

SHRI GOVIND GURU UNIVERSITY
SYLLABUS FOR 1st Sem B.Sc. PROGRAMME
Cell Biology (11102103)

Type of Course: B.Sc.

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
Lec	Tut	Lab		External		Internal			
3	-	-	3	T	P	T	CE	P	100
				60	-	20	20	-	

Lect- Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** – Practical

Sr.	Topic	Weightage	Teaching Hrs.
1.	<p>Unit-1: Cell: Introduction and classification of organisms by cell structure, cytosol, compartmentalization of eukaryotic cells, cell fractionation. Cell Membrane and Permeability: Chemical components of biological membranes, organization and Fluid Mosaic Model, membrane as a dynamic entity, cell recognition and membrane transport.</p>	25 %	12
2	<p>Unit 2 : Membrane Vacuolar system, cytoskeleton and cell motility: Structure and function of microtubules, Microfilaments, Intermediate filaments. Endoplasmic reticulum: Structure, function including role in protein segregation. Golgi complex: Structure, biogenesis and functions including role in protein secretion.</p>	25%	12
3	<p>Unit-3: Lysosomes: Vacuoles and micro bodies: Structure and functions Ribosomes: Structures and function including role in protein synthesis. Mitochondria: Structure and function, Genomes, biogenesis. Chloroplasts: Structure and function, genomes, biogenesis Nucleus: Structure and function, chromosomes and their structure.</p>	25%	11
4	<p>Unit-4: Extracellular Matrix: Composition, molecules that mediate cell adhesion, membrane receptors for extra cellular matrix, Mechanism of mitosis & meiosis, macromolecules, regulation of receptor expression and function. Signal transduction.</p>	25%	10

HRI GOVIND GURU UNIVERSITY

**SYLLABUS FOR 1st Sem B.Sc. PROGRAMME
INTRODUCTION TO MICROBIOLOGY (11101103)**

Type of Course: B.Sc.

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme					Total
Lect. Hrs./week	Tut Hrs.	Lab Hrs.	Credit	External		Internal			
				T	P	T	CE	P	
3	-	-	3	60	-	20	20	-	100

Lect- Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** – Practical

Contents:

Sr.	Topic	Weightage	Teaching Hours
1	<p>Unit 1: History of Development of Microbiology: Development of microbiology as a discipline, Spontaneous generation vs. biogenesis. Contributions of Anton von Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming Role of microorganisms in fermentation, Germ theory of disease, Development of various microbiological techniques and golden era of microbiology, Development of the field of soil microbiology: Contributions of Martinus W. Beijerinck, Sergei N. Winogradsky, Selman A. Waksman Establishment of fields of medical microbiology and immunology through the work of Paul Ehrlich, Elie Metchnikoff, Edward Jenner</p>	25%	12
2	<p>Unit 2: Diversity of Microbial World Systems of classification Binomial Nomenclature, Whittaker's five kingdom and Carl Woese's three kingdom classification systems and their utility. Difference between prokaryotic and eukaryotic microorganisms B. General characteristics of different groups: Acellular microorganisms (Viruses, Viroids, Prions) and Cellular microorganisms (Bacteria, Algae, Fungi and Protozoa) with emphasis on distribution and occurrence, morphology, mode of reproduction and economic importance.</p>	25%	11
3	<p>Unit 4: FUNGI: Fungi Historical developments in the field of Mycology including significant contributions of eminent mycologists. General characteristics of fungi including habitat, distribution, nutritional requirements, fungal cell ultra- structure, thallus organization and aggregation, fungal wall structure and synthesis, asexual reproduction, sexual reproduction, heterokaryosis, heterothallism and parasexual mechanism. Economic importance of fungi with examples in agriculture, environment, Industry, medicine, food, biodeterioration and mycotoxins.</p>	25%	11
4	<p>Unit 3: Algae: History of phycology with emphasis on contributions of Indian scientists; General characteristics of algae including occurrence, thallus organization, algae cell ultra structure, pigments, flagella, eyespot food reserves and vegetative, asexual</p>	25%	12

