REVA UNIVERSITY
Bengaluru, India

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(School of Applied Sciences)
B. Sc. Medical Laboratory Technology
HAND BOOK
2020-2023

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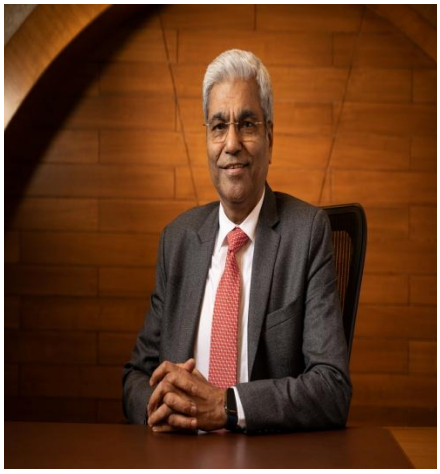
Chancellor's Message

"Education is the most powerful weapon which you can use to change the world."

- Nelson Mandela.



There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when 'intellectual gratification' has becomeindispensable. Information is easily attainable for the soul that is curious enough to go look for it. Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.

It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of 'Knowledge is Power', we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I'm always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centered and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said 'A University should be a place of light, of liberty and of learning'. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.

Dr. P. Shyama Raju
The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

The last two decades have seen a remarkable growth in higher education in India and across the globe. The move towards inter-disciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry.

A strong believer and practitioner of the dictum "Knowledge is Power", REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on a sprawling 45 acres of green campus, this 'temple of learning' has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of REVA University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students. REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of "Technology Incubation Centers" in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, "Intelligence plus character –that is the goal of education" (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating "GLOBAL PROFESSIONALS".

Welcome to the portals of REVA University!

Dr. S. Y. Kulkarni
Vice-Chancellor, REVA University

MESSAGE FROM THE DIRECTOR

Medical Laboratory Technology (MLT) is Allied Health Sciences program assimilates in itself a number of disciplines and as such hasgrown rapidly. B Sc in MLT offered by REVA University aims to provide the required skills and knowledge necessary to pursue a successful career in MLT. This program imparts need based, practical education in contemporary world to develop global competence among students. It strives to prepare students to become leaders in the field of Health Sciences in general and MLT in particular by encouraging them to inculcate scientific thinking coupled with creative and innovative ideas.

The program provides hands- on training and practical skills in the field of Health Sciences, Pathology, Microbiology & Biochemistry.

As far as employment is concerned MLT has become one of the fast-growing sectors. Employment record shows that MLT has a great scope in future. Medical laboratory technician can find careers with Hospitals, and allied health care.

The curriculum caters to and has relevance to local, regional, national, global developmental needs. Maximum number of courses are integrated with cross cutting issues with relevant to professional ethics, gender, human values, environment and sustainability.

This handbook provides you outline of regulations for bachelor's degree, scheme of instruction, and detailed syllabus. I am sure the students choosing BSc Medical Laboratory Technology at REVA University will enjoy the curriculum, teaching and learning environment, the vast infrastructure and the experienced teacher's involvement and guidance. We will strive to provide all needed comfort and congenial environment for their studies. I wish all students a pleasant stay at REVA and grand success in theircareer.

Dr. Beena G
Director
School of Applied Sciences

PREFACE

Higher education across the globe is opening doors of its academic disciplines to the real-world experiences. The disciplinary legitimacy is under critical review. Trans-border mobility and practice learning are being fore-grounded as guiding principles. Interactive learning, bridging disciplines and facilitating learners to gain different competencies through judicious management of time is viewed as one of the greatest and fascinating priorities and challenges today.

Indian economy is experiencing an upward growth right from the beginning of 21st century necessitating well qualified science graduates to work as scientists, teachers, algorithm developers, computer programmers, professionals and often administrators. At present more than 400 million youth are below 18 years of age and government is committed to increase the GER to 30% by 2020, further necessitating more number of teachers and professors to work in schools and colleges. Research has also been given equal importance. Pivate sector and Corporates are also looking for smart science graduaes in a big way. The B.Sc. (Medical Laboratory Technology) degree program of REVA University is designed to outcome as medical laboratory technician and professionals to meet the challenges of current scenerio in medical laboratory research.

The program has been developed with an emphasis on knowledge assimilation, application, national and international job market and its social relevance. The outcome based curriculum designed and followed imbibes required theoretical concepts and practical skills in the domain. By undergoing this program, you will develop practical test analysis abilities in context of all health related laboratory test. The L: T: P structure of teaching and learning under Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) would certainly help our students learn and build competencies needed in this knowledge based society.

This handy document containing brief information about B.Sc. (Medical Laboratory Technology) program, scheme of instruction and detailed course content will serve as a guiding path to you to move forward in a right direction.

I am sure you will enjoy the curriculum, teaching and learning environment, the vast infrastructure and the experienced teachers involvement and guidance. We will strive to provide all needed comfort and congenial environment for your studies. I wish you and all students' pleasant stay in REVA and grand success in your career.

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RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. **Rukmini Educational Charitable Trust** (RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjaynagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 13,000 students study various courses across REVA's three

campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette dated 7thFebruary, 2013. The University is empowered by UGC to award degrees any branch of knowledge under Sec.22 of the UGC Act. The University is a Member of Association of Indian Universities, New Delhi. The main objective of the University is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University located in between Kempegowda International Airport and Bangalore city, has a sprawling green campus spread over 45 acres of land and equipped with state-of-the-art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, custom-built teaching facilities, fully air-conditioned library and central computer centre, the well planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

The University is presently offering 23 Post Graduate Degree programs, 20 Degree and PG Degree programs in various branches of studies and has 15000+ students studying in various branches of knowledge at graduate and post graduate level and 410 Scholars pursuing research leading to PhD in 18 disciplines. It has 800+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS

– CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Director of Research and Innovation. This division facilitatesall faculty members and research scholars to undertake innovative research projects in engineering,science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our youngfaculty members are working include Data Mining, Cloud Computing, Image Processing, NetworkSecurity, VLSI and Embedded Systems, Wireless Censor Networks, Computer Networks, IOT, MEMS, Nano- Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Vibration Energies, Electric Vehicles, Multilevel Inverter Application, Battery Management System, LED Lightings, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structuralMaterials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nanomaterials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

ABOUT REVA UNIVERSITY

The REVA University has also given utmost importance to develop the much required skillsthrough variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC)department with world class infrastructure, headed by a dynamic experienced Professor & Director, and supported by well experienced Trainers, Counselors and Placement Officers. The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor& Director facilitating skill related training to REVA students and other unemployed students. TheUniversity has been recognized as a Centre of Skill Development and Training by NSDC (NationalSkill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University,Okalahoma State University, Western Connecticut University, University of Alabama, Huntsville,Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC^2, VMware, SAP, Apollo etc, to facilitate student exchange and teacher–scholar exchange programs and conduct training programs. These collaborations with foreignuniversities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Director of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. As a part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman

ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director I.I.Sc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST,Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and ScientificAdvisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also hasinstituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is **'LifeTime Achievement Award'** to be awarded to successful personalities who have made mark in theirfield of work. This award is presented on occasion of the **"Founders' Day Celebration"** of REVAUniversity on 6th January of every year in presence of dignitaries, faculty members and students gathering. The first "REVA Life Time Achievement Award" for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO, followed by Shri. Shekhar Gupta, renowned Journalist for the year 2016, Dr K J Yesudas, renowned play back singer for the year 2017. REVA also introduced"**REVA Award of Excellence"** in the year 2017 and the first Awardee of this prestigious award isShri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

REVA organizes various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society.One of such cultural events is REVAMP conducted every year. The event not only givesopportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vidaaya, - Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective pheres of activities. During this occasion, the students who have achieved top ranks and wonmedalsand prizes in academic, cultural and sports activities are also recognized by distributing awards andprizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga classes everyday to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Recognizing the fast growth of the university and its quality in imparting higher education, the BERG

(Business Excellence and Research Group), Singapore has awarded BERG Education Award 2015 to REVA University under Private Universities category. The University has also beenhonored with many more such honors and recognitions.

Vision

REVA University aspires to become an innovative university by developing excellent human resources with leadership qualities, ethical and moral values, research culture and innovative skills through higher education of global standards

Misson

- To create excellent infrastructure facilities and state-of-the-art laboratories and incubation centers
- To provide student-centric learning environment through innovative pedagogy and education reforms
- To encourage research and entrepreneurship through collaborations and extension activities
- To promote industry-institute partnerships and share knowledge for innovation and development
- To organize society development programs for knowledge enhancement in thrust areas
- To enhance leadership qualities among the youth and enrich personality traits, promote patriotism and moral values.

Objectives

- Creation, preservation and dissemination of knowledge and attainment of excellence in different disciplines
- Smooth transition from teacher - centric focus to learner - centric processes and activities
- Performing all the functions of interest to its major constituents like faculty, staff, students and the society to reach leadership position
- Developing a sense of ethics in the University and Community, making it conscious of its obligations to the society and the nation
- Accepting the challenges of globalization to offer high quality education and other services in a competitive

ABOUT SCHOOL OF APPLIED SCIENCES

The School of Applied Sciences offers graduate and post graduate programs in Biotechnology, Biochemistry, Chemistry, Physics and Mathematics which are incredibly fascinating. It aims to attract talented youth and train them to acquire knowledge and skills useful to industrial sectors, research laboratories, and educational institutions. The School presently offers B.Sc. degree programs in Bio-Chemistry, Bio-Technology, Chemistry, Physics, Mathematics and B Sc with various combinations viz, Biotechnology, Biochemistry and Genetics,Physics Chemistry and Mathematics, Mathematics , Physics and Statistics, Mathematics Statisticsand Computer Science, and Bioinformatics, Biology Mathematics & Computer Science and alsoPost Graduate Diploma in Clinical Research Management, Post Graduate Diploma in Functional Geneomics & Bioinformatics. The School also facilitates research leading to PhD in Biotechnology, Biochemistry, Physics, Chemistry, Mathematics and related areas of study.

The School of Applied Sciences is shouldered by well qualified, experienced and highly committed faculty. The state-of-the-art infrastructure digital classrooms, well equipped laboratories, conference rooms and the serene academic atmosphere at REVA University will enhance the transfer as well as creation of knowledge. The school provides an interactive, collaborative peer tutoring environment that encourages students to break down complex problemsand develop strategies for finding solutions across a variety of situations and disciplines. The school aims to develop a learning community of critical thinkers who serves as models of innovative problems solving in the university environment to enrich their academic and professional careers.

Vision

To nurture intellect, creativity, character and professionalism among students and impart contemporary knowledge in various branches of Chemical, Biological, Physical and Mathematical Sciences that are socially relevant and transform them to become global citizens.

