



# SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU

## B.Sc., Biochemistry Course Structure for the Academic year 2020-21

Skill Enhancement Courses (SECs) for Semester -V,

From 2022-23(Syllabus-Curriculum)

Structure of SECs for Semester-V

(batch)

(To choose One pair from the Four alternate pairs of SECs)

| Univ. Code | Courses 6&7 | Name of Course           | Th. Hrs/ Week | IE Marks | EE Marks | Credits | Prac. Hrs/wk | Marks | Credits |
|------------|-------------|--------------------------|---------------|----------|----------|---------|--------------|-------|---------|
|            | 6A          | Genetic Engineering      | 3             | 25       | 75       | 3       | 3            | 50    | 2       |
|            | 7A          | Advances In Biochemistry | 3             | 25       | 75       | 3       | 3            | 50    | 2       |

OR

| Univ. Code | Courses 6&7 | Name of Course                        | Th.Hrs/ Week | IE Marks | EE Marks | Credits | Prac. Hrs/wk | Marks | Credits |
|------------|-------------|---------------------------------------|--------------|----------|----------|---------|--------------|-------|---------|
|            | 6B          | Laboratory techniques and Diagnostics | 3            | 25       | 75       | 3       | 3            | 50    | 2       |
|            | 7B          | Blood Banking & Clinical Science      | 3            | 25       | 75       | 3       | 3            | 50    | 2       |

OR

| Univ. Code | Courses 6&7 | Name of Course                                   | Th. Hrs/ Week | IE Marks | EE Marks | Credits | Prac. Hrs/wk | Marks | Credits |
|------------|-------------|--|---------------|----------|----------|---------|--------------|-------|---------|
|            | 6C          | Molecular Basis Of Infectious Diseases           | 3             | 25       | 75       | 3       | 3            | 50    | 2       |
|            | 7C          | Molecular Basis Of Non-Infectious Human Diseases | 3             | 25       | 75       | 3       | 3            | 50    | 2       |

Note: \*Course type code: T: Theory, L: Lab, P: Problem solving

\*Note: FIRST and SECOND PHASES (2 spells) of APPRENTICESHIP between 1st and 2nd year and between 2nd and 3rd year (two summer vacations)

\*Note: THIRD PHASE of APPRENTICESHIP Entire 6th Semester

**Note-1:** For Semester-V, for the domain subject Biochemistry, any one of the three pairs of SECs shall be chosen as courses 6 and 7, i.e., 6A & 7A or 6B & 7B or 6C & 7C. The pair shall not be broken (ABCD allotment is random, not on any priority basis).

**Note-2:** One of the main objectives of Skill Enhancement Courses (SEC) is to inculcate field skills related to the domain subject in students. The syllabus of SEC will be partially skill oriented.

Hence, teachers shall also impart practical training to students on the field skills embedded in the syllabus citing related real field situations

*[Signature]*



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**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

|                   |  |                  |
|-------------------|--|------------------|
| <b>B.Sc</b>       | <b>Semester – V (Skill Enhancement Course- Elective)</b> | <b>Credits:4</b> |
| <b>Course: 6A</b> | <b>Genetic Engineering</b>                               | <b>Hrs/Wk:4</b>  |

**Learning outcomes:**

Students after successful completion of the course will be able to

1. Understand different types of Genetic Engineering steps
2. Identify various tools required to do Genetic Engineering experiments.
3. Understood expertise related to various practices in a Genetic Engineering experiments
4. Acquire skills to get an employment or to become an entrepreneur.

**Syllabus:** (Total 90 hrs. (Including Teaching, Lab, Field Training and unit tests etc.)

**Unit- I: Introduction to genetic engineering** 10 hours

- 1.1 Importance and outline of recombinant DNA technology
- 1.2 Tools of r-DNA technology- Restriction endonucleases- types, mechanism of action and applications
- 1.3 Restriction modification- methylases; other enzymes- methyl transferases, Restriction mapping.
- 1.4 Ligases - types and mechanism of action, applications
- 1.5 linkers, adaptors, homopolymer tailing
- 1.6 phosphatases, reverse transcriptase, polynucleotide kinases, Klenow fragment.
- 1.7 Terminal transferase, nucleases-S1 and RNAase- H.

**Unit- II: Vectors in genetic engineering** 10 hours

- 2.1 Cloning vectors- Plasmids, types of plasmids - pBR322, pUC8, pGEM3Z.
- 2.2  $\lambda$  phages vectors- M13 phage Vector
- 2.3 cosmids
- 2.4 Artificial chromosomes Vectors - BAC, YAC
- 2.5 Cloning vectors for higher plants- *Agrobacterium* vectors

**Unit -III Transformation** 10 hours

- 3.1 Preparation of competent cells of bacteria.
- 3.2 selection for transformed cells physical, chemical and biological methods of gene transfer
- 3.3 physical- microinjection, electroporation, biolistic, ultrasound
- 3.4 chemical- calcium phosphate precipitation method, PEI, dendrimers;
- 3.5 biological- liposome mediated; transfection, electroporation, transformation of protoplasts.

**UNIT –IV Selection and screening of recombinants** 10 hours

- 4.1 Construction of genomic libraries.
- 4.2 Construction of c-DNA libraries
- 4.3 Isolation and sequencing of cloned genes- colony hybridization
- 4.4 nucleic acid and protein hybridization, using  $\beta$ - galactosidases, green fluorescent proteins

**UNIT –V Applications of Genetic engineering** 10 hours

- 5.1 Gene cloning in medicine -Insulin, human growth hormone, Blood clotting factor VIII, interferons
- 5.2 Genetic engineering in plants - production of *Bt-cotton* and edible vaccines.
- 5.3 Human gene therapies
- 5.4 Genetic engineering role in disease diagnosis





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|-------------------|--|------------------|
| <b>B.Sc</b>       | <b>Semester – V (Skill Enhancement Course- Elective)</b> | <b>Credits:1</b> |
| <b>Course: 6A</b> | <b>Genetic Engineering Lab</b>                           | <b>Hrs/Wk:2</b>  |

Skill outcomes:

On successful completion of the practical course, student shall be able to

1. List out different types of Tools for Genetic Engineering.
2. Identify the Laboratory tools
3. Develop skill on isolation and separation Of DNA
4. Develop skill on isolation and separation Of Proteins

**Practical syllabus:**

1. Isolation of DNA from bacterial cells
2. Isolation of plasmid DNA
3. Agarose gel electrophoresis of DNA
4. Quantification of DNA by Spectrophotometer
5. Separation of proteins by SDS-PAGE
6. Restriction digestion of DNA[demo with record]
8. Bacterial Transformation [demo with record]