	<p>and sexual reproduction. Different types of life cycles in algae with suitable examples: Haplobiontic, Haplontic, Diplontic, Diplobiontic and Diplohaplontic life cycles. Applications of algae in agriculture, industry, environment and food.</p> <p>Protozoa: General characteristics with special reference to Amoeba, Paramecium, Plasmodium, Leishmania and Giardia</p> <p>An overview of Scope of Microbiology</p>		
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***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Tortora GJ, Funke BR and Case CL. (2008). Microbiology: An Introduction. 9th edition. Pearson Education.
2. Madigan MT, Martinko JM, Dunlap PV and Clark DP. (2014). Brock Biology of Microorganisms. 14th edition. Pearson International Edition
3. Cappuccino J and Sherman N. (2010). Microbiology: A Laboratory Manual. 9th edition. Pearson Education Limited
4. Wiley JM, Sherwood LM and Woolverton CJ. (2013) Prescott's Microbiology. 9th Edition. McGraw Hill International.
5. Atlas RM. (1997). Principles of Microbiology. 2nd edition. WM.T.Brown Publishers.
6. Pelczar MJ, Chan ECS and Krieg NR. (1993). Microbiology. 5th edition. McGraw Hill Book Company.
7. Stanier RY, Ingraham JL, Wheelis ML, and Painter PR. (2005). General Microbiology. 5th edition. McMillan.

SHRI GOVIND GURU UNIVERSITY

SYLLABUS FOR 1st Sem B.Sc. PROGRAMME

Chemistry-I (11100102)

Type of Course: B.Sc.

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme					Total
Lect. Hrs./week	Tut Hrs.	Lab Hrs.	Credit	External		Internal			
				T	P	T	CE	P	
3	-	-	3	60	-	20	20	-	100

Lect- Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** – Practical

Sr. no.	Topic	Weightage (%)	Teaching Hours
1.	UNIT- 1 Organic Chemistry: Classification, trivial names and IUPAC system of nomenclature of organic compounds. Hybridization, bond energy, polarity of bond, dipole moment of molecules, inductive effect, hydrogen bond, conjugation, resonance. Hemolytic and heterolytic fission of bonds, electrophiles and nucleophiles, carbon ions and radicals- their stability, geometry and generation.	45%	20
2.	Different types of Isomerism, Structural Isomers, Chain isomerism, Position isomerism, Functional isomerism, Metamerism Geometrical, Stereoisomerism, Configurational Isomers, Conformational Isomers, Concept of asymmetric carbon atom, Enantiomers, Diastereoisomers, Stereogenic atom.		
1.	UNIT- 2 Inorganic Chemistry: Bohr's atomic model and limitation. Idea of de Broglie matter waves. Heisenberg's uncertainty principle. Multielectron system-Pauli's exclusion principle, Hund's rules of maximum multiplicity. Quantum Numbers, Stability of half filled full filled orbitals, Aufbau principle and its limitation. Electronic configuration of atoms.	31%	15
2.	Electronic and electrolytic conductors, Specific, equivalent and molar conduction, Kohlrausch law of independent migration of ions, ionic mobility and conductance, Transference number		
1.	UNIT- 3 Physical Chemistry: Phase, component, system, degrees of freedom. The phase rule. Phase diagram of one component system: water	24%	10
2.	Radioactive disintegration series, group displacement law, law of radioactive decay, half-life and average life of radio elements, radioactive equilibrium, and measurement of radioactivity. Stability of atomic nucleus, n/p ratio. Radioisotopes and their application		

SHRI GOVIND GURU UNIVERSITY

SYLLABUS FOR 1st Sem B.Sc. PROGRAMME

Communication Skills-I (11193101)

Type of Course: B.Sc.

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme					Total
Lect. Hrs./week	Tut Hrs.	Lab Hrs.	Credit	External		Internal			
				T	P	T	CE	P	
2	-	-	2	60	-	20	20	-	100

Lect- Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** – Practical

Sr.	Topic	Weightage	Teaching Hrs.
1.	Unit-1 Grammar: Practice & Application		4
2	Unit-2 Listening Skills: Telephonic Conversation		2
3	Unit-3: Speaking Skills: Storytelling, Role Play, Presentation, ITEP (International Test of English Proficiency) ±Speaking Task 1: To speak on a given topic for 1 minute, IELTS (International English Language Testing System) Task1: To speak on a given topic for 2 to 3 minutes		12
4	Unit-4: Reading: Reading Comprehension		2
5	Unit-5: Writing Skills: Selection of topic, thesis statement, developing the thesis; introductory, developmental, transitional and concluding paragraphs, linguistic unity, coherence and cohesion, descriptive, narrative, expository and argumentative writing, Dialogue writing, Paragraph writing, ITEP ±Writing Task 1: write a short note to respond to a simple situation or topic (75 to 100 words), E- mail, memorandum, notices, agenda.		10

SHRI GOVIND GURU UNIVERSITY

**SYLLABUS FOR 1st Sem B.Sc. PROGRAMME
Basics of Computer Application (11100103)**

Type of Course: B.Sc.