Mission

To achieve excellence in studies and research through pedagogy and support interface between industry and academia

VALUES

- Excellence in all our academic and research endeavours
- Dedication and service to our stakeholders
- Leadership through innovation
- Accountability and transparency
- Creating conducive academic environment with service motto
- Integrity and intellectual honesty
- Ethical and moral behaviour
- Freedom of thought and expression
- Adaptability to the change
- Team-work

"The constant questioning of our values and achievements is a challenge without which neither science nor society can remain healthy"

— Aage Niels Bohr

Advisory Board Members

Sl.No.	Name of the Member	Designation
1	**Dr. Jayashree S** Prof. and HOD Dept. of Biochemistry, REVA University jayashrees@reva.edu.in	Chairperson
2	**Dr. Renuka Srihari,** Professor, Department of Biochemistry, MLACW, Bangalore rsh1_thesis@rediffmail.com	External Member
3	**Dr. Renuka P** Director & Pathologist ChanRe Diagnostic Laboratory Bangalore-560003 drrenuka@chanrediagnostic.com	External Member
4	**Dr. Gale Kathleen Edward** HOD Laboratory Service and Consultant Pathologist ELBIT Medical Diagnostics Pvt. Ltd dr.galekathleen@elbitdiagnostics.com	External Member
5	**Dr. Mahesh Mylarappa** Head, Division of Emergency Medicine, Colombia Asia Hospital, Hebbal, Bangalore.	External Member
6	**Dr. Satish Kumar Murari** Assistant Professor, Dept. of Biochemistry, REVA University satishkumar.m@reva.edu.in	Internal Member
7	**Ms. Sridevi** Associate Professor, School of Applied Sciences REVA University	Internal Member

B.Sc (Medical Laboratory Technology)

Programme Overview

The Bachelor of Science (B.Sc.) in Medical Laboratory Technology is an Allied Health specialty program that deals with the diagnosis, treatment and prevention of diseases through the utilization of clinical laboratory tests. As important members of the health care group, medical laboratory experts play an important role in collecting the information required to provide the best care to an ill or injured patient. The truth of the matter is that the practice of modern medicine would be outlandish without the tests performed in the laboratory. In this programme the students learn to perform diagnostic analysis on body fluids which include hematological, bacteriological, immunologic, biochemical and microscopic tests that aid in the diagnosis and treatment of diseases.

Medical Laboratory Technology is becoming an essential component of a growing array of areas of investigation in medical health management. The medical treatment starts only after the diagnosis of the disease and diagnose, doctors need various kinds of analysis through tests. On the basis of outcome of these tests, consultant treats and gives advice for prevention and cure. This is where the crucial role of Medical Laboratory Technology or Clinical laboratory science comes in picture. The Medical Laboratory Technicians are the ones who does the blood collection and perform the various diagnostic tests by analysing body fluids like blood, saliva and urine, tissues, microorganism screening, chemical analyses, cell counts of human body etc. This work involves the integration of human anatomy and physiology, biochemistry, microbiology, chemistry, medical laboratory techniques, applied immunology, blood coagulation and urinalysis in the broadest sense, and the interplay of these areas with areas of potential application; the Medical Laboratory Technology is best conceived of as including all these components. These activities are crucial to medical diagnosis, human healthcare activities, and healthy nation.

REVA UNIVERSITY has designed to offer B.Sc. in Medical Laboratory Technology degree programme toward human healh care diagnostic field such as hematological, bacteriological,

immunologic, biochemical and microscopic tests for healthy nation. Medical Laboratory Technicians play an important role in collecting the information needed, sampling, testing, reporting and documentation of these investigations. They determine the presence, extent or absence of disease and provide data needed to evaluate the effectiveness of treatment. Hence, this programme equips students with the knowledge and skills required to handle advanced lab equipments and perform accurate laboratory tests.

Indian healthcare sector is experiencing rapid change. However, this transformation has been ongoing for several years it has become considerably visible in the last decade, with a renewed emphasis from both the government and a growing market for healthcare services and products. Beginning of 21st century except for a short stint during the mid of present decade demanding well qualified medical lab technician to work with physician, lab manager or medical technologist. At present more than 600 million youth are below 25 years of age and government is committed to increase the GER to 30% by 2020, further necessitating more number of medical lab technicians to work in health care management. This B.Sc. Medical Laboratory Technology degree program is designed to prepare qualified medical lab technician to meet the challenges of growing market for healthcare services as well as to meet the growing aspirations of the youth.

The B.Sc. Medical Laboratory Technology programme has been planned and designed after a detailed study and interactions with various universities, research establishments and industries in India and abroad. The program has been developed with an emphasis on knowledge assimilation, application, national job market and its social relevance. The curriculum is outcome based and it imbibes required theoretical concepts and practical skills in the domain. By undergoing this programme, students develop critical, diagnostic analysis and perform accurate laboratory tests for a smooth transition from medical diagnosis to real-life work environment. In addition, students are trained in communication skills and interdisciplinary topics to enhance their scope. The above mentioned features of the programme, advanced research and development to medical diagnostics, and experience of the faculty members with their strong connections with industry, hospitals and research organizations makes this programme unique.

Programme Educational Objectives (PEOs)

The programme educational objectives of the B.Sc (MLT) course is to prepare graduates to

PEO-1	Demonstrate problem solving skills in Performing routine Clinical Laboratory Procedures by communicating effectively either leading a team or as a team member.
PEO-2	Express Express oral and written interpersonal skills as part of the health care team to understand, learn and advance their careers through research developments and seeking higher learning.
PEO-3	Understand the professional, ethical and social responsibilities through lifelong learning skills

Programme Outcomes (POs)

PO1. Demonstrate the knowledge in the areas of phlebotomy, clinical chemistry, immunology, pathogenic microbiology and pathology.

PO2. Apply the fundamentals of basic clinical laboratory principles to solve and interpret complex problems.

PO3. Comprehend, analyze, model and solve complex problems in the areas of diagnostic laboratory test results.

PO4. Recognize the need to expertise in the areas of medical laboratory technology by self up gradation through life long learning.

PO5. Communicate with clarity and coherence, both written and verbally.

PO6. Exhibit professional and ethical responsibility.

PO7. Encourage collaborative learning through group activities and clinical hands-on learning.

PO8. Use latest computer techniques and tools to carry out scientific investigations and develop new diagnostic solutions and solve problems related to environment and society.

Programme Specific Outcomes (PSOs)

After successful completion of the programme, the graduates shall be able to

PSO1. Demonistrate the knowledge of Biochemistry, Microbiology and Pathology

PSO2. Apply the concepts in the design, development and implementation of application oriented clinical laboratory solutions.

PSO3. Comprehend the fundamentals of medical laboratory skills and undertake advanced level of knowledge to analyse and create techniques to solve real life problems.

REVA University Regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Science Graduate Degree Programs, 2020

(Framed as per the provisions under Section 35 (ii), Section 7 (x) and Section 8 (xvi) & (xxi) of the REVA University Act, 2012)

1. Title and Commencement:

1.1. These Regulations shall be called the **"REVA University Regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Under Graduate Degree Programs- 2020".**

1.2. These Regulations shall come into force from the date of assent of the Chancellor.

2. The Programs:

The following programs and all Graduate Degree programs to be instituted and introduced in REVA University in coming years shall follow these regulations.

B.Sc in:

Medical Laboratory Technology

Biotechnology, Biochemistry and Genetics

Physics Chemistry and Mathematics

Mathematics, Physics and Statistics

Mathematics Statistics and Computer Science

Bioinformatics, Biology Mathematics & Computer Science

3. Definitions:

Course: Every course offered will have three components associated with the teaching-learning process of the course, namely:

- L= Lecture (ii) T= Tutorial (iii) P=Practice; where:

L stands for **Lecture** session consisting of classroom instruction.

T stands for **Tutorial** session consisting participatory discussion / selfstudy/ desk work/ brief seminar presentations by students and such other novel methods that make a student to absorb and assimilate more effectively the contents delivered in the Lecture classes.

P stands for **Practice** session and it consists of Hands on Experience / Laboratory Experiments / Field Studies / Case Studies that equip students to acquire the much required skill component.

4. Courses of study and Credits

4.1. The study of various subjects in B.Sc., degree program are grouped under various courses. Each of these course carries credits which are based on the number of hours of teaching and learning.

4.1.1. In terms of credits, every **one hour session of L amounts to 1 credit per Semester.**
In terms of credits, every **one hour session of L amounts to 1 credit per Semester** and a minimum of **two hour session of T or P amounts to 1 credit per Semester** over a period of one Semester of 16 weeks for teaching-learning process.

4.1.2. The total duration of a semester is 20 weeks inclusive of semester-end examination.

4.1.3. **A course shall have either or all the four components.** That means a course may have only lecture component, or only practical component or combination of any two or all the three components.

4.1.4. The concerned BoS will assign Credit Pattern for every course based on the requirement. However, generally, courses can be assigned with 1-4 Credits depending on the size of the course.

4.1.5. Different **Courses of Study** are labelled and defined as follows:

Core Course:

A course which should compulsorily be studied by a candidate as a core-requirement is termed as a Core course. The CORE courses of Study are of THREE types, viz – (i) Foundation Course (ii) Hard Core Course, and (iiI) Soft Core Course.

a. Foundation Course (FC)

b. Foundation Courses are four courses including language study which are mandatory in nature prescribed by the University and should be completed successfully as part of Graduate Degree Program irrespective of the branch of study.

c. Hard Core Course (HC):

The **Hard Core Course** is a Core Course in the main branch of study and related branch (es) of study, if any that the candidates have to complete compulsorily.

d. Soft Core Course (SC):

A Core course may be a **Soft Core** if there is a choice or an option for the candidate to choose a course from a pool of courses from the main branch of study or from a sister/related branch of study which supports the main branch of study.

e. Open Elective Course:

An elective course chosen generally from other discipline / subject, with an intention to seek exposure to the basics of subjects other than the main discipline the student is studying is called an O**pen Elective Course.**

f. Clinical Postings /Internship/:

Clinical Postings /Internship is a special course involving application of knowledge in solving / analysing /exploring a real life situation / difficult problem. An internship carrying **EIGHT** credits and Clinical postings with 2 to 4 credits on each semester. **Clinical Postings /Internship may be a hard core or a Soft Core as decided by the BoS / concerned.**

5. Eligibility for Admission:

Pass in PUC/10+2 examination with lifescience / Biology as compulsory subjects with minimum 45% marks (40% in case of candidate belonging to SC/ST category) in the above subjects taken together of any Board recognized by the respective State Government /Central Government/Union Territories or 2 years DMLT(10+2) or any other qualification recognized as equivalent thereto.

6. Scheme, Duration and Medium of Instructions:

6.1 The Three Year degree program is of 6 semester (3 years) duration. A candidate can avail a maximum of 12 semesters (6 years) as per double duration norm, in one stretch to complete the

ThreeYear Degree, including blank semesters, if any. Whenever a candidate opts fo blank semester, he/she has to study the prevailing courses offered by the School when he/she resumes his/her studies.

6.2. The medium of instruction shall be English.

7. Credits and Credit Distribution

7.1. A candidate has to earn 144 credits for successful completion of Three Year Degree B.Sc MLT with a distribution of credits as given in Table - 1 below:

Table-1

Credits and Credit Distribution for ThreeYear degree programs

Course Type	Credits for Three Year Degree (6 semesters)
Hard Core Course	126
Core Courses (including languages)	10
RULO	08
Total	**144**

7.2. The concerned BOS based on the credits distribution pattern given above shall prescribe the credits to various types of courses and shall assign title to every course including project work, practical work, and field work, self-study elective, as **Foundation Course (FC), Hard Core (HC) or Open Elective (OE)**.

7.3. Every course including project work, practical work, Clinical Postings, self-study elective should be entitled as Foundation Course (FC), Hard Core (HC) or Soft Core (SC) or Open Elective (OE) by the BoS concerned.

However, following shall be the

RULO (REVA Unique Learning Offerings) courses with credits mentioned against them, common to all branches of study. However the BOS of respective program/ discipline shall decide about the total credits for RULO courses.