**REFERENCE BOOKS**

1. Molecular Biology of the cell. Alberts, B; Bray, D, Lews, J., Raff, M., Roberts, K and Watson, J.D. Garland publishers, Oxford
2. Molecular Biology of the Gene - By Watson, Hopkins, Goberts, Steitz and Weiner (Pearson Education)
3. Text Book of Biotechnology - By H.K. Das (Wiley Publications)
4. Gene Structure & Expression - By J.D. Howkins, Publ: Cambridge
5. Test Book of Molecular Biology - By K.S. Sastry, G. Padmanabhan& C. Subramanyan, Publ: Macmillan India
6. Principles of Gene Manipulation - By R.W. Old & S.B. Primrose, Publ: Blackwell
7. Genes - By B. Lewin - Oxford Univ. Press
8. Molecular Biology &Biotechnol. - By H.D. Kumar, Publ: Vikas
9. Methods for General & Molecular Bacteriology - By P. Gerhardt et al., Publ: ASM
10. Molecular Biotechnology - By G.R. Click and J.J. Pasternak, Publ: Panima
11. Genes and Genomes – By Maxine Singer and Paul Berg
12. Molecular Biology - By D. Freifelder, Publ: Narosa
13. Molecular biology. By;F.Weaver. WCB/McGraw Hill.
14. Gene, Genomics and Genetic Engineering - By Irfan Ali Khan and AtiyaKhanum (Ukaaz Publications).

**SUGGESTED REFERENCES FOR PRACTICALS:**

1. Practical clinical Biochemistry - Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and co. ltd., Vol, I, II, III
3. Clinical chemistry – Ranjana Chawla
4. laboratory Manual in Biochemistry – Jayaraman
5. Biochemical methods – S.Sadasivan And Manickam
6. Introduction to practical biochemistry – David T. Plummer.



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**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

**Co-curricular activities:**

- a) Mandatory:** (Training of students by teacher on field related skills: 15hrs)
1. For teachers: Training of students by teacher in laboratory and field for a total of 15hrs on divisions in diagnostic center and infrastructure of diagnostic center.
  2. For students; Visit to local diagnostic centers, observing the various analysis doing in lab. Submission of field work report of 10 pages in the prescribed format.
  3. Maximum marks for field work report: 05
  4. Suggested format for field work report: Title page, student details, content page, introduction, work done, findings, conclusion and acknowledgements.
  5. Unit test (IE)
- b) Suggested co-curricular activities:**
1. Visit to diagnostic centers
  2. Learning techniques of basic tools and instruments handling related to field work
  3. Observe the Sample collection, processing and preservation
  4. Training of students by related subject experts
  5. Attending special lectures, group discussions and seminars on related topics





**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

**MODEL QUESTION PAPER**  
**Semester V**  
**(Skill Enhancement Course- Elective)**  
**PAPER-6A Genetic Engineering**  
**(w.e.f. 2022-23)**

**Time: 3 hours**

**Max. Marks: 75**

**SECTION-A**

**5X5=25M]**

Answer any five questions. Each question carries 5 marks.

1. Restriction endonucleases.
2. Reverse transcriptase.
3. PBR322.
4. Cosmid.
5. Electroporation.
6. GFP.
7. C-DNA library.
8. Edible vaccines.

**SECTION-B**

**[5X10=50M]**

Answer all the questions. Each question carries 10 marks.

9. a) Write an essay on importance and various applications of r-DNA technology.  
(OR)  
b) Write in detailed note on mechanism of ligases and their applications.
10. a) Write an essay on  $\lambda$  phage vectors.  
(OR)  
b) Write an essay on cloning vectors for higher plants.
11. a) Explain various biological methods of gene transfer .  
(OR)  
b) Write an essay on preparation of competent cells of bacteria.
- 12 a) Write a detailed note on construction of genomic libraries.  
(OR)  
b) Write an essay on isolation and sequencing of cloned genes.
- 13.a) Write a detailed note on gene cloning mechanism of Insulin hormone .  
(OR)  
b) Write an essay on genetic engineering role in disease diagnosis.



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**Suggested Question Paper Model for Practical Examination**  
**Semester – V/ Biochemistry Course – 6 A (Skill Enhancement Course)**  
**BCP-6A: GENETIC ENGINEERING**

Max. Time: 3 Hrs.

Max. Marks: 50

1. To Separate the given protein sample by SDS-PAGE . 20 M
2. Write the principle, procedure for Isolation of DNA from bacterial cells. 10M
3. Write the principle /procedure for following Practical's 5 M
- a) Restriction digestion of DNA b) Bacterial Transformation

4. Scientific Identification of spotters

5 x 1 = 5 M

- A. C-DNA library.
- B. PBR322.
- C. Cosmid.
- D. Electroporation.
- E. Restriction endonucleases.

5. Record + Viva-voce

5+5 = 10 M





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|                   |  |                  |
|-------------------|--|------------------|
| <b>B.Sc</b>       | <b>Semester – V (Skill Enhancement Course- Elective)</b> | <b>Credits:4</b> |
| <b>Course: 7A</b> | <b>Advances in Biochemistry</b>                          | <b>Hrs/Wk:4</b>  |

**Learning outcomes:**

Students after successful completion of the course will be able to

1. To gain the knowledge about various techniques used in Molecular biology
2. To gain the knowledge about various techniques used in tissue culture to Obtain high yielding and disease resistant varieties etc
3. To understand the propagation of animal cells and tissues under laboratory Conditions and their importance
4. To gain knowledge about stem cells and their importance in treatment of Diseases
5. To acquire knowledge about types of vaccines, their preparation and Applications of gene therapy
6. Acquire skills to get an employment or to become an entrepreneur.

**Syllabus:** (Total 90 hrs. (Including Teaching, Lab, Field Training and unit tests etc.)

**Unit-1 Molecular biology Techniques**

- 1.1 DNA sequencing- Maxam Gilbert and Sanger's methods.
- 1.2 Polymerase chain reaction (PCR) and its applications
- 1.3 Types of PCR and their applications- multiplex, nested, inverse, real time, quantitative, hot-start, touchdown;
- 1.4 Methods of nucleic acid and protein hybridization-Southern, Northern and Western blotting techniques;
- 1.5 Methods for measuring nucleic acid and protein interactions – foot printing, CAT assay, gel Shift analysis.
- 1.6 DNA markers in genetic analysis – RFLP, Minisatellites, Microsatellites, PCR based RAPD markers,
- 1.7 DNA Fingerprinting.