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme					Total
Lect. Hrs./week	Tut Hrs.	Lab Hrs.	Credit	External		Internal			
				T	P	T	CE	P	
2	-	-	2	60	-	40	-	-	100

Lect- Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** – Practical

Sr.	Topic	Weightage	Teaching Hrs.
1.	Unit-1 Unit-1: Basic concept of computer: Introduction, different components of computer, basic design of computer	33%	10
2	Unit-2 Unit-2: Introduction to Microsoft Office: Windows operation: Customizing the interface, windows explorer, computer upkeep & utilities Office operation Microsoft word: concept of toolbar, character, paragraph & document formatting, drawing tool bar, header footer, document editing, pagesetup, short cut keys, text & graphics. Microsoft excel: concept of spread sheets, creating worksheet, well formatted documents, concept of row, column, cell & formula bar, using function, using shortcuts, chart, conditional formatting, goal seek, validation rule. Microsoft powerpoint: slide presentation, slide layout & design, custom animation, image importing, slide transition	67%	20

**SHRI GOVIND GURU UNIVERSITY - FACULTY OF APPLIED SCIENCE
SYLLABUS FOR 1st Sem B.Sc. PROGRAMME**

Lab- I Cell biology and Introduction to microbiology (11100106)

Type of Course: B.Sc.

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
Lec	Tut	Lab		External		Internal			
	-	3	2	T	P	T	CE	P	50
					30	-	-	20	

Lect- Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** – Practical

1. Microbiology Good Laboratory Practices and Biosafety.
2. To study the principle and applications of important instruments (biological safety cabinets, autoclave, incubator, BOD incubator, hot air oven, light microscope, pH meter) used in the microbiology laboratory.
3. Preparation of culture media for bacterial cultivation.
4. Sterilization of medium using Autoclave and assessment for sterility
5. Sterilization of glassware using Hot Air Oven and assessment for sterility
6. Sterilization of heat sensitive material by membrane filtration and assessment for sterility
7. Demonstration of the presence of microflora in the environment by exposing nutrient agar plates to air.
8. Study of *Rhizopus*, *Penicillium*, *Aspergillus* using temporary mounts
9. Study of *Spirogyra* and *Chlamydomonas*, *Volvox* using temporary Mounts
10. Study of the following protozoans using permanent mounts/photographs: *Amoeba*, *Entamoeba*, *Paramecium* and *Plasmodium*.
11. **Cell Biology:**
Structure and working of microscopes (Simple microscope, Compound microscope)
- 12 Observation of Prokaryotic and Eukaryotic cells and cell types (Living cells/Temporary/Permanent preparations).
13. Structure of a plant cell (through chart/model)
14. Structure of animal cell (through chart/model).
- 15 Structure of cell organelles adopting preparations/charts/models Mitochondria
- 16 Chloroplast o Ribosomes o Endoplasmic reticulum o Nucleus
- 17 Mitosis □ Squash preparation of Onion root-tip
- 18 Meiosis-Squash preparation of anther lobes.

SHRI GOVIND GURU UNIVERSITY -

SYLLABUS FOR 1st Sem B.Sc. PROGRAMME
Lab- II (Practical in Biochemistry-I and Chemistry-I)(11103104)

Type of Course: B.Sc.

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
Lec	Tut	Lab		External		Internal			
	-	3	2	T	P	T	CE	P	50
					30	-	-	20	

Lect- Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** – Practical

1. Biochemistry-I: Preparation of standard buffers and determination of pH of a solution
2. Biochemistry-I: Qualitative tests for Carbohydrates
3. Biochemistry-I: Qualitative tests for Proteins and amino acids
4. Biochemistry-I: Qualitative tests for Lipids
5. Biochemistry-I: Titration curve of amino acids and determination of pK value.
6. Biochemistry-I: Verification of Beer-Lambert's law.
7. Biochemistry-I: Estimation of reducing sugars by DNSA method
8. Biochemistry-I: Quantitative estimation of amino acids by Ninhydrin method
9. Biochemistry-I: Separation of sugars using paper chromatography
10. Chemistry-I: Detection of elements and functional groups
11. Chemistry-I: Detection of elements in an Organic compound
12. Chemistry-I: Detection of the functional groups present in an organic compound

SHRI GOVIND GURU UNIVERSITY
SYLLABUS FOR 2nd Sem B.Sc. PROGRAMME
Molecular Genetics (11102151)

Type of Course:B.Sc.

