100.00
B.Sc. (Mb.Z.Bt.)	I	1	1	100.00
Total		22	22	100.00

SEMESTER-III

Course	Semester	Appeared	Passed	%
B.Sc. (Bt.B.C)	III	16	15	93.75
B.Sc. (Bt.B.Z.)	III	13	13	100.00
B.Sc. (Bt.Z.C.)	III	8	8	100.00
B.Sc. (Mb.Z.Bt.)	III	1	1	100.00
Total		38	37	97.37

SEMESTER-V

Course	Semester	Appeared	Passed	%
B.Sc. (Bt.B.C)	V	12	10	83.33
Total		12	10	83.33

SEMESTER-II

Course	Semester	Appeared	Passed	%
B.Sc. (Bt.B.C)	II	7	5	71.43
B.Sc. (Bt.B.Z.)	II	8	7	87.50
B.Sc. (Bt.Z.C.)	II	1	1	100.00
B.Sc. (Mb.C.Bt.)	II	2	2	100.00
B.Sc. (Mb.Z.Bt.)	II	1	1	100.00
Total		19	16	84.21

SEMESTER-IV

Course	Semester	Appeared	Passed	%
B.Sc. (Bt.B.C)	IV	16	16	100.00
B.Sc. (Bt.B.Z.)	IV	13	12	92.31
B.Sc. (Bt.Z.C.)	IV	8	8	100.00
B.Sc. (Mb.Z.Bt.)	IV	1	1	100.00
Total		38	37	97.37

SEMESTER-VI

Course	Semester	Appeared	Passed	%
B.Sc. (Bt.B.C)	VI	12	12	100.00
Total		12	12	100.00

FIELD VISIT:

VISIT TO KARIMNAGAR DAIRY



FUTURE PLANS:

To conduct skill oriented programs and Certificate courses.