**Unit: 2 Plant tissue culture**

- 2.1 Plant tissue culture: Culture media – Composition and preparation,
- 2.2 Totipotency, Organogenesis and plant regeneration,
- 2.3 Somatic embryogenesis, Artificial seeds, Different stages of Micropropagation.
- 2.4 Isolation and culture of protoplasts, Somatic hybridization.
- 2.5 Cybrids, Anther culture,
- 2.6 Transgenic plants and their applications

**Unit: 3 Animal tissue culture: principles and applications**

- 3.1 Cell culture technique: cell culture media, sterilization techniques
- 3.2 Cell lines, characteristic feature of cell lines and maintenance
- 3.3 Methods of separation of various cell types (physical and enzymatic methods)
- 3.4 Genetic manipulation of cells – Physical (microinjection) and Chemical methods
- 3.5 Commercial applications of cell culture: Cell based manufacturing (vaccines), toxicity testing and tissue engineering



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**Unit –IV Stem cells and its applications**

- 4.1 Stem cells – Sources embryonic stem cells, adult stem cells, cord blood stem cells.
- 4.2 Generation of stem cells by cloning, stem cell differentiation, stem cell plasticity, preservation of stem cells.
- 4.3 Organogenesis through stem cells for transplantation.
- 4.4 Applications of stem cell therapy- Parkinson's disease and Alzheimer's disease.

**Unit:-V Vaccines**

- 5.1 Vaccines Classification
- 5.2 Principles of vaccination, Design of vaccines.
- 5.3 Conventional vaccines – Whole organism, live and attenuated, purified macromolecules.
- 5.4 New generation vaccines- Recombinant antigen vaccines, recombinant vector antigens,
- 5.5 DNA vaccines, synthetic vaccines, edible vaccines.
- 5.6 Vaccine delivery systems – Liposomes, micelles, ISCOMS.
- 5.7 Strategies for developing vaccines for Malaria, HIV and covid-19.

**Reference books:**

1. Plant Cell and Tissue Culture - A Tool in Biotechnology - Neumann, Karl-Hermann et al.,
2. Plant Tissue Culture- Roberta Smith, 3rd ed
3. Introduction to Plant Biotechnology – H.S.Chawla, 3rd ed
4. Textbook of Animal Biotechnology – B.Singh, S.K.Gautham
5. Vaccine Adjuvants and Delivery Systems - Manmohan Singh
6. Nanoparticulate Vaccine Delivery Systems – Martin J.D'Souza
7. Metabolic Engineering: Principles and Methodologies - Aristos A. Aristidou, Jens Nielsen et al.,
8. Human Embryonic Stem Cells - Ann Kiessling, Scott C. Anderson, 2nd ed
9. Concepts and Applications of Stem Cell Biology - Rodrigues, Gabriela et al.,
10. Principles of Gene Manipulation: An Introduction to Genetic Engineering - Sandy B. Primrose, Richard Twyman, Bob Old, 6th ed
11. Biotechnology – U.Satyanarayana





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| B.Sc       | Semester – V (Skill Enhancement Course- Elective) | Credits:1 |
|------------|---|-----------|
| Course: 7A | Advances in Biochemistry Lab                      | Hrs/Wk:2  |

**Skill outcomes:**

On successful completion of the practical course, student shall be able to

1. List out different types of Tools for plant and animal biotechnology.
2. Identify the Laboratory tools
3. Develop skill on plant tissue culture
4. Develop skill on isolation and separation Of animal cells and their maintenance

**Practical syllabus:**

1. Plant culture media and composition of MS media
2. Raising of aseptic seedlings
3. Induction of callus from different explants, cytology of callus
4. Plant propagation through Tissue culture (shoot tip and Nodal culture)
5. Establishing a plant cell culture (both in solid and liquid media)
6. Suspension cell culture
7. Cell count by hemocytometer.
8. Establishing primary cell culture of chicken embryo fibroblasts.
9. Animal tissue culture – maintenance of established cell lines.
10. Estimation of cell viability by dye exclusion (Trypan blue).

**SUGGESTED REFERENCES FOR PRACTICALS:**

1. Practical clinical Biochemistry - Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and co. Ltd., Vol, I, II, III
3. Clinical chemistry – Ranjana Chawla
4. laboratory Manual in Biochemistry – Jayaraman
5. Biochemical methods – S.Sadasivan And Manickam
6. Introduction to practical biochemistry – David T. Plummer.

**Co-curricular activities:**

- a) **Mandatory:** (Training of students by teacher on field related skills: 15hrs)
1. For teachers: Training of students by teacher in laboratory and field for a total of 15hrs on divisions in diagnostic center and infrastructure of diagnostic center.
  2. For students; Visit to local diagnostic centers ,observing the various analysis doing in lab . Submission of field work report of 10 pages in the prescribed format.
  3. Maximum marks for field work report: 05
  4. Suggested format for field work report: Title page, student details, content page, introduction, work done, findings, conclusion and acknowledgements.
  5. Unit test (IE)
- b) **Suggested co-curricular activities:**
1. Visit to diagnostic centers
  2. Learning techniques of basic tools and instruments handling related to field work
  3. Observe the Sample collection, processing and preservation
  4. Training of students by related subject experts
  5. Attending special lectures, group discussions and seminars on related topics



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**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

**MODEL QUESTION PAPER**  
**Semester V**  
**(Skill Enhancement Course- Elective)**  
**PAPER-7A Advances in Biochemistry**  
**(w.e.f. 2022-23)**

**Time: 3 hours**

**Max. Marks: 75**

**SECTION-A**

**[5X5=25M]**

Answer any five questions. Each question carries 5 marks.

1. Sanger's method.
2. Southern blotting.
3. Totipotency.
4. Somatic hybridization.
5. Cell culture media.
6. Stem cell.
7. Principles of vaccination.
8. DNA vaccines.

**SECTION-B**

**[5X10=50M]**

Answer **ALL** the questions. Each question carries 10 marks.

9. a) Write an essay on PCR and its applications.  
(OR)  
b) Write in detailed note on DNA finger printing.
10. a) Write an essay on plant tissue culture.  
(OR)  
b) Write an essay on transgenic plants and their applications.
11. a) Write a detailed note on various methods of separation of various cell types.  
(OR)  
b) Write an essay on Commercial applications of cell culture.
12. a) Write an essay on generation of stem cells by cloning.  
(OR)  
b) Write an essay on applications of stem cell therapy.
13. a) Write a detailed note on classification of vaccines.  
(OR)  
b) Write an essay on strategies for developing vaccines for HIV and COVID-19.