RULO Courses		
Sl. No.	Course Title	Number of Credits
1	Sports, Yoga, Music, Dance, Theatre	2
2	Internship	8
3	Soft Skill Training	4
4	Skill Development Course	2
	Total	16

7.4. The concerned BOS shall specify the desired Program Objectives, Program Educational Objectives, Program Specific Outcomes and Course Outcomes while preparing the curriculum of a particular program.

7.5. A candidate can enrol for a maximum of 27 credits and a minimum of 21 credits per Semester. However he / she may not successfully earn a maximum of 27 credits per semester. This maximum of 27 credits does not include the credits of courses carried forward by a candidate.

7.6. Only such full time candidates who register for a minimum prescribed number of credits in each semester from I semester to VI semester and complete successfully 144 credits in 6 successive semesters shall be considered for declaration of Ranks, Medals, Prizes and are eligible to apply for Student Fellowship, Scholarship, Free ships, and such other rewards / advantages which could be applicable for all full time students and for hostel facilities.

8. Add-on Proficiency Certification / Diploma:

8.1 Add- on Proficiency Certification:

To acquire Add on Proficiency Certification a candidate can opt to complete a minimum of 2 extra credits either in the same discipline /subject or in different discipline / subject in excess to 144 credits for the Three Year Graduate degree programs.

8.2 Add on Proficiency Diploma:

To acquire Add on Proficiency Diploma, a candidate can opt to complete a minimum of 2 extra credits either in the same discipline /subject or in different discipline / subject in excess to 144 credits for the Three Year Graduate degree programs.

The Add on Proficiency Certification / Diploma so issued to the candidate contains the courses studied and grades earned.

9. Assessment and Evaluation

a) Each course is assessed for a total weight of 100%. Out of the total 100% weight; 50% weight is for Continuous Internal Assessment (CIA or IA) and the remaining 50% for the Semester End Examination (SEE). This is applicable for theory, laboratory, workshop, studio and any such courses

b) Out of 50% weight earmarked for Internal Assessment (IA)- 15% for test-1, 15% for test-2 and 20% for Assignments and this is applicable for theory based courses

c) The tests and assignments are conducted as per the semester academic calendar provided by the University.

The details as given in the table

Component	**Description**	**Conduction**	**Weight Percentage**
C1	**Test-1: IA1**	**6th week from the starting date of semester**	**15**
	Test-2: IA2	**12th week from the starting date of semester**	**15**
C2	**1 Assignment 1**	**7th week**	**10**
	2 Assignment 2	**13th week**	**10**
C3	**SEE including practical & Clinical Postings Report**	**between 17th Week-20th Week**	**50**
Results to be Announced			**By the end of 21st Week**

Note: IA or CIA includes C1 and C2

Each test must be conducted for a duration of 60 minutes, setting the test question paper for a maximum of 30 marks. The final examination must be conducted for a duration of 3 hours and the question paper must be set for a maximum of 100 marks.

d) Students are required to complete courses like technical skills, placement related courses, Open electives and any such value addition or specialized courses through online platforms like SWAYAM/NPTEL/Any other reputed online education aggregator. Students are required to choose the courses on the advice of their course coordinator/Director and required to submit the course completion certificate along with percentage of marks/grade scored in the assessment conducted by the online education aggregator. If the online education aggregator has issued a certificate along with the grade or marks scored to students, such courses will be considered for SGPA calculations, in case the aggregator has issued only a certificate and not marks scored, then such courses will be graded through an examination by concerned School, in case, if grading is not possible, students will be given a pass grade and award the credit and the credits will not be considered for SGPA calculations. The Online/MOOCs courses will not have continuous internal assessment component

Such of those students who would like to discontinue with the open elective course that they have already registered for earning required credits can do so, however, they need to complete the required credits by choosing an alternative open elective course.

Setting question paper and evaluation of answer scripts.

i. For SEE, three sets of question papers shall be set for each theory course out of which two sets will be by the internal examiners and one set will be by an external examiner. In subsequent years by carrying forward the unused question papers, an overall three sets of question papers should be managed and depending on the consumption of question papers either internal or external examiner be called for setting the question paper to maintain an overall tally of 3 papers with the conditioned mentioned earlier. The internal examiner who sets the question paper should have been course tutor

ii. The Chairman of BoE shall get the question papers set by internal and external examiners.

iii. The Board of Examiners shall scrutinize and approve the question papers and scheme of valuation. It is the responsibility of the BoE to see that all questions contained in the question paper are within the prescribed syllabus of the concerned course.

iv. There shall be single valuation for all theory papers by internal examiners.

However, there shall be moderation by the external examiner who has the subject background. In case no external examiner with subject background is available, a senior faculty member within the discipline shall be appointed as moderator.

v. The SEE examination for Practical work / Field work / Project work/Internship will be conducted jointly by internal and external examiners as detailed below: However, the BoE on its discretion can also permit two internal examiners.

vi. If a course is fully of (L=0):T:(P=0) type or a course is partly P type i.e, (L=3): (T=0) (P=1), then the examination for SEE component will be as decided by the BoS concerned.

10. Evaluation of Practical's and Minor Project / Major Project / Dissertation /Clinical Postings

10.3.1. A practical examination shall be assessed on the basis of:

a) Knowledge of relevant processes;

b) Skills and operations involved;

c) Results / products including calculation and reporting.

10.3.2. In case a course is fully of P type (L=0:T=0:P=4), the performance of a candidate shall be assessed for a maximum of 100 marks as explained below:

a) Continuous Internal assessment (CIA) = 50 marks
b) Semester end practical examination (SEE) = 50 marks

The 25 marks for continuous assessment shall further be allocated as under (IA or CIA):

i	Conduction of regular practical throughout the semester	20 marks
ii	Maintenance of lab records /industry reports	15 marks
iii	Laboratory test and viva	15 marks
	Total	50 marks

The 50 marks meant for Semester End Examination, shall be allocated as under:

i	Conduction of semester end practical examination	30 marks
ii	Write up about the experiment / practical conducted	10 marks
iii	Viva Voce	10 marks
	Total	50 marks

10.3.3. The SEE for Practical work will be conducted jointly by internal and external examiners. However, if external examiner does not turn up, then both the examiners will be internal examiners.

10.3.4. In case a course is partly P type i.e, (L=3): (T=0) (P=1), then the examination for SEE component will be as decided by the BoS concerned.

10.3.5. The duration for semester-end practical examination shall be decided by the concerned School Board.

10.4. Evaluation of Internship/Clinical Postings:

Right from the initial stage of defining the problem, the candidate has to submit the progress reports periodically and also present his/her progress in the form of seminars in addition to the regular discussion with the supervisor. At the end of the semester, the candidate has to submit final report of the project / dissertation, as the case may be, for final evaluation. The components of evaluation are as follows:

1	Intership/Clinical Postings	Should be done a semester before the project semester	Weightage: 0%
2	Intership/Clinical Postings	7th week from the start date of project semester	Weightage: 25%
3	Intership/Clinical Postings	14th Week from the start date of project semester	Weightage -25%

4	Intership/Clinical Postings	17^{th} -20^{th} Week of project Semester	Weightage: 30% for Dissertation Weightage : 20% for Final Viva Voce

11. Provision for Appeal

If a candidate is not satisfied with the evaluation of C1,C2 components, he/she can approach the grievance cell with the written submission together with all facts, the assignments, test papers etc, which were evaluated. He/she can do so before the commencement of semester-end examination. The grievance cell is empowered to revise the marks if the case is genuine and is also empowered to levy penalty as prescribed by the university on the candidate if his/her submission is found to be baseless and unduly motivated. This cell may recommend taking disciplinary/corrective action on an evaluator if he/she is found guilty. The decision taken by the grievance cell is final.

For every program there will be one grievance cell. The composition of the grievance cell is as follows:-

- The Registrar (Evaluation) - Ex-officio Chairman / Convener
- One Senior Faculty Member (other than those concerned with the evaluation of the course concerned) drawn from the school / department/discipline and/or from the sister schools / departments/sister disciplines – Member.
- One Senior Faculty Members / Subject Experts drawn from outside the University school / department – Member.

12. Eligibility to Appear Semester End Examination (SEE)

12.1. Only those students who fulfil a minimum of 75% attendance in aggregate of all the courses including practical courses / field visits etc, as part of the course(s), as provided in the succeeding sections, shall be eligible to appear for SEE examination.

12.2. Requirements to Pass a Course

Students are required to score a total minimum of 40% (Continuous Internal assessment and SEE) in each course offered by the University/ Department for a pass (other than online courses) with a minimum of 25% (12) marks in final examination.

13. Requirements to Pass the Semester

To pass the semester, a candidate has to secure minimum of 40% marks in each subject / course of the study prescribed in that semester.

13.1 Provision to Carry Forward the Failed Subjects / Courses:

A student who has failed in a given number of courses in odd and even semesters of first year shall move to third semester of second and final year of the study. However, he / she shall have to clear all courses of all semesters within the double duration, i. e., within sixyears of admission of the first semester failing which the student has to re-register to the entire program.

13.2. Provision **to Withdraw Course:**

A candidate can withdraw any course within ten days from the date of notification of final results. Whenever a candidate withdraws a course, he/she has to register for the same course in case it is hard core course, the same course or an alternate course if it is Soft Core Course or Open Elective Course.
A DROPPED course is automatically considered as a course withdrawn.

13.3. Re-Registration and Re-Admission:

a) In case a candidate's class attendance in aggregate of all courses in a semester is less than 75% or as stipulated by the University, such a candidate is considered as dropped the semester and is not allowed to appear for end semester examination (C3) and he / she shall have to seek re-admission to that semester during subsequent semester / year within a stipulated period.

b) In such case where in a candidate drops all the courses in a semester due to personal reasons, it is considered that the candidate has dropped the semester and he / she shall seek re-admission to such dropped semester.

14. Attendance Requirement:

14.1 All students must attend every lecture, tutorial and practical classes, clinical postings**.**

14.2 In case a student is on approved leave of absence (e g:- representing the university in sports, games or athletics, placement activities, NCC, NSS activities and such others) and / or any other such contingencies like medical emergencies, the attendance requirement shall be minimum of 75% of the classes taught.

a) Any student with less than 75% of attendance in aggregate of all the courses including practical courses / field visits etc, during a semester shall not be permitted to appear to the end semester (C4) examination and such student shall seek re-admission as provided in 7.8.4.

b) Teachers offering the courses will place the above details in the School Board meeting during the last week of the semester, before the commencement of C3, and subsequently a notification pertaining to the above will be brought out by the Director of the School before the

commencement of C3 examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar (Evaluation).

15. Absence during Mid Semester Examination:

In case a student has been absent from a mid-semester (C1,C2) examination due to the illness or other contingencies he / she may give a request along with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Head of the School, for make-up examination. The Head of the School may consider such request depending on the merit of the case and after consultation with course instructor and class teacher, and arrange to conduct a special test for such candidate(s) well in advance before the C3 examination of that respective semester. Under no circumstances C1,C2 test shall be held after C3 examination.

16. Grade Card and Grade Point

16.1. Provisional Grade Card: The tentative / provisional grade card will be issued by the Registrar (Evaluation) at the end of every semester indicating the courses completed successfully. The provisional grade card provides **Semester Grade Point Average** (SGPA).