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
Lect	Tut	Lab		External		Internal			
				T	P	T	CE	P	
3	-	-	3	60	-	20	20	-	100

Lect- Lecture, **Tut-** Tutorial, **Lab-** Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	unit 1: A. Science of Genetics ±Classical, Molecular and Evolutionary Genetics, History of Human Genetics Pedigrees- gathering family history, pedigree symbols, construction of pedigrees, presentation of molecular genetic data in pedigrees, Autosomal and Sex Linked Inheritance, Mitochondrial and Chloroplast Inheritance	10%	7
2	B. Genome Organization and complexity- Organization of viral and bacterial genomes, Eukaryotic genome, C-value paradox, Repetitive DNA, General concept of a gene, Gene families, Non-coding genes, Chromatin structure, Polytene and Lampbrush Chromosomes	13%	8
3	unit 2: A. Classical Genetics ±Mendel's Laws of inheritance, Deviation from Mendel's Dihybrid phenotype, Linkage, Sutton's view on linkage, Morgan's view on linkage, Bateson and Punnett's Coupling and Repulsion hypothesis.	16%	7
4	B. Linkage and Crossing over -Chromosome theory of Linkage, kinds of linkage, linkage groups, types of Crossing over, mechanism of Meiotic Crossing over, kinds of Crossing over, theories about the mechanism of Crossing over	16%	8
5	unit 3: A. Allelic Variation and Gene function ±Multiple allele, Genetic interaction, Epistatic interactions, Non-Epistatic inter-allelic genetic interactions, Atavism/Reversion, Penetrance (complete and incomplete), Expressivity, Pleiotropism, Modifier/Modifying genes.	16%	7

6	B. Structural and functional organization of interphase nucleus - Mitosis and Meiosis, Numerical and structural anomalies in chromosome, Dosage compensation	16%	8
7	unit 4: Population and Evolutionary Genetics - Macro- and Micro - evolution in Mendelian population, Hardy-Weinberg equilibrium and conditions for its maintenance, Elemental forces of evolution - Mutation, Selection (Types of selection, selection coefficient, selection in natural populations), Genetic drift, Migration Species and speciation - Sympatric and Allopatric	13%	15

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Molecular Biology of Cell
Bruce Albert
2. Molecular Cell Biology
Lodish
3. Genes VIII
Lewin
4. Principle of Genetics
Gardener
5. Essentials of Genetics
Klugg and Cummings
6. Genetics
B.D .Singh

SHRI GOVIND GURU UNIVERSITY

SYLLABUS FOR 2nd Sem B.Sc. PROGRAMME

Lab-1 (Molecular Genetics and Microbial Techniques) (11102152)

Type of Course:B.Sc.

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme (Hrs./Week)			Credit	Examination Scheme					Total
Lect	Tut	Lab		External		Internal			
				T	P	T	CE	P	
-	-	3	2	-	30	-	-	20	50

Lect- Lecture, **Tut-** Tutorial, **Lab-** Lab, **T -** Theory, **P -** Practical, **CE -** CE, **T -** Theory, **P -** Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	Molecular Genetics: Preparation of mitotic chromosomes from onion root tip	%	3
2	Molecular Genetics: Preparation meiotic chromosomes from datura or hibiscus pollen grain	%	3
3	Molecular Genetics: Preparation of metaphase chromosomes	%	3
4	Molecular Genetics: Mutagenesis by gradient plate method	%	3
5	Molecular Genetics: Replica plating	%	3
6	Molecular Genetics: Cell fractionation: Nucleus isolation and staining	%	3
7	Molecular Genetics: Study of microbiocidal effect of UV rays	%	3
8	Microbial Techniques: Staining ‡Simple staining: Monochrome, Negative ‡Differential : Gram's staining ‡Structural staining: I Capsule staining (Manvel's Method) ‡Hanging drop technique.	%	3

9	Microbial Techniques: Preparation of culture media ‡Nutrient broth and Agar ‡MacConkey's Broth and Agar ‡Sugar Media	%	3
10	Microbial Techniques: Isolation of bacteria from mixed culture ‡Streak plate method ‡Spread plate method ‡Pour plate method	%	3
11	Microbial Techniques: Study of Bacterial Growth curve.	%	3
12	Microbial Techniques: Effect of physical and chemical agents on growth of bacteria ‡pH ‡Temperature ‡Heavy metal ions (Oligodynamic Action) ‡U.V. Rays ‡Antibiotics	%	3

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc