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**Suggested Question Paper Model for Practical Examination**  
**Semester – V/ Biochemistry Course – 6 A (Skill Enhancement Course)**  
**BCP-7A: ADVANCES IN BIOCHEMISTRY**

Max. Time: 3 Hrs.

Max. Marks: 50

- |   |             |
|---|-------------|
| 1. Estimate the Estimation of cell viability by dye exclusion           | 20 M        |
| 2. Write the principle, procedure for Establishing a plant cell culture | 10M         |
| 3. Write the principle /procedure for following Practicals              | 5 M         |
| a) Raising of aseptic seedlings   |             |
| b) Plant propagation  |             |
| 4. Scientific Identification of spotters                                | 5 x 1 = 5 M |
| A. Southern blotting.   |             |
| B. DNA vaccines.  |             |
| C. Cell culture media.  |             |
| D. Totipotency.   |             |
| E. Somatic hybridization.   |             |
| 5. Record + Viva-voce   | 5+5 = 10 M  |



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|                   |  |                  |
|-------------------|--|------------------|
| <b>B.Sc</b>       | <b>Semester – V (Skill Enhancement Course- Elective)</b> | <b>Credits:4</b> |
| <b>Course: 6B</b> | <b>Laboratory Techniques and Diagnostics</b>             | <b>Hrs/Wk:4</b>  |

**Learning outcomes:**

Students after successful completion of the course will be able to

1. Understand different types of diagnostic Laboratory Techniques
2. Identify various facilities required to set up a diagnostic labs.
3. Understand expertise related to various practices in diagnostic labs.
4. Acquire skills to get an employment or to become an entrepreneur.

**Syllabus: (Total 90 hrs. (Including Teaching, Lab, Field Training and unit tests etc.))**

**UNIT – I: Basic Medical Laboratory Principles and Procedures: (10h)**

- 1.1 Code of conduct for laboratory personnel – safety measures in the laboratory, chemical/reagents labeling, storage and usage.
- 1.2 First Aid in laboratory accidents – Precautions and first aid equipment's.
- 1.3 Sterilization, preparation of reagents.
- 1.4 General approach to quality control, quality control of quantitative data.
- 1.5 Reporting laboratory tests and keeping records.

**UNIT-II: Laboratory equipment's: (10h)**

- 2.1 Principle, Procedure & Applications of microscope – light microscope, Phase contrast, Fluorescence, Electron microscope.
- 2.2 Centrifuge-principle, types and applications
- 2.3 Colorimeter - Usage and care.
- 2.4 serological water bath and incubator, hot-air oven

**UNIT-III: Urine Analysis: (10h)**

- 3.1 Composition- abnormal and normal constituents of urine
- 3.2 Collection and preservation of urine
- 3.3 Physical examination
- 3.4 Chemical examination [abnormal and normal constituents of urine]
- 3.5 Microscopic examination of the urinary sediment.
- 3.6 Microbial culture of urine

**UNIT- IV: Stool Examination: (10h)**

- 4.1 Specimen collection- inspection of faeces- odour, pH
- 4.2 Interfering substance.
- 4.3 Test for occult blood, fecal fat
- 4.4 Microscopic examination of stool specimen.

**UNIT-V: Clinical Hematology: (10h)**

- 5.1 Collection of blood - Anticoagulants, preservation
- 5.2 Hemoglobin estimation by Sahli's method
- 5.3 RBC count, Packed cell volume [PCV]
- 5.4 Erythrocyte sedimentation rate [ESR]
- 5.5 Total and differential count of WBC, Platelet count
- 5.6 Blood grouping, ABO system, Rh System,

**SUGGESTED REFERENCES:**

- Park, K. (2007), Preventive and Social Medicine, B.B. Publishers
- Godkar P.B. and Godkar D.P. Textbook of Medical Laboratory Technology, II Edition, Bhalani Publishing House
- Cheesbrough M., A Laboratory Manual for Rural Tropical Hospitals, A Basis for Training Courses
- Guyton A.C. and Hall J.E. Textbook of Medical Physiology.
- Robbins and Cortan, Pathologic Basis of Disease, VIII Edition.
- Prakash, G. (2012), Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Co. Ltd.
- Medical laboratory technology by Mukaraje

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**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

B.Sc Bio-Chemistry Syllabus (w.e.f:2020-21A.B)

|                   |  |                  |
|-------------------|--|------------------|
| <b>B.Sc</b>       | <b>Semester – V (Skill Enhancement Course- Elective)</b> | <b>Credits:1</b> |
| <b>Course: 6B</b> | <b>Laboratory Techniques and DiagnosticsLab</b>          | <b>Hrs/Wk:2</b>  |

**Skill outcomes:**

On successful completion of the practical course, student shall be able to

1. List out different types of Blood Cells.
2. Identify the Laboratory tools
3. Develop skill on Collection and analysis of urine
4. Develop skill on Collection and analysis of fecal sample

**Practical syllabus:**

1. Hemoglobin estimation by Shale's method
2. RBC count
3. ESR
4. Total and differential WBC count
5. Blood grouping [ ABO system & Rh System]
6. Collection of urine and fecal samples
7. Fecal analysis to detect fats, undigested food and blood
8. Qualitative analysis of urine for normal and pathological conditions.

**SUGGESTED REFERENCES FOR PRACTICALS:**

1. Practical clinical Biochemistry - Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and co. ltd., Vol, I, II, III
3. Clinical chemistry – Ranjana Chawla
4. laboratory Manual in Biochemistry – Jayaraman
5. Biochemical methods – S.Sadasivan And Manickam
6. Introduction to practical biochemistry – David T. Plummer.

**Co-curricular activities:**

- a) Mandatory: (Training of students by teacher on field related skills: 15hrs)
    - 1) For teachers: Training of students by teacher in laboratory and field for a total of 15hrs on divisions in diagnostic center and infrastructure of diagnostic center.
    - 2) For students; Visit to local diagnostic centers, observing the various analysis doing in lab.
- Submission of field work report of 10 pages in the prescribed format.
- 3) Maximum marks for field work report: 05
  - 4) Suggested format for field work report: Title page, student details, content page, introduction, work done, findings, conclusion and acknowledgements.
  - 5) Unit test (IE)
- b) Suggested co-curricular activities:**
1. Visit to diagnostic centers
  2. Learning techniques of basic tools and instruments handling related to field work
  3. Observe the Sample collection , processing and preservation
  4. Training of students by related subject experts
  5. Attending special lectures, group discussions and seminars on related topics



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**MODEL QUESTION PAPER**  
**Semester V**  
**(Skill Enhancement Course- Elective)**  
**PAPER-6B: Laboratory Techniques and Diagnostics**  
**(w.e.f. 2022-23)**

**Time: 3 hours**

**Max. Marks: 75**

**SECTION-A**

**[5X5=25M]**

(Answer any five questions. Each question carries 5 marks)

1. First aid and precautions.
2. Quality control.
3. Incubator.
4. Normal and abnormal constituents of urine.
5. Physical examination of urine.
6. Test for fecal fat.
7. ESR.
8. ABO system.

**SECTION-B**

**[5X10=50M]**

(Answer all the questions. Each question carries 10 marks)

9. a) Write an essay on Laboratory safety and hygiene.  
(OR)  
b) Write in detailed note on sterilization and preparation of reagents.
10. a) Write an essay on working principle of Electron microscope.  
(OR)  
b) Write the working principle and instrumentation of Laboratory centrifuge.
11. a) Write a detailed note on collection and preservation of urine.  
(OR)  
b) Write an essay on microbial culture of urine.
12. a) Write an essay on specimen collection and inspection of faeces.  
(OR)  
b) Write an essay on microscopic examination of stool specimen.
13. a) How do you estimate Haemoglobin percentage by Sahli's method.  
(OR)  
b) Write an essay on total and differential count of WBC.





**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

**Suggested Question Paper Model For Practical Examination**

Semester – V/ Biochemistry Course – 6 A (Skill Enhancement Course)

**BCP-6B: LABORATORY TECHNIQUES AND DIAGNOSTICS**

Max. Time: 3 Hrs.

Max. Marks: 50

1. Estimate the amount of Hemoglobin by Shale's method 20 M
2. Write the principle ,procedure for Blood grouping 10M
3. Write the principle /procedure for following Practicals 5 M  
a) ESR b) Total count of RBC
4. Scientific Identification of spotters 5 x 1 = 5 M
  - A. Centrifuge
  - B. Colorimeter
  - C. light microscope
  - D. Neubauer chamber
  - E. RBC Pipette
5. Record + Viva-voce 5+5 = 10 M



**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

|                   |  |                  |
|-------------------|--|------------------|
| <b>B.Sc</b>       | <b>Semester – V (Skill Enhancement Course- Elective)</b> | <b>Credits:4</b> |
| <b>Course: 7B</b> | <b>Blood Banking &amp; Clinical Science</b>              | <b>Hrs/Wk:4</b>  |

**Learning outcomes:**

Students after successful completion of the course will be able to

1. Understand different types of procedures in Blood Bank.
2. Identify various facilities required to set up a Blood Bank.  
And clinical lab.
3. Understood expertise related to various practices in a Blood Bank.  
And clinical lab.
4. Acquire skills to get an employment or to become an entrepreneur.

**Syllabus: (Total 90 hrs. (Including Teaching, Lab, Field Training and unit tests etc.)**

**UNIT - I: Blood Banking**

- 1.1 Blood grouping- ABO system, Rh typing.
- 1.2 Coomb's test.
- 1.3 Blood transfusion - Blood donors, donor screening, drawing of blood
- 1.4 Compatibility testing, cross matching,
- 1.5 Blood transfusion complications.

**UNIT - II: CSF and Other Body Fluids**

- 2.1 Composition of Cerebrospinal fluid & CSF analysis
- 2.2 Composition of semen
- 2.3 Semen analysis
- 2.4 sputum examination
- 2.5 pregnancy tests - Interpretation.

**UNIT - III: Endocrine Function Tests and diabetes tests**

- 3.1 thyroid hormones and its function, and Clinical disorders
- 3.2 Thyroid function test - T3 and T4, TSH, 131 I Uptake.
- 3.3 cortisol and prolactin test
- 3.4 testosterone and estrogen test
- 3.5 types of diabetes
- 3.6 Glucose tolerance test , Glycated hemoglobin

**UNIT - IV: Medical Parasitology**

- 4.1 Amoebiasis- life cycle of causative organism , pathogenesis and diagnosis
- 4.2 Malaria – life cycle, pathogenesis and diagnosis
- 4.3 Acute and chronic filariasis – diagnosis.
- 4.4 Helminthiasis- life cycle, pathogenesis and diagnosis

**UNIT - V Medical Microbiology**

- 5.1 Safety procedure in microbiological techniques.
- 5.2 Culture of organisms from various specimens.
- 5.3 Culture media
- 5.4 Antibiotic sensitivity tests (pus, urine, stool, sputum, throat swab]
- 5.5 Gram staining, Ziehl –Neilson staining (TB, Leptra bacilli).

**SUGGESTED REFERENCES:**

1. Medical Laboratory Technology - K. Mukherjee. Vol. I, II, III. Tata McGraw-Hill Publishing Company Ltd.
2. Medical Laboratory Technology – V.H. Talib
3. Clinical Laboratory practices in CMC procedure, CMC, Vellore.
4. Medical Lab Technology - Ramnik Sood.





**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**  
B.Sc Bio-Chemistry Syllabus (w.e.f:2020-21A.B)

| B.Sc       | Semester – V (Skill Enhancement Course- Elective) | Credits:1 |
|------------|---|-----------|
| Course: 7B | Blood Banking & Clinical Science Lab              | Hrs/Wk:2  |

**Skill outcomes:**

On successful completion of the practical course, student shall be able to

1. List out different types of Blood Cells.
2. Identify the Laboratory tools
3. Develop skill on Collection And Analysis Of Urine
4. Develop skill on Collection And Analysis Of fecal sample

**Practical syllabus:**

1. Blood grouping
2. RH Typing
3. Coomb's test.
4. Cerebrospinal fluid analysis
5. Semen analysis
6. pregnancy test
7. Thyroid function test - T3 and T4, TSH
8. Glucose tolerance test
9. Estimation Of Glycated hemoglobin
10. Observe the permanent Slides; malarial parasites, Amoebiasis
11. Gram staining, Ziehl –Neilson staining [demonstration]

**SUGGESTED REFERENCES:**

1. Practical clinical Biochemistry - Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and co. Ltd., Vol, I, II, III
3. Clinical Chemistry – Ranjana Chawla
4. Laboratory Manual in Biochemistry – Jayaraman
5. Biochemical methods – S.Sadasivan And Manickam
6. Introduction to Practical biochemistry – David T. Plummer.