16.2. Final Grade Card: Upon successful completion of M.Sc., Degree a Final Grade card consisting of grades of all courses successfully completed by the candidate will be issued by the Registrar (Evaluation).

16.3. The Grade and the Grade Point: The Grade and the Grade Point earned by the candidate in the subject will be as given below.

Marks P	Grade G	Grade Point (GP=V x G)	Letter Grade
90 >100	10	v*10	O
80 > 90	9	v*9	A+
70 > 80	8	v*8	A
60 > 70	7	v*7	B+
55 > 60	6	v*6	B
50 > 55	5.5	V*5.5	C +
40 > 50	5	v*5	P
0-40	0	v*0	F
ABSENT			AB

O - Outstanding; A-Excellent; B-Very Good; C-Good; D-Fair; E-Satisfactory; F - Fail

Here, P is the percentage of marks (P=[C1+C2+C3]) secured by a candidate in a course which is **rounded to nearest integer**. V is the credit value of course. G is the grade and GP is the grade point.

16.3.1. Computation of SGPA and CGPA

The Following procedure to compute the Semester Grade Point Average (SGPA)

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student in a given semester, i.e:

SGPA (Si) = ∑(Ci x Gi) / ∑Ci where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

Illustration for Computation of SGPA and CGPA

Illustration No. 1

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course 1	4	A+	9	4X9=36
Course 2	4	A	8	4X8=32
Course 3	3	B+	7	3X7=21
Course 4	3	O	10	3X10=30
Course 5	3	P	5	3X5=15
Course 6	3	B	6	3X6=18
Course 7	2	O	10	2X10=20
Course 8	2	A	8	2X8=16
	24			188

Thus, **SGPA = 188 ÷ 24 = 7.83**

Illustration No. 2

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	P	5	3X5=15
Course 7	2	B+	7	2X7=21
Course 8	2	O	10	2X10=20
	24			175

Thus, **SGPA = 175 ÷ 24 = 7.29**

Illustration No.3

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	O	10	4 x 10 = 40
Course 2	4	A+	9	4 x 9 = 36
Course 3	3	B+	7	3 x 7 = 21
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	B+	7	3 x 7 = 21
Course 7	2	A+	9	2 x 9 = 18
Course 8	2	A+	9	2 x 9 = 18
	24			199

Thus**, SGPA = 199 ÷ 24 = 8.29**

Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (96) for Two year Post Graduate degree program is calculated taking into account all the courses undergone by a student over all the semesters of a program i. e.,

$CGPA = \sum(Ci \times Si) / \sum Ci$

Where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration: No.1

CGPA after Final Semester

Semester (ith)	No. of Credits (Ci)	SGPA (Si)	Credits x SGPA (Ci X Si)
1	24	6.83	24 x 6.83 = 163.92
2	24	7.71	24 x 7.71 = 185.04
3	24	8.68	24 x 8.68 = 208.32
4	24	9.20	24 x 9.20 = 220.80
Cumulative	96		778.08

Thus, CGPA = 24x6.83+24x7.13+24x8.68+24x9.20 = 8.11

96

16.3.2. CONVERSION OF GRADES INTO PERCENTAGE:

Conversion formula for the conversion of CGPA into Percentage is:

Percentage of marks scored = CGPA Earned x 10

Illustration: CGPA Earned 8.10 x 10=81.0

16.3.3. Classification of Results

The final grade point (FGP) to be awarded to the student is based on CGPA secured by the candidate and is given as follows.

CGPA	Grade (Numerical Index)	Letter Grade	Performance	FGP
	G			Qualitative Index
9 >= CGPA 10	10	O	Outstanding	Distinction
8 >= CGPA < 9	9	A+	Excellent	
7 >= CGPA < 8	8	A	Very Good	First Class
6 >= CGPA < 7	7	B+	Good	
5.5> = CGPA < 6	6	B	Above average	Second Class
> 5 CGPA < 5.5	5.5	C	Average	
> 4 CGPA <5	5	P	Pass	Satisfactory

Overall percentage=10*CGPA

17. Challenge Valuation

a. A student who desires to apply for challenge valuation shall obtain a photo copy of the answer script by paying the prescribed fee within 10 days after the announcement of the results. He / She can challenge the grade awarded to him/her by surrendering the grade card and by submitting an application along with the prescribed fee to the Registrar (Evaluation) within 10 days after the announcement of the results. This challenge valuation is only for SEE.

The answer scripts for which challenge valuation is sought for shall be evaluated by the external examiner who has not involved in the first evaluation. The higher of two marks from first valuation and challenge valuation shall be the final.

b. With regard to any specific case of ambiguity and unsolved problem, the decision of the Vice-Chancellor shall be final.

Mapping of PEOS with Respect to Pos

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PE01	√	√	√	√	√	√	√	√
PE02	√	√	√	√	√	√	√	√
PE03	√	√	√	√	√	√	√	√

Attainment of CO (Course Outcome)

CO Attainment	Value
0.4 - 0.6	1
0.6 – 0.75	2
> 0.75	3

Mapping of Course Outcomes with programme Outcomes

Course Code	POS/ COs	PO1	PO2	PO3	PO4	PO5	PO6	P7	PO8	PSO1	PSO2	PSO3
B20MT1010	CO1	3	2	3	3	3	2	2	2	2	1	1
	CO2	2	3	1	3	1	3	2	2	1	1	1
	CO3	1	2	2	3	1	3	3	3	2	1	2
	CO4	3	3	2	3	1	3	2	3	1		2

Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PSO1	PSO2	PSO3
B20MT1020	CO1	3	2	3	3	3	2	2	2	2	1	1
	CO2	2	3	1	3	1	3	2	2	1	1	1
	CO3	1	2	2	3	1	3	3	3	2	1	2
	CO4	3	3	2	3	1	3	2	3	1		2

Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P7	PO8	PSO1	PSO2	PSO3
B20MT1030	CO1	2	3	3	3	1	2	2	3	2	1	2
	CO2	3	2	3	3	1	2	2	3	2	2	1
	CO3	2	2	3	3	2	1	3	3	1	1	2
	CO4	3	3	2	3	1	1	3	2	2	1	1

Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PSO1	PSO2	PSO3
B20MT1040	CO1	2	3	2	3	1	3	1	1	1	2	2
	CO2	2	3	3	3	1	1	2	3	2	2	2
	CO3	3	3	3	2	1	1	2	1	1	2	1
	CO4	3	2	1	3	1	3	2	3	1	1	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO3
B20MT1050	CO1	3	1	3	3	2	1	3	2	1	1	1
	CO2	3	3	2	3	1	1	2	3	1	2	2
	CO3	2	3	2	3	2	1	2	3	2	1	1
	CO4	1	3	2	3	2	3	2	3	2	2	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO3
B20MT1060	CO1	3	3	1	2	1	1	2	---	1	1	1
	CO2	2	2	1	--	--	--	1	--	1	1	2
	CO3	3	2	1	2	--	1	1	--	2	2	2
	CO4	3	3	2	3	--	1	1	--	2	1	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PSO1	PSO2	PSO3
B20MT1070	CO1	2	2	3	3	1	2	3	1	1	1	2
	CO2	3	2	2	3	3	2	2	2	2		1
	CO3	2	3	3	3	3	2	3	3	2	1	2
	CO4	1	3	3	3	2	2	3	3	1		2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PS O1	PS O2	PS O3
B19MT2010	CO1	3	2	3	3	2	1	1	2	1	1	2
	CO2	2	3	2	3	1	1	3	2	2	1	2
	CO3	2	2	3	3	1	2	3	2	2	2	2
	CO4	2	3	3	3	2	3	3	3	2	1	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO3
B20MT2030	CO1	3	2	2	2	1	1	2	3	2	1	2

	CO2	3	3	2	3	2	1	2	3	1	2	2
	CO3	2	3	2	3	1	2	2	2	1	1	2
	CO4	2	2	2	3	2	3	2	3	1	2	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO3
B20MT2040	CO1	3	1	1	3	1	2	2	1	2	1	1
	CO2	3	1	1	3	1	2	2	1	1	1	2
	CO3	3	1	1	3	1	2	3	1	1	1	1
	CO4	3	1	1	3	1	2	2	1	2	2	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO3
B20MT2050	CO1	3	2	1	3	1	1	2	2	2	2	1
	CO2	3	2	2	3	1	1	2	2	1	2	2
	CO3	3	3	3	2	2	2	3	3	1	2	2
	CO4	2	3	3	3	2	2	3	3	2	2	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PSO1	PSO2	PSO3
B20MT2060	CO1	3	1	2	2	--	1	1	--	1	1	2
	CO2	3	2	2	3	--	1	2	--	1	2	1
	CO3	3	3	2	1	--	1	2	--	2	1	2
	CO4	3	3	2	3	--	1	2	--	1	1	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PSO1	PSO2	PSO3
B20MT2080	CO1	1	3	2	2	3	2	3	3	1	1	2
	CO2	1	3	3	3	1	1	3	3	2	2	1
	CO3	1	3	3	3	1	2	2	3	1	1	2
	CO4	2	3	2	3	1	2	2	2	2	2	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO3
B20MT3010	CO1	3	3	2	3	1	1	2	3	1		2
	CO2	3	3	2	3	1	1	2	3	2	1	2
	CO3	3	3	2	3	1	1	2	3	2	1	1

	CO4	3	3	2	3	1	1	2	3	1	1	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3
B20MT3020	CO1	3	3	2	3	3	2	1	2	1	2	2
	CO2	3	3	2	3	3	2	1	2	2	2	2
	CO3	3	3	2	3	2	3	1	2	2	1	1
	CO4	3	3	2	3	2	3	1	2	2	2	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3
B20MT3030	CO1	3	1	1	1	1	1	1	--	1	1	2
	CO2	3	1	1	2	1	1	2	--	2	2	1
	CO3	2	3	2	2	--	1	2	--	1	1	2
	CO4	1	3	3	3	--	1	2	--	2	1	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
BT19MT3050	CO1	2	1	1	1				2	2	1	1
	CO2	2	1	2	1	2			2	2	2	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3
B20MT3060	CO1	3	3	3	3	1	1	3	2	2	1	1
	CO2	3	2	1	3	1	3	1	3	2	1	2
	CO3	3	1	1	3	1	3	1	2	2	2	1
	CO4	3	3	3	3	1	3	2	3	1	1	2
	CO5	3	3	2	3	1	3	1	2	2	1	2
	CO6	3	3	1	3	1	3	2	2	2	2	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3
B20MT3070	CO1	3	3	2	2	1	2	2	2	2	2	1
	CO2	3	3	2	2	1	3	2	2	1	1	2
	CO3	3	3	1	2	1	2	3	3	2	1	2
	CO4	3	3	1	2	1	3	3	3	2	1	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3

B20MT3080	CO1	1	3	2	2	--	1	2	--	2	1	1
	CO2	1	3	3	2	--	--	1	--	2	2	1
	CO3	2	3	2	3	--	--	--	--	1	1	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
B20MT4010	CO1	3	3	2	3	1	2	2	3	1	1	2
	CO2	3	3	2	3	1	2	2	3	2	2	1
	CO3	3	3	1	3	1	1	2	2	1	1	2
	CO4	3	3	1	3	1	1	2	2	2	2	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3
B20MT4020	CO1	3	2	3	3	1	1	2	3	1	1	2
	CO2	2	3	2	3	1	1	2	3	2	2	1
	CO3	3	3	2	2	1	1	2	3	1	1	2
	CO4	2	3	1	3	1	1	2	3	1	2	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3
B20MT4030	CO1	3	2	2	1	--	1	--	--	1	2	2
	CO2	2	2	2	2	--	--	--	--	2	2	1
	CO3	3	1	1	2	--	1	1	--	1	1	2
	CO4	2	3	3	1	--	1	--	--	1	2	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PS O1	PSO2	PSO3
B20MT4040	CO1	3	3	2	1	1	1	2	3	1	2	2
	CO2	2	3	3	2	1	1	2	2	1	1	2
	CO3	3	2	3	1	1	2	3	2	1	1	1
	CO4	2	3	2	1	1	1	2	2	2		1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PS O1	PSO2	PSO3
B20MT4060	CO1	3	3	1	3	1	2	3	1	1	2	1
	CO2	3	3	1	3	1	2	3	1	1	1	2
	CO3	3	3	1	3	1	2	3	1	1	2	2

	CO4	3	3	1	3	1	2	3	1	1	1	1
	CO5	3	3	1	3	1	2	3	1	1	2	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
B20MT4080	CO1	1	3	2	2	--	--	1	--	2	2	2
	CO2	1	3	3	2	--	--	1	--	1	2	1
	CO3	2	2	2	2	--	1	1	--	2		1
	CO4	1	2	2	1	--	--	1	--	1	2	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
B20MT5010	CO1	3	1	1	3	1	2	2	1	2	1	2
	CO2	3	1	1	3	1	2	2	1	2		1
	CO3	3	1	1	3	1	2	2	1	2	2	1
	CO4	3	2	3	3	1	1	2	3	2	1	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
B20MT5020	CO1	3	2	2	3	1	2	3	3	1	1	1
	CO2	2	3	3	3	1	3	2	2	1	1	2
	CO3	3	2	3	3	1	2	2	3	2	1	1
	CO4	2	3	3	3	1	2	2	3	2	1	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3
B20MT5030	CO1	3	1	1	1	--	--	--	--	1	1	2
	CO2	2	3	2	2	1	--	1	--	2	1	1
	CO3	3	3	2	2	--	--	--	--	2	1	1
	CO4	3	1	1	2	--	--	--	--	2	2	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
B20MT5030	CO1	1					3	2	2	2	1	1
	CO2						2		2	2		1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
B20MT5050	CO1	3	3	1	2	1	2	3	3	1	2	2

	CO2	3	3	1	2	1	2	3	3	1	1	1
	CO3	3	3	1	2	1	2	3	3	2	1	1
	CO4	3	3	1	2	1	2	3	3	2	1	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3
B20MT50 60	CO1	3	3	2	3	1	2	3	2	2	1	1
	CO2	3	3	2	3	2	1	3	3	2	2	1
	CO3	2	3	2	3	1	1	3	3	1	1	2
	CO4	1	3	2	1	1	2	2	2	1	2	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P7	PO8	PS O1	PSO2	PSO3
B20MT50 70	CO1	1	3	3	2	--	1	1	1	1	1	2
	CO2	1	3	3	2	--	1	1	1	2	2	1
	CO3	1	3	3	2	--	1	1	1	2	1	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3
B20MT60 10	CO1	3	2	2	3	1	2	1	2	2	2	1
	CO2	3	3	1	3	1	3	1	2	1	1	2
	CO3	3	3	1	3	1	3	1	2	2	2	1
	CO4	3	3	1	3	1	3	1	2	1	1	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PS O1	PSO2	PSO3
B20MT60 20	CO1	3	2	3	3	2	3	2	1	1	1	2
	CO2	3	3	3	2	2	2	2	3	2	2	1
	CO3	3	3	2	3	3	2	1	2	1	1	1
	CO4	2	2	3	3	3	2	1	3	1	1	2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
B20MT60 30	CO1	3	1	1	1	--	1	2	--	2	1	2
	CO2	3	1	--	--	3	2	3	--	1	2	2
	CO3	1	2	2	2	--	--	1	--	1	2	2

	CO4	1	2	1	2	--	--	1	--	1		2
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
B20MT60 40	CO1	3	3	1	2	1	2	3	3	1	1	1
	CO2	3	3	1	2	1	2	3	3	1	2	2
	CO3	3	3	1	2	1	2	3	3	1	1	2
	CO4	3	3	1	2	1	2	3	3	2	1	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
B20MT60 50	CO1	3	3	3	2	1	2	2	3	1	2	2
	CO2	2	3	3	1	1	3	2	3	1		2
	CO3	2	3	3	1	1	3	2	3	1	2	2
	CO4	2	3	3	1	1	2	3	3	2	1	1
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P07	PO8	PS O1	PSO2	PSO3
B20MT60 60	CO1	1	3	3	2	--	1	1	1	1	2	2
	CO2	1	3	3	2	--	1	1	1	2	1	2
	CO3	1	3	3	2	--	1	1	1	2	1	1
	CO4											

B.Sc (Medical Laboratory Technology) Program

Scheme 2020-2023

Note: Core course-CC, Hard Core-HC, REVA Unique Learning Offering-RULO

Sl. No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours	Teaching School/Dept.
				L	T	P	C		
First Semester:									
1	B20MT1010	Language- I: Communicative English	CC	2	1	0	3	4	Arts and Humanities
2	B20MT1011	Language – II: Kannada*	CC	1	1	0	2	3	Arts and Humanities
3	B20MT1012	Language – II: Hindi							
4	B20MT1013	Language – II: Additional English							
5	B20MT1020	Human Anatomy-I	HC	3	0	0	3	3	Biochemistry
6	B20MT1030	Human Physiology-I	HC	3	0	0	3	3	Biochemistry
7	B20MT1040	Biochemistry-I	HC	2	1	0	3	4	Biochemistry
8	B20MT1050	Microbiology-I	HC	2	1	0	3	4	Biochemistry
9	B20MT1060	Pathology-I	HC	2	1	0	3	4	Biochemistry
		Practicals							
10	B20MT1070	Practical: Human Anatomy-I	HC	0	0	2	2	3	Biochemistry
11	B20MT1080	Clinical Postings-I**	HC	0	0	2	2	3	Biochemistry
Total Credits for the First Semester:							**24**	**31**	

**** Students have to undergo practical training in identified hospitals**

SL.No	Course code	Course title	Course Type	Credit Pattern and Value				Weekly Contact Hours	Teaching School/Dept.
				L	T	P	C		
Second Semester:									
1	B20MT2010	Language- I: Communicative English	CC	2	1	0	3	4	Arts and Humanities
2	B20MT2011	Language – II: Kannada*	CC	1	1	0	2	3	Arts and Humanities
3	B20MT2012	Language – II: Hindi							
4	B20MT2013	Language – II: Additional English							
5	B20MT2020	Human Anatomy-II	HC	3	0	0	3	3	Biochemistry
6	B20MT2030	Human Physiology-II	HC	3	0	0	3	3	Biochemistry
7	B20MT2040	Biochemistry-II	HC	2	1	0	3	4	Biochemistry
8	B20MT2050	Microbiology-II	HC	2	1	0	3	4	Biochemistry
9	B20MT2060	Pathology-II	HC	2	1	0	3	4	Biochemistry
10	B20MT2070	Sports/Yoga/Music/Dance/ Theatre	RULO	2	0	0	2	2	Biochemistry
		Practicals							
11	B20MT2080	Practical: Human Physiology-I	HC	0	0	2	2	3	Biochemistry
12	B20MT2090	Clinical Postings-II	HC	0	0	3	3	5	Biochemistry
Total Credits for the Second Semester:							**27**	**35**	

Sl. No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours	Teaching School/ Dept.
				L	T	P	C		
Third Semester:									
1	B20MT3010	Biochemistry-III	HC	2	1	0	3	4	Biochemistry
2	B20MT3020	Microbiology-III	HC	2	1	0	3	4	Biochemistry
3	B20MT3030	Pathology-III	HC	2	1	0	3	4	Biochemistry
4	B20MT3040	Open Elective	HC	4	0	0	4	4	Biochemistry
5	B20MT3050	Skill Development (Health Care	RULO	2	0	0	2	2	Biochemistry
		Practicals							Biochemistry
6	B20MT3060	Practical: Biochemistry-I	HC	0	0	2	2	4	Biochemistry
7	B20MT3070	Practical: Microbiology-I	HC	0	0	2	2	4	Biochemistry
8	B20MT3080	Practical: Pathology-I	HC	0	0	2	2	4	Biochemistry
9	B20MT3090	Clinical Postings-III	HC	0	0	4	4	6	Biochemistry
Total Credits for the Third Semester:							**25**	**36**	

Fourth Semester:									
Sl. No.	**Course Code**	**Course Title**	**Course Type**	**Credit Pattern and Value**				**Weekly Contact Hours**	**Teaching School/ Dept.**
				L	T	P	C		
1	B20MT4010	Biochemistry-IV	HC	2	1	0	3	4	Biochemistry
2	B20MT4020	Microbiology-IV	HC	2	1	0	3	4	Biochemistry
3	B20MT4030	Pathology-IV	HC	2	1	0	3	4	Biochemistry

4	B20MT4040	Pharmacology	HC	2	1	0	3	4	Biochemistry
5	B20MT4050	Soft Skill Training (Computer Basics)	RULO	1	1	0	2	3	Biochemistry
		Practicals							Biochemistry
6	B20MT4060	Practical: Biochemistry-II	HC	0	0	2	2	4	Biochemistry
7	B20MT4070	Practical: Microbiology-II	HC	0	0	2	2	4	Biochemistry
8	B20MT4080	Practical: Pathology-II	HC	0	0	2	2	4	Biochemistry
9	B20MT4090	Clinical Postings- IV	HC	0	0	4	4	6	Biochemistry
Total Credits for the Fourth Semester:							**24**	**37**	

Fifth Semester

Sl. No.	**Course Code**	**Course Title**	**Course Type**	**Credit Pattern and Value**				**Weekly Contact Hours**	**Teaching School/ Dept.**
				L	**T**	**P**	**C**		
1	B20MT5010	Biochemistry-V	HC	2	1	0	3	4	Biochemistry
2	B20MT5020	Microbiology-V	HC	2	1	0	3	4	Biochemistry
3	B20MT5030	Pathology-V	HC	2	1	0	3	4	Biochemistry
4	B20MT5040	Soft Skill Training (Communicative Medicine)	RULO	1	1	0	2	3	Biochemistry
		Practicals							
5	B20MT5050	Practical: Biochemistry-III	HC	0	0	2	2	4	Biochemistry
6	B20MT5060	Practical: Microbiology-III	HC	0	0	2	2	4	Biochemistry

7	B20MT5070	Practical: Pathology – III	HC	0	0	2	2	4	Biochemistry
8	B20MT5080	Clinical Postings-V	HC	0	0	4	4	6	Biochemistry
Total Credits for the Fifth Semester:							**21**	**33**	

SIXTH SEMESTER

Sl. No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours	Teaching School/ Dept.
				L	T	P	C		
1	B20MT6010	Biochemistry-VI	HC	2	1	0	3	4	Biochemistry
2	B20MT6020	Microbiology-VI	HC	2	1	0	3	4	Biochemistry
3	B20MT6030	Pathology-VI	HC	2	1	0	3	4	Biochemistry
4		**Practicals**							Biochemistry
5	B20MT6040	Practical: Biochemistry-IV	HC	0	0	2	2	4	Biochemistry
6	B20MT6050	Practical: Microbiology-IV	HC	0	0	2	2	4	Biochemistry
7	B20MT6060	Practical: Pathology –IV	HC	0	0	2	2	4	Biochemistry
8	B20MT6070	Internship	HC	0	0	8	8	8	Biochemistry
Total Credits for the SixthSemester:							**23**	**32**	
Total Credits of all Semesters							**144**	**204**	

Semester-wise Summary of Credit Distribution

Semester	L	T	P	Total	Total Hours
I	12	5	6	23	**31**
II	14	5	6	25	**33**
III	14	5	6	25	**33**
IV	11	6	6	23	**32**
V	10	4	10	24	**33**
VI	10	4	10	24	**33**
Total Credits	**71**	**29**	**44**	**144**	**195**

Detailed Syllabus
Semester I:

B20MT1010	Language- I: Communicative English	L	T	P	C
Duration: 3 hrs/wk		2	1	0	3

Prerequisites

Knowledge of intermediate English Grammar and LSRW skills

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To develop basic communication skills in English for the learners of Bachelor of Science.
2. To prioritize listening and reading skills among the learners.
3. To simplify writing skills needed for academic as well as workplace context.
4. To examine that the learners use the electronic media such as internet and supplement the learning materials used in the classroom.

Course Outcomes:

On completion of the course, learners will be able to:

CO1. Interpret audio files and comprehend different spoken discourses/ excerpts in different accents (Listening Skills).
CO2. Demonstrate speaking ability with clarity, confidence and comprehension and communicate with one or many listeners using appropriate communicative strategies (Speaking Skills).
CO3. Make use of reading different genres of texts adopting various reading strategies (Reading Skills).
CO4. Develop the ability to write cohesively, coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic (Writing Skills).

Mapping of Course Outcomes with Programme Outcomes

Course Code	POS/ COs	PO1	PO2	PO3	PO4	PO5	PO6	P7	PO8	PSO1	PSO2	PSO3
B20MT1010	CO1	3	2	3	3	3	2	2	2	2	1	1
	CO2	2	3	1	3	1	3	2	2	1	1	1
	CO3	1	2	2	3	1	3	3	3	2	1	2
	CO4	3	3	2	3	1	3	2	3	1		2

Course Contents:

UNIT –I **12 Hrs**

Functional English: Grammar: Prepositions; Modal Auxiliaries

Listening: Listening to audio (verbal & sounds)

Speaking: Debating Skills

Reading: Skimming a reading passage; Scanning for specific information

Writing: Email communication

UNIT – II **12 Hrs**

Interpersonal Skills: Grammar: Tenses; Wh-questions

Listening& Speaking: Listening and responding to video lectures / talks

Reading: Reading Comprehension; Critical Reading; Finding key information in a given text

Writing: Process descriptions (general/specific); Recommendations

UNIT – III **12 Hrs**

Multitasking Skills: Grammar: Conditional Sentences

Listening & Speaking: Listening to specific task; focused audio tracks and responding

Reading: Reading and interpreting visual material

Writing: Channel conversion (flowchart into process); Types of paragraph (cause and effect / compare and contrast / narrative / analytical); Note Taking/ Note Making

UNIT – IV **12 Hrs**

Communication Skills: Grammar: Directand indirect speech

Listening & Speaking: Watching videos / documentaries and responding to questions based on them; Role

plays

Reading: Making inference from the reading passage; predicting the content of a reading passage

Writing: Interpreting visual materials (line graphs, pie charts etc.); Different types of Essay Writing

B20MT1011	Kannada – II (Language)	L	T	P	C
Duration: 3 hrs/wk		1	1	0	2

Prerequisites:

- PÀ£ÀßqÀ ¨sÁµÉAiÀÄ §UÉUÉ ¥ÁæxÀ«ÄPÀ w¼ÀÄªÀ½PÉ CUÀvÀå.
- ¨sÁµÉAiÀÄ£ÀÄß NzÀ®Ä ªÀÄvÀÄÛ §gÉAiÀÄ®Ä w½¢gÀ¨ÉÃPÀÄ.
- ¥ÀzÀ« ¥ÀÆªÀð ²PÀëtzÀ°è PÀ£ÀßqÀ ¨sÁµÉAiÀÄ£ÀÄß N¢gÀ¨ÉÃPÀÄ.

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

£Á®ÄÌ ¸É«Ä¸ÀÖgïUÀ¼À°è ¸ÀªÀÄUÀæ PÀ£ÀßqÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀjZÀ¬Ä¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß ºÉÆA¢zÉ. CzÀgÀAvÉ ªÉÆzÀ®£ÉAiÀÄ ¸É«Ä¸ÀÖgï£À°è d£À¥ÀzÀ, ¥ÁæaÃ£À, ªÀÄzsÀåPÁ°Ã£À PÁªÀåUÀ¼ÀÄ, ºÉÆ¸ÀUÀ£ÀßqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ £ÁlPÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀoÀåªÀ£ÁßV DAiÉÄÌ ªÀiÁrPÉÆAqÀÄ, «zÁåyðUÀ¼À°è ¸Á»vÀåzÀ §UÉÎ ¸ÀzÀ©ügÀÄaAiÀÄ£ÀÄß ªÀÄÆr¸À¯ÁUÀÄvÀÛzÉ. ¸ÁA¸ÀÌøwPÀ w¼ÀÄªÀ½PÉAiÀÄ eÉÆvÉUÉ ªÀåQÛvÀé «PÀ¸À£ÀzÀ PÀqÉUÉ UÀªÀÄ£À ¤ÃqÀ¯ÁUÀÄvÀÛzÉ.

1. ¨sÁµÉ, ¸Á»vÀå, EwºÁ¸À ªÀÄvÀÄÛ ¸ÀA¸ÀÌøwUÀ¼À£ÀÄß PÀ£ÀßqÀ, PÀ£ÁðlPÀPÉÌ ¸ÀA§A¢ü¹zÀAvÉ ¥ÀjZÀ¬Ä¸À¯ÁUÀÄvÀÛzÉ.
2. «zÁåyðUÀ¼À ¸ÀªÀðvÉÆÃªÀÄÄR ¨É¼ÀªÀtÂUÉUÉ C£ÀÄªÁUÀÄªÀAvÉ ºÁUÀÆ CªÀgÀ°è ªÀiÁ£ÀªÀ ¸ÀA§AzsÀUÀ¼À §UÉÎ UËgÀªÀ, ¸ÀªÀiÁ£ÀvÉ ªÀÄÆr¹, ¨É¼É¸ÀÄªÀ ¤nÖ£À°è ¥ÀoÀåUÀ¼À DAiÉÄÌAiÀiÁVzÉ.
3. CªÀgÀ°è ¸ÀÈd£À²Ã®vÉ, ±ÀÄzÀÞ ¨sÁµÉ, GvÀÛªÀÄ «ªÀÄ±Áð UÀÄt, ¤gÀUÀð¼À ¸ÀA¨sÁµÀuÉ, ¨sÁµÀt PÀ¯É ºÁUÀÆ §gÀºÀ PË±À®åUÀ¼À£ÀÄß ¨É¼É¸ÀÄªÀÅzÀÄ UÀÄjAiÀiÁVzÉ
4. ¸ÀàzsÁðvÀäPÀ ¥ÀjÃPÉëUÀ½UÉ C£ÀÄPÀÆ®ªÁUÀÄªÀAvÀºÀ «µÀAiÀÄUÀ¼À£ÀÄß UÀªÀÄ£ÀzÀ°èèlÄÖPÉÆAqÀÄ ¸ÀÆPÀÛ ¥ÀoÀåUÀ¼À£ÀÄß DAiÉÄÌ ªÀiÁrPÉÆ¼Àî¯ÁVzÉ.

Course Outcomes

d£À¥ÀzÀ, ¥ÁæaÃ£À, ªÀÄzsÀåPÁ°Ã£À PÁªÀåUÀ¼ÀÄ, ºÉÆ¸ÀUÀ£ÀßqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ £ÁlPÀ ¸Á»vÀå PÀ°PÉAiÀÄ ªÀÄÆ®PÀ PÁ®zÀ ¹ÜvÀåAvÀgÀUÀ¼À£ÀÄß CzÀgÀ M¼À£ÉÆÃlUÀ¼À£ÀÄß ¨É¼É¸ÀÄvÀÛzÉ.

CO1. ¸ÁªÀiÁfPÀ, gÁdQÃAiÀÄ, zsÁ«ÄðPÀ, ¸ÁA¸ÀÌøwPÀ ºÁUÀÆ °AUÀ¸ÀA§A¢ü «ZÁgÀUÀ¼ÉqÉ UÀªÀÄ£ÀºÀj¸ÀÄªÀÅzÀgÉÆA¢UÉ «zÁåyðUÀ¼À°è ZÀZÁð

ªÀÄ£ÉÆÃ¨sÁªÀªÀÅ ¨É¼ÉAiÀÄÄvÀÛzÉ.

CO2. fÃªÀ£ÀzÀ°è §gÀÄªÀ C©ü¥ÁæAiÀÄ ¨ÉÃzsÀUÀ¼ÀÄ, ¸ÀªÀÄ¸ÉåUÀ¼À£ÀÄß DzsÀĤPÀ ¸ÀAzÀ¨sÀðzÀ°è ªÀiÁ£À«ÃAiÀÄvÉAiÉÆA¢UÉ ¤ªÀð»¸ÀÄªÀAvÉ ¥ÉæÃgÉÃ¦¸ÀÄvÀÛzÉ.

CO3. ¸ÁªÀiÁfPÀ CjªÀÅ ªÀÄÆr¸ÀÄvÀÛzÉ
CO4. GvÀÛªÀÄ ¸ÀAªÀºÀ£À PÀ¯ÉAiÀÄ£ÀÄß ¨É¼É¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß FqÉÃj¸ÀÄvÀÛzÉ.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P7	PO8	PSO 1	PSO2	PSO3
B20MT1011	CO1	3	2	3	3	3	2	2	2	2	1	1
	CO2	2	3	1	3	1	3	2	2	1	1	1
	CO3	1	2	2	3	1	3	3	3	2	1	2
	CO4	3	3	2	3	1	3	2	3	1		2

Course Contents:

Unit-I: **12 Hrs**

1. ¸ÀvÀåªÀAvÉ ºÀqÉzÀªÀé - d£À¥ÀzÀ VÃvÉ
2. £É®¸ÀÄUÉ ¤£Àß ªÀPÀëzÉÆ¼É - ¥ÀA¥À
3. PÀÄqÀÄ ZÀ¥À¼É d¥ÀzÀ ªÀÄtÂAiÀÄA - £ÁUÀªÀªÀÄð
4. avÀæªÀÄ¥ÁvÉæ gÀªÀÄvÉ £Áj - d£Àß

Unit-II: **12 Hrs**

1. C©ÞAiÀÄÄªÉÆªÉÄð PÁ®ªÀ±À¢A ªÀÄgÁåzÉAiÀÄA zÁAlzÉÃ.... - £ÁUÀZÀAzÀæ
2. ªÀZÀ£ÀUÀ¼ÀÄ - CPÀÌªÀÄºÁzÉÃ«
3. ªÀZÀ£ÀUÀ¼ÀÄ - §¸ÀªÀtÚ
4. UÀÄAqÀAiÀÄå£À gÀUÀ¼É - ºÀjºÀgÀ

Unit-III: **12 Hrs**

1. zÀÄµÀÖ§Ä¢ÞAiÀÄÄA zsÀªÀÄð§Ä¢ÞAiÀÄÄA - zÀÄUÀð¹AºÀ
2. PÀ¯ÁärAiÀÄ PÉÆÃt - ªÀiÁ¹Û
3. AiÀiÁgÀÆ CjAiÀÄzÀ «ÃgÀ - PÀÄªÉA¥ÀÄ
4. ¸ÀªÀÄ¸ÉåAiÀÄ ªÀÄUÀÄ - wæªÉÃtÂ

Unit-IV: **12 Hrs**

1. mÉÆ¼ÀÄîUÀnÖ - n.¦. PÉÊ¯Á¸ÀA

¥ÀgÁªÀÄ±Àð£À UÀæAxÀUÀ¼ÀÄ:

1. ªÀÄÄUÀ½ gÀA.²æÃ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 2014
2. ¸ÀAUÀæºÀ. £ÁUÉÃUËqÀ JZï.J¯ï., ZÁjwæPÀ d£À¥ÀzÀ PÀxÀ£À PÁªÀåUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£ÁðlPÀ eÁ£À¥ÀzÀ ¥ÀjµÀvÀÄÛ, ¨ÉAUÀ¼ÀÆgÀÄ. 2008
3. ¹ÃªÀiÁwÃvÀ PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ ¸ÀA¥ÀÄl 1,2,3,4,5 ªÀÄvÀÄÛ 6, PÀÄªÉA¥ÀÄ PÀ£ÀßqÀ CzsÀåAiÀÄ£À ¸ÀA¸ÉÜ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ, ªÉÄÊ¸ÀÆgÀÄ. 2014
4. ¸ÀAUÀæºÀ. £ÁUÉÃUËqÀ JZï.J¯ï., PÀ£ÀßqÀ d£À¥ÀzÀ PÀxÀ£À PÁªÀåUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£ÁðlPÀ eÁ£À¥ÀzÀ ¥ÀjµÀvÀÄÛ, ¨ÉAUÀ¼ÀÆgÀÄ. 2007
5. ºÀA¥À £ÁUÀgÁdAiÀÄå, ¸ÁAUÀvÀå PÀ«UÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
6. £ÁgÁAiÀÄt ¦.«, ZÀA¥ÀÆ PÀ«UÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
7. PÁ¼ÉÃUËqÀ £ÁUÀªÁgÀ, wæ¥À¢, gÀUÀ¼É ªÀÄvÀÄÛ eÁ£À¥ÀzÀ ¸Á»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
8. ¸ÀA. ¨É£ÀUÀ¯ï gÁªÀÄ gÁªï ªÀÄvÀÄÛ ¥Á£ÀåA ¸ÀÄAzÀgÀ ±Á¹ÛçÃ, ¥ÀÄgÁt £ÁªÀÄ ZÀÆqÁªÀÄtÂ, ¥ÀæPÁ±ÀPÀgÀÄ ¥Àæ¸ÁgÁAUÀ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ. 2010
9. qÁ. azÁ£ÀAzÀ ªÀÄÆwð, ªÀZÀ£À ¸Á»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2013
10. ¸ÀA. §¸ÀªÀgÁdÄ J¯ï. ¸ÀªÀðdÕ£À ªÀZÀ£ÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 2012
11. ¸ÀA. §¸ÀªÀgÁdÄ J¯ï. CPÀÌ£À ªÀZÀ£ÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 1997
12. ¸ÀA ªÀÄgÀÄ¼À¹zÀÝ¥Àà PÉ, £ÁUÀgÁd Q.gÀA. ªÀZÀ£À PÀªÀÄäl, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2016
13. £ÀgÀ¹AºÁZÁgï. r.J¯ï., ¥ÀA¥À ¨sÁgÀvÀ ¢Ã¦PÉ, ¥ÀæPÁ±ÀPÀgÀÄ r.«.PÉ ªÀÄÆwð ¥ÀæPÁ±À£À, ªÉÄÊ¸ÀÆgÀÄ. 2012
14. gÀAeÁ£ï zÀUÁð, ±ÀgÀtgÀ ¸ÀªÀÄUÀæ PÁæAw, ¥ÀæPÁ±ÀPÀgÀÄ. ¯ÉÆÃ»AiÀiÁ ¥ÀæPÁ±À£À, §¼Áîj. 2015
15. zÉÃ±À¥ÁAqÉ J¸ï.J¯ï. ¨ÉÃAzÉæ ±ÀjÃ¥sÀgÀ PÁªÁåAiÀiÁ£À, ¥ÀæPÁ±ÀPÀgÀÄ zÉÃ¹ ¥ÀÄ¸ÀÛPÀ, ¨ÉAUÀ¼ÀÆgÀÄ. 2013
16. ¸ÀA. ©.J¸ï. PÉÃ±ÀªÀgÁªï. PÉÊ¯Á¸ÀA PÀ£ÀßqÀ £ÁlPÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ CAQvÀ ¥ÀÄ¸ÀÛPÀ, ¨ÉAUÀ¼ÀÆgÀÄ. 2005
17. ±ÁªÀÄgÁAiÀÄ vÀ.¸ÀÄ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQ£À ªÉAPÀtÚAiÀÄå ¸ÁägÀPÀ UÀæAxÀªÀiÁ¯É, ªÉÄÊ¸ÀÆgÀÄ -2014
18. ²ªÀgÀÄzÀæ¥Àà f.J¸ï. PÀ£ÀßqÀ ¸Á»vÀå ¸À«ÄÃPÉë, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2013

B20MT1012	Hindi – II (Language)	L	T	P	C
Duration: 3 hrs/wk		1	1	0	2

Prerequisites:

Knowledge of Hindi.

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. सदर्भनुसभर उचित र्भषभ कभ प्रयोग करने की दक्षतभ को छभत्रों मेंं उत्पन्न करनभ।
2. सभचित्य के मभध्यम से समभज एवं मभनवीय मूल्रों को समझभकर, उन मूल्रों की रक्षभ हेतु प्रेररत करनभ।
3. छभत्रों मेंं पुस्तक पठन एवं लेखन की अकृ चतम प्रवृचि स्थभचपत करनभ।
4. अध्येतभओं मेंं सभचित्य के मभध्यम से प्रर्भवी एवं कु शल संभर कभ चवकभस करनभ।

Course Outcomes:

अध्ययन की समभप्ति पर अध्येतभ –

CO1. सभमभचजक मूल् एवं नैचतक जवभबदेिी को स्वीकभर कर सकतभ िै।

CO2. सभचित्य की प्रभसंचगकतभ को जीवन में समझने की दक्षतभ रखतभ िै।

CO3. समभज मेंं अंतचनचित पद्दचतयभ एवं चवभिरधभरभओं कभ व्यभख्यभन करने मेंं सक्षम बन सकतभ िै।

CO4. सभचित्य के मभध्यम से प्रर्भवी एवं कु शल संभर कभ चवकभस कर सकतभ िै।

Mapping of Course Outcomes with programme Outcomes

Course Code	POS/COs	PO1	P2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	
B20MT1012	CO1	2	3	3	3	1	2	2	3	2	1	2
	CO2	3	2	3	3	1	2	2	3	2	2	1
	CO3	2	2	3	3	2	1	3	3	1	1	2

	CO4	3	3	2	3	1	1	3	2	2	1	1

Course Contents:

इकाई – 1: कविता, संस्मरण
12 hrs.

कविता – नशा – प्रेमचंद
कविता – सुखमय जीवन – दिनकर शमा गुलेरी
संस्मरण – शरत के साथ चबतायम कुछ समय – अमृतलाल नागर

इकाई – 2: कविता, आत्मकथा **12 hrs**.

कविता – मरने से पहले –
ग्रीष्म सविनी कविता – लाल
हिवेली – चशवानी
आत्मकथा – जेल– जीवन की झलक - गणेश शंकर चवद्यार्थी

इकाई – 3: कविता, व्यंग्य रचना **12 hrs**.

कविता – विभय कमा एक प्रयास – कैसे थरीन
मैनसफील्ड व्यंग्य रचना – रेड़े और
रेचियेंं – हिररशंकर परसाई

इकाई – 4: अनुवाद, संक्षेपण **12 hrs**.
अनुवाद : अंग्रेज़ी – चिन्दी (शब्द एवं अनुच्छेद)
संक्षेपण : पररच्छेद कमा एक तिहाई भाग में |

सूचना : प्रत्येक इकाई 25 अंक के लिए लनर्धारित है

| References:

1. सुबोध व्यविभररक चिन्दी – डॉ. कुलदीप गुप्ता
2. अचर्नव व्यविभररक चिन्दी – डॉ.परमानन्द गुप्ता
3. चिन्दी सावित्य कमा इचतिास - डॉ. नागेन्द्र
4. आधुचनक चिन्दी सावित्य कमा इचतिास - डॉ. बच्चन चसंह
5. चिन्दी सावित्य कमा नवीन इचतिास - डॉ. लाल सावि्ब चसंह
6. शुद्ध चिन्दी कैसे बोलें कैसे चलखें- पृथ्वीनाथ पाण्डेय
7. कायालय अनुवाद चनदेशका
8. संक्षेपण और पल्लवन - के.सी.भार्गचिय&तुमन चसंग

B20MT1013	Additional English (Language-II)	L	T	P	C
Duration: 3 hrs/wk		1	1	0	2

Prerequisites:

Knowledge of intermediate English Grammar and LSRW skills.

Pedagogy

Mode of Teaching using ICT and Board

Course Objectives:

Course Outcomes:

On completion of the course, learners will be able to:

CO1. Demonstrate a thorough understanding of sensitive and critical social issues.
CO2. Develop reading skills and vocabulary range
CO3. Critically analyse a piece of prose or poetry
CO4. Express their opinion in a coherent and communicable manner

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO3	PO4	PO 5	PO 6	P 7	PO8	PSO 1	PSO2	PSO3
B20MT1013	CO1	2	3	2	3	1	3	1	1	1	2	2
	CO2	2	3	3	3	1	1	2	3	2	2	2
	CO3	3	3	3	2	1	1	2	1	1	2	1
	CO4	3	2	1	3	1	3	2	3	1	1	2

Course Contents:

Unit-I: Values and Ethics
12 Hrs
Literature: Rabindranath Tagore - Where the Mind is Without Fear, William Wordsworth – Three Years She Grew in Sun and Shower, Saki – The Lumber-room, William Shakespeare – Extract from *Julius Caesar* (Mark Antony's Speech) Language: Vocabulary Building

Unit-II: Natural & Super Natural
12 Hrs
Literature: John Keats – La Belle Dame Sans MerciCharles Dickens – The Signal Man

Hans Christian Anderson - The Fir TreeWilliam Shakespeare – An Excerpt from *The Tempest*
Language: Collective Nouns

Unit-III: Travel and Adventure
12 Hrs
Literature: R.L. Stevenson – Travel, Elizabeth Bishop - The Question of Travel, H.G. Wells – The Magic Shop, Jonathan Swift – Excerpt from *Gulliver's Travels Book – I*
Writing Skills: Travelogue

Unit-IV: Success Stories
12 Hrs
Literature: Emily Dickinson – Success is Counted SweetestRupert Brooke – Success
Dr. Martin Luther King - I Have a DreamHelen Keller – Excerpt from *The Story of My Life*
Writing Skills: Brochure &Leaflet

Reference Books:

1. Tagore, Rabindranath. *Gitanjal*i. Rupa Publications, 2002.
2. Wordsworth, William. *The Complete Works of William Wordsworth*. Andesite Press, 2017.
3. Munro, Hector Hugh. *The Complete Works of Saki*. Rupa Publications, 2000.
4. Shakespeare, William. *The Complete Works of William Shakespeare*. Sagwan Press, 2015.
5. Chindhade, Shirish. *Five Indian English Poets: Nissim Ezekiel, A.K. Ramanujan, ArunKolatkar, DilipChitre, R. Parthasarathy*. Atlantic Publications, 2011.
6. Dickens, Charles. *The Signalman and Other Horrors: The Best Victorian Ghost Stories of Charles Dickens: Volume 2*. Createspace Independent Publications, 2015.
7. Anderson, Hans Christian. *The Fir Tree*. Dreamland Publications, 2011.
8. Colvin, Sidney (ed). *The Works of R. L. Stevenson. (Edinburgh Edition)*. British Library, Historical Prints Edition, 2011.
9. Bishop, Elizabeth. *Poems*. Farrar, Straus and Giroux, 2011.
10. Swift, Jonathan. *Gulliver's Travels*. Penguin, 2003.
11. Dickinson, Emily. *The Complete Poems of Emily Dickinson*. Createspace Independent Publications, 2016.
12. Brooke, Rupert. *The Complete Poems of Rupert Brooke*. Andesite Press, 2017.
13. King, Martin Luther Jr. &James M. Washington. *I Have a Dream: Writings and Speeches That Changed The World.* Harper Collins, 1992.
14. Keller, Helen. *The Story of My Life*. Fingerprint Publishing, 2016.
15. Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.
16. Thorpe, Edgar and Showick Thorpe. *Basic Vocabulary*. Pearson Education India, 2012.
17. Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.
18. Murphy, Raymond. *Murphy's English Grammar with CD*. Cambridge University Press, 2004.

B20MT1020	HUMAN ANATOMY-I	L	T	P	C
Duration: 3 hrs/wk		3	0	0	3

Prerequisites:

Students on Completion of study of basic principles of cross-sectional normal anatomy of human body tissue.

Pedagogy

Mode of Teaching using ICT and Board

Course Objectives:

1. To understand the organization of human body
2. To obtain knowledge regarding the structural compositions in various organ systems
3. To undrstand the structure and functions of nervous system
4. To interpret the importance of lymphatic system

Course Outcomes:

CO1. Ready to explain the organization of components in the Human Body

CO2. Able to understand the structural compositions in various organ systems

CO3. To get knowledge about the structure and functions of nervous system

CO4. Able to analyse the blood components and lymphatic system

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P7	PO8	PSO1	PSO2	PSO3
B20MT1020	CO1	3	2	3	3	3	2	2	2	2	1	1
	CO2	2	3	1	3	1	3	2	2	1	1	1
	CO3	1	2	2	3	1	3	3	3	2	1	2
	CO4	3	3	2	3	1	3	2	3	1	0	2

Course Contents:

Unit 1

Introduction to anatomical terms and organization of the human body. Body Partsand Areas, Terms of Location and Position, Body Cavities and Their Membranes, Dorsal cavity, Ventral cavity, Planes and Sections.

Cells: Structure, function and location, Prokaryotic and eukaryotic cells, Cell organelles, Cell division

UNIT–II **12 Hrs**

Systemic Anatomy**:** Tissues –Definitions, Types, characteristics, classification. Types Location, functions and formation of Epithelial Tissue, Connective Tissue, Muscle Tissue, Nerve Tissue, Membranes, Glandular tissue Bones – types, structure, Axial & appendicular skeleton. Bone formation and growth, Joints – classification and structure. Movements at the joints and muscles producing movements.

UNIT–III **12 Hrs**

Nervous System**:** Structure of Neuroglia and neurouns General organization and function of CNS – Structure of Brain and spinal cord and their functions. PNS - Cranial nerves and spinal nerves

ANS - Sympathetic and Parasympathetic Special senses-general organization & functions.

Structure of Skin - Subcutaneous Tissue, Eye, Nose, Tongue (Auditory and Olfactory apparatus)

UNIT-IV **12 Hrs**

Circulatory system – Basic anatomy of heart and structure of blood vessels – arterial and venous system.Brief introduction about Lymphatic System: Gross and microscopic structure of lymphatic tissue.

Reference Bookss:

1. Human Anatomy by Inderbir Singh
2. Ross & Wilson Anatomy & Physiology in Health & Illness by Waugh (A)
3. Text Book of Human histology by Inderbir Singh
4. Theory and Practice of Histological Techniques by Bancroft (JD)
5. Human Genetics by Gangane (SD)
6. Ross & Wilson,(2014),Anatomy & Physiology in health & illness,11th edition, Elsevier Publications
7. Chaurasia B D, (2016), Human Anatomy, 7th edition, CBS publishers
8. Gerard J. Tortora and Bryan H.Derrickson,(Principles of Anatomy and

Physiology,14th edition,Wiley Publications.

B20MT1030	HUMAN PHYSIOLOGY-I	L	T	P	C
Duration: 3 hrs/wk		3	0	0	3

Prerequisites:

Students on Completion of study of basic principles of Human organs and systems functions.

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To know about blood cell, blood component, lymphatic system and related lab technique
2. To learn about cardiovascular system, cardiac cycle, blood pressure & heart rate and ECG
3. To known about nerve cell & nervous system, nerve impulse, EEG and about the sense organ
4. To understand the gastrointestinal physiology, digestion of lipid, carbohydrate and protein and related disease.

Course Outcomes:

CO1. Achieve knowledge about blood cell, blood component, lymphatic system and related lab technique

CO2. Able to understand cardiovascular system, cardiac cycle, blood pressure & heart rate and ECG measurement

CO3. Able to understand nerve cell & nervous system, nerve impulse, EEG and about the sense organ

CO4. Ready to understand the gastrointestinal physiology, digestion of lipid, carbohydrate and protein and related disease.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PSO1	PSO2	PSO3

	CO1	2	3	3	3	1	2	2	3	2	1	2

B20MT1030	CO2	3	2	3	3	1	2	2	3	2	2	1
	CO3	2	2	3	3	2	1	3	3	1	1	2
	CO4	3	3	2	3	1	1	3	2	2	1	1

Course Contents:

UNIT- I **12Hrs**

Blood-composition, function, cellular component & their function, haemoglobin & anaemia, blood groups and coagulation. Haematocrit, ESR, blood volume measurements. RBC, WBC & platelet counts, names of developmental stages of RBC, functions and fate of RBC. Functions of WBC and platelets. Lymphatic System-Composition & function of lymph, lymphatic tissue, Immunity with the role of thymus

UNIT- II **12Hrs**

Cardiovascular system-general arrange, heart, arteries, veins and capillaries, heart structure and function, cardiac cycle, heart sounds, heart rate, blood pressure, mechanism of circulation, definition of hypertension & shock, definitions of cardiac output, stroke volume, principles of measurements of cardiac output. ECG– methods of recording and ECG waves. Normal values of blood pressure, heart rate and their regulation in brief.

UNIT- III **12Hrs**

Respiratory system: parts of respiratory system, mechanism of respiration, pulmonary function, pulmonary circulation, respiratory muscles lungs volume and capacities, collection and composition of inspired alveolar and expired airs. Transport of oxygen and carbon dioxide. Brief account of respiratory regulation, Gas transport between lungs and tissues, Definition of hypoxia, dyspnoea, cyanosis, asphyxia and obstructive airways diseases

UNIT- IV **12Hrs**

Gastrointestinal physiology: Organs of GIT and their structure & function, secretion, digestion, absorption and assimilation, gastrointestinal hormones, physiology of digestion of carbohydrates, proteins & lipids, Structure & function of liver, spleen, gall bladder & pancreas, Jaundice, Cirrhosis

& Pancreatitis.

References:

1. Ross & Wilson,(2014),Anatomy & Physiology in health & illness,11th edition, Elsevier Publications
2. Sujit Chaudhury,(2011),Concise Medical Physiology,6th edition, NCBA
3. Sembulingam k,(2012),Essentials of Medical Physiology,6th edition, Jaypee Publications
4. Guyton and Hall,(2011) Textbook of Medical Physiology,12th Edition,Saunder/Elsevier
    a. Gerard J. Tortora and Bryan H.Derrickson,(Principles of Anatomy and Physiology, 14th edition, Wiley publications
5. Textbook of Medical Physiology by G.K. Pal.
6. Review of Medical Physiology by Ganong.
7. Samson Wrights Applied Physiology.
8. Text book of Medical physiology by A.B. Das Mahapatra.

B20MT1040	BIOCHEMISTRY -I	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of study of terminology and basic principles of common instruments used in Biochemistry laboratory, basic concepts of acids and bases and simple calculations of preparation of normality and molarity.

Pedagogy

Mode of Teaching using ICT and Board

Course Objectives:

1. To understand the knowledge of medical laboratory, apparatus handling and maintenance
2. To understand about the basic instruments used in the laboratory, preparation of reagents and buffers with units and measurements
3. To know about the collection and processing of biological samples
4. To Know the various collections

Course Outcomes:

CO1. Apply knowledge on safety rules and ethics in the practice of medical laboratory.

CO2. Acquire knowledge to explain the principles and the operation mode of the most used analytical equipments used in biochemistry lab.

CO3. Apply knowledge on reagents and buffer preparations and their applications.

CO4. Ascertain the collection and processing of biological specimen.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7	PO8	PSO1	PSO2	PSO3
B20MT1040	CO1	2	3	2	3	1	3	1	1	1	2	2
	CO2	2	3	3	3	1	1	2	3	2	2	2
	CO3	3	3	3	2	1	1	2	1	1	2	1
	CO4	3	2	1	3	1	3	2	3	1	1	2

Course Contents:

UNIT- I **12Hrs**

Role of Medical Laboratory technologists – ethics of laboratory practice. Laboratory safety – Common lab accidents their prevention and their first aid. General laboratory layout as applicable to biochemistry. Glassware's& plastic ware's used in lab, calibration of volumetric apparatus, cleaning, care and maintenance.

UNIT-II **12Hrs**

Instruments (Theory and demonstration): Principle, working, care & maintenance and calibration of Weighing balance, Hotplate, Magnetic stirrer, Centrifuges, Lyophilizer Incubator, Hot air oven, Colorimeter, Spectrophotometer, Water distillation plant, Deionizers ,pH paper, pH meter, method of pH measurement. Types of electrodes, salt bridge solution. Use, care and maintenance ofelectrodes.

UNIT-III **12Hrs**

Preparation of solution and reagents, normal solution, molar solutions, percent solution, dilutions, w/v, v/v, standard solution. Body fluid dilutions. Units of measurement: SI unit, reference range, units for measurement of enzymes, protein, drugs, hormones, vitamins. Concepts of acid base, hydrogen ion concentration. Ionization of water. Buffers, types, Henderson Hassel back Equation, pH value of a solution, preparation of buffer solutions. Indicators and its types.

Quality control: Accuracy, Precision, Specificity, Sensitivity.

UNIT- IV **12Hrs**

Specimen collection and processing of blood, urine & CSF, separation of serum and