**Co-curricular activities:**

- a) Mandatory: (Training of students by teacher on field related skills: 15hrs)
  1. For teachers: Training of students by teacher in laboratory and field for a total of 15hrs on divisions in diagnostic center and infrastructure of diagnostic center.
  2. For students; Visit to local diagnostic centers ,observing the various analysis doing in lab . Submission of field work report of 10 pages in the prescribed format.
  3. Maximum marks for field work report: 05
  4. Suggested format for field work report: Title page, student details, content page, introduction, work done, findings, conclusion and acknowledgements.
  5. Unit test (IE)
- b) Suggested co-curricular activities:
  1. Visit to diagnostic centers
  2. Learning techniques of basic tools and instruments handling related to field work
  3. Observe the Sample collection, processing and preservation
  4. Training of students by related subject experts
  5. Attending special lectures, group discussions and seminars on related topics



**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

**MODEL QUESTION PAPER**  
**Semester V**  
**(Skill Enhancement Course- Elective)**  
**PAPER-7B: Blood Banking & Clinical Science**  
**(w.e.f. 2022-23)**

**Time: 3 hours**

**Max. Marks: 75**

**SECTION-A**

**[5X5=25M]**

Answer any five questions. Each question carries 5 marks.

1. Coomb's test.
2. Cross matching.
3. Composition of semen.
4. Semen analysis.
5. Types of diabetes.
6. GTT.
7. Amoebiasis.
8. Gram's staining.

**SECTION-B**

**[5X10=50M]**

Answer All the questions. Each question carries 10 marks.

9. a) Write an essay on ABO blood grouping.  
(OR)  
b) Write in detailed note on blood transfusion.
10. a) Write an essay on composition of CSF and analysis.  
(OR)  
b) Write a detailed note on pregnancy test and interpretation.
11. a) Write an essay on thyroid hormones and its clinical disorders.  
(OR)  
b) Write a detailed note on testosterone and estrogen test .
12. a) Write an essay on malarial parasites.  
(OR)  
b) Write an essay on Helminthiasis.
13. a) Write an essay on various culture media.  
(OR)  
b) Write a detailed note on antibiotic sensitivity tests.





**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

**Suggested Question Paper Model For Practical Examination**

Semester – V/ Biochemistry Course – 6 A (Skill Enhancement Course)

**BCP-7B: BLOOD BANKING& CLINICAL SCIENCE**

Max. Time: 3 Hrs. Max. Marks: 50

1. Estimate the amount of Glycated hemoglobin present in given blood sample 20 M
2. Write the principle, procedure for Blood grouping 10M
3. Write the principle /procedure for following Practicals 5 M  
a) Coomb's test. b) GTT
4. Scientific Identification of spotters 5 x 1 = 5 M
  - A. Centrifuge
  - B. Coomb's test.
  - C. GTT
  - D. Neubauer chamber
  - E. RBC Pipette
5. Record + Viva-voce 5+5 = 10 M



**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

|                   |  |                  |
|-------------------|--|------------------|
| <b>B.Sc</b>       | <b>Semester – V (Skill Enhancement Course- Elective)</b> | <b>Credits:4</b> |
| <b>Course: 6C</b> | <b>Molecular Basis of Infectious Diseases</b>            | <b>Hrs/Wk:4</b>  |

**Learning outcomes:**

Students after successful completion of the course will be able to

1. Understand different types of Infectious Diseases .
2. Identify various transmission infectious agents into human body.
3. Understood expertise related to various molecular basis and pathogenicity of causative agents
4. Acquire skills to get an employment or to become an entrepreneur.

**Syllabus:** (Total 90 hrs. (Including Teaching, Lab, Field Training and unit tests etc.)

**Unit-I Classification of infectious agents**

- 1.1 Past and present emerging and re-emerging infectious diseases and pathogens.
- 1.2 Source, reservoir and transmission of pathogens,
- 1.3 Antigenic shift and antigenic drift.
- 1.4 Host parasite relationships, types of infections associated with parasitic organisms.
- 1.5 Overview of viral and bacterial pathogenesis. Infection and evasion.

**Unit -II Overview of diseases caused by bacteria**

- 2.1 Detailed study of tuberculosis: History, causative agent, molecular basis of host specificity, infection and pathogenicity, Diagnostics, Therapeutics
- 2.2. Detailed study of Typhoid- History, causative agent, molecular basis of host specificity, infection and pathogenicity, Diagnostics, Therapeutics
- 2.3 Detailed study of Diphtheria- History, causative agent, molecular basis of host specificity, infection and pathogenicity, Diagnostics, Therapeutics

**Unit -III Overview of diseases caused by Viruses**

- 3.1 Detailed study of AIDS- history, causative agent, pathogenesis, Diagnostics, Drugs and inhibitors.
- 3.2 Detailed study of hepatitis - history, causative agent, pathogenesis, Diagnostics, Drugs and inhibitors
- 3.3 Detailed study of polio- history, causative agent, pathogenesis, Diagnostics, Drugs and inhibitors
- 3.4 Detailed study of Covid - history, causative agent, pathogenesis, Diagnostics, Drugs and inhibitors

**Unit –IV Overview of diseases caused by parasites**

- 4.1 Detailed study of Malaria-history, causative agents, Vectors, life cycle, Host parasite interactions, Diagnostics, Treatment.
- 4.2 Detailed study of amoebiasis- history, causative agents, Vectors, life cycle, Host parasite interactions, Diagnostics, Treatment .
- 4.3 Detailed study of leishmaniasis - history, causative agents, Vectors, life cycle, Host parasite interactions, Diagnostics, Treatment

**Unit –V Overview of diseases caused by fungi**

- 5.1 Detailed study of Dermatophytosis -history, causative agents, Vectors, life cycle, Host parasite interactions, Diagnostics, Treatment.
- 5.2 Detailed study of candidosis -history, causative agents, Vectors, life cycle, Host parasite interactions, Diagnostics, Treatment .
- 5.3 Detailed study of Deep mycoses -history, causative agents, Vectors, life cycle, Host parasite interactions, Diagnostics, Treatment.





**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

|                   |  |                  |
|-------------------|--|------------------|
| <b>B.Sc</b>       | <b>Semester – V (Skill Enhancement Course- Elective)</b> | <b>Credits:1</b> |
| <b>Course: 6C</b> | <b>Molecular Basis of Infectious Diseases Lab</b>        | <b>Hrs/Wk:2</b>  |

**Skill outcomes:**

On successful completion of the practical course, student shall be able to

1. List out different types of infections caused by different groups of microbes.
2. Identify the Laboratory tools for their identification.
3. Develop skill on diagnosis of infection from samples
4. Develop skill on conformation of causative agent of infection.

**Practical syllabus:**

1. Permanent slides of pathogens. Mycobacterium tuberculosis, Plasmodium falciparum
2. WIDAL test (Tutorial & demo)
3. Gram staining (Not to be set in the examinations)
4. Acid fast staining (Not to be set in the examinations)
5. PCR based diagnosis (Tutorial & demo)
6. Dot Blot & ELISA (Tutorial & demo)

**SUGGESTED READINGS FOR THEORY:**

1. Prescott, Harley, Klein's Microbiology (2008) 7th Ed., Willey, J.M., Sherwood, L.M., Woolverton, C.J. Mc Graw Hill International Edition (New York) ISBN: 978-007- 126727. 44
2. Mandell, Douglas and Bennett.S, Principles and practices of Infectious diseases, 7th edition, Volume, 2. Churchill Livingstone Elsevier. 94
3. Sherris Medical Microbiology: An Introduction to Infectious Diseases by Kenneth J. Ryan, C. George Ray, Publisher: McGraw-Hill
4. Medical Microbiology by Patrick R. Murray, Ken S. Rosenthal, Michael A. Pfaller, Elsevier Health Sciences 95

**SUGGESTED REFERENCES FOR PRACTICALS :**

1. Practical clinical Biochemistry - Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and co. Ltd., Vol, I, II, III
3. Clinical Chemistry – Ranjana Chawla
4. Laboratory Manual in Biochemistry – Jayaraman
5. Biochemical methods – S.Sadasivan And Manickam
6. Introduction to Practical biochemistry – David T. Plummer.

**Co-curricular activities:**

- a) Mandatory: (Training of students by teacher on field related skills: 15hrs)
  1. For teachers: Training of students by teacher in laboratory and field for a total of 15hrs on divisions in diagnostic center and infrastructure of diagnostic center.
  2. For students; Visit to local diagnostic centers ,observing the various analysis doing in lab .  
Submission of field work report of 10 pages in the prescribed format.
  3. Maximum marks for field work report: 05
  4. Suggested format for field work report: Title page, student details, content page, introduction, work done, findings, conclusion and acknowledgements.
  5. Unit test (IE)
- b) **Suggested co-curricular activities:**
  1. Visit to diagnostic centers
  2. Learning techniques of basic tools and instruments handling related to field work
  3. Observe the Sample collection, processing and preservation
  4. Training of students by related subject experts
  5. Attending special lectures, group discussions and seminars on related topics



**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

**MODEL QUESTION PAPER**  
**Semester V**  
**(Skill Enhancement Course- Elective)**  
**PAPER-6C: Molecular Basis of Infectious Diseases**  
**(w.e.f. 2022-23)**

**Time: 3 hours**

**Max. Marks: 75**

**SECTION-A**

**[5X5=25M]**

Answer any five questions. Each question carries 5 marks.

1. Antigenic shift.
2. Types of infections associated with parasitic organisms.
3. Infection and pathogenicity of tuberculosis.
4. Pathogenesis of AIDS.
5. Pathogenesis of polio.
6. Host parasite interactions of malaria.
7. Amoebiasis.
8. Candidosis.

**SECTION-B**

**[5X10=50M]**

Answer all the questions. Each question carries 10 marks.

9. a) Write an essay on source, reservoir and transmission of pathogens.  
(OR)  
b) Give an overview of viral and bacterial pathogenesis.
10. a) Write a detailed note on typhoid.  
(OR)  
b) Write a detailed note on Diphtheria.
11. a) Write a detailed note on Hepatitis  
(OR)  
b) Give a detailed note on covid.
12. a) Write an essay on life cycle of malaria.  
(OR)  
b) Write an essay on Leishmaniasis.
13. a) Write a detailed note on Dermatophytosis.  
(OR)  
b) Write an detailed note on Deep mycoses.





**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

**Suggested Question Paper Model For Practical Examination**

Semester – V/ Biochemistry Course – 6 A (Skill Enhancement Course)

**BCP-6C: MOLECULAR BASIS OF INFECTIOUS DISEASES**

Max. Time: 3 Hrs. Max. Marks: 50

1. identify the given blood sample for typhoid. 20 M
2. Write the principle, procedure for grams staining 10M
3. Write the principle /procedure for following Practicals 5 M
- a) Acid fast staining b)Dot Blot & ELISA
4. Scientific Identification of spotters 5 x 1 = 5 M
- A. Amoebiasis.
- B. Candidosis.
- C. Pathogenesis of polio.
- D. Microscope.
- D. HIV
5. Record + Viva-voce 5+5 = 10 M



**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

|                   |  |                  |
|-------------------|--|------------------|
| <b>B.Sc</b>       | <b>Semester – V (Skill Enhancement Course- Elective)</b> | <b>Credits:4</b> |
| <b>Course: 7C</b> | <b>Molecular Basis of Non-Infectious Human Diseases</b>  | <b>Hrs/Wk:4</b>  |

**Learning outcomes:**

Students after successful completion of the course will be able to

1. Understand different types of Disorders Though Non- Infectious Manner .
2. Identify various Causes Disorders in human body.
3. Understood expertise related to various molecular basis of disorders
4. Acquire skills to get an employment or to become an entrepreneur.

**Syllabus:** (Total 90 hrs. (Including Teaching, Lab, Field Training and unit tests etc.)

**Unit-I Nutritional disorders**

- 1.1 Overview of major and minor nutrient components in the diet.
- 1.2 Balanced diet and the concept of RDA.
- 1.3 Nutrient deficiencies; Kwashiorkor and Marasmus,
- 1.4 Scurvy, beri beri, pellagra and B12 deficiency,
- 1.5 Xerophthalmia and Night blindness,
- 1.6 Vitamin D deficiency, Vitamin K deficiency.

**Unit-II Metabolic and Lifestyle disorders**

- 2.1 Obesity and eating disorders like Anorexia nervosa and Bullemia.
- 2.2 Diabetes mellitus -A metabolic syndrome and the relationship with hypertension, obesity, hypothyroidism and stress.
- 2.3 Cardio vascular disorders- Atherosclerosis-defining the broad spectrum of ailments that fall in this category, understanding the factors that contribute to the syndrome, stages of disorder and the management of the condition.
- 2.4 Irritable bowel syndrome- biochemistry behind the disorder and the influence of diet, stress and environment on the condition.

**Unit-III Multifactorial complex disorders and Cancer**

- 3.1 Understanding the definition of multifactorial diseases.
- 3.2 Polygenic diseases and the relationship of environmental factors and genetic makeup in the onset of diseases.
- 3.3 Cancer: characteristics of a transformed cell, causes and stages of Cancer, molecular basis for neoplastic growth and metastasis, Proto-oncogenes and tumor suppressor genes;
- 3.4 Cancer causing mutations;
- 3.5 Tumor viruses;
- 3.6 Biochemical analysis of cancer;
- 3.7 Molecular approaches to cancer treatment.

**Unit-IV Diseases due to misfolded proteins**

- 4.1 Introduction to protein folding and proteosome removal of misfolded proteins;
- 4.2 etiology and molecular basis for Alzheimer's, Prion diseases,
- 4.3 Huntington's Chorea,
- 4.4 Polycystic ovarian syndrome,
- 4.5 Parkinson's disease, ALS.

**Unit-V Monogenic diseases**

- 5.1 In born errors in metabolism: PKU, Alkaptonuria, Maple syrup urine disease;
- 5.2 Receptor and transport defects: Cystic fibrosis, Long QT syndrome,
- 5.3 familial hypercholesterolemia,
- 5.4 sickle cell anemia, Thalassemia.
- 5.5 clotting disorders-Hemophilia
- 5.6 Disorders of mood : Schizophrenia, dementia and anxiety disorders.





**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

|                   |   |                  |
|-------------------|---|------------------|
| <b>B.Sc</b>       | <b>Semester – V (Skill Enhancement Course- Elective)</b>    | <b>Credits:1</b> |
| <b>Course: 7C</b> | <b>Molecular Basis of Non-Infectious Human Diseases Lab</b> | <b>Hrs/Wk:2</b>  |

**Skill outcomes:**

On successful completion of the practical course, student shall be able to

1. List out different types of disorders and its scientific background .
2. Identify the Laboratory tools for their identification.
3. Develop skill on diagnosis of disorders at molecular level.
4. Develop skill on conformation of causative reason.

**Practical syllabus:**

1. Anthropometric measurements for normal and high risk individuals and identifications for Kwashiorkor, Marasmus and Obesity
2. Estimation of homocysteine levels in serum
3. Estimation of glycosylated hemoglobin
4. Permanent slides for different types of cancer
5. Diagnostic profile for assessment of CVS and Diabetes mellitus using case studies.
6. Bone densitometry test demonstration (visit to a nearby clinic)

**SUGGESTED READINGS**

1. Textbook of Biochemistry with Clinical Correlations (2011) Devlin, T.M. John Wiley & Sons, Inc. (New York), ISBN: 978-0-4710-28173-4.
2. Introduction to Human Physiology (2013) 8th edition; Lauralee Sherwood. Brooks/Cole, Cengage Learning.
3. The World of the cell, 7th edition (2009)
4. Genetics (2012) Snustad and Simmons,
5. Cooper, G.M. and Hausman, R.E. 2009 The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.

**SUGGESTED REFERENCES FOR PRACTICALS:**

1. Practical clinical Biochemistry - Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and co. Ltd., Vol, I, II, III
3. Clinical Chemistry – Ranjana Chawla
4. Laboratory Manual in Biochemistry – Jayaraman
5. Biochemical methods – S.Sadasivan And Manickam
6. Introduction to Practical biochemistry – David T. Plummer.

**Co-curricular activities:**

- a) Mandatory:** (Training of students by teacher on field related skills: 15hrs)
1. For teachers: Training of students by teacher in laboratory and field for a total of 15hrs on divisions in diagnostic center and infrastructure of diagnostic center.
  2. For students; Visit to local diagnostic centers, observing the various analysis doing in lab . Submission of field work report of 10 pages in the prescribed format.
  3. Maximum marks for field work report: 05
  4. Suggested format for field work report: Title page, student details, content page, introduction, work done, findings, conclusion and acknowledgements.
  5. Unit test (IE)
- b) Suggested co-curricular activities:**
1. Visit to diagnostic centers
  2. Learning techniques of basic tools and instruments handling related to field work
  3. Observe the Sample collection, processing and preservation
  4. Training of students by related subject experts
  5. Attending special lectures, group discussions and seminars on related topics



**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

**MODEL QUESTION PAPER**  
**Semester V**  
**(Skill Enhancement Course- Elective)**  
**PAPER-7C: Molecular Basis of Non-Infectious Human Diseases**  
**(w.e.f. 2022-23)**

**Time: 3 hours**

**Max. Marks: 75**

**SECTION-A**

**[5X5=25M]**

Answer any five questions. Each question carries 5 marks.

1. Balanced diet.
2. Vitamin D deficiency.
3. Obesity.
4. Atherosclerosis.
5. Polygenic diseases.
6. Alzheimer's disease.
7. PKU.
8. Hemophilia.

**SECTION-B**

**[5X10=50M]**

Answer all the questions. Each question carries 10 marks.

9.a) Write a detailed note about protein-calorie malnutrition disorders.

(OR)

b) Write an essay on disorders caused due to water soluble vitamins deficiencies.

10a) Describe a detailed note on Diabetes mellitus.

(OR)

b) Write an essay on cardiovascular disorders and various factors that contribute to it.

11. a) What is cancer and describe the various stages of cancer.

(OR)

b) Write an essay on molecular approaches to cancer treatment.

12a) Describe in detail about the protein misfolding and various disorders caused due to protein misfoldings.

(OR)

b) Write an essay on polycystic ovarian syndrome.

13. a) Write in detail about sickle cell anemia and thalassemia.

(OR)

b) Write an essay on disorders of mood.





**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU**  
**B.Sc., Biochemistry Course Structure for the Academic year 2020-21**

**Suggested Question Paper Model For Practical Examination**

Semester – V/ Biochemistry Course – 6 A (Skill Enhancement Course)  
**BCP-7C: MOLECULAR BASIS OF NON-INFECTIOUS DISEASES**

Max. Time: 3 Hrs. Max. Marks: 50

1. Estimate the amount of glycosylated hemoglobin . 20 M
2. Write the principle, procedure for Estimation of homocysteine 10M
3. Write the principle /procedure for following Practicals 5 M  
a) Kwashiorkor b) Marasmus
4. Scientific Identification of spotters 5 x 1 = 5 M
  - A. Vitamin D .
  - B. Atherosclerosis.
  - C. Polygenic diseases.
  - D. Alzheimer's disease.
  - E. PKU.

5. Record + Viva-voce 5+5 = 10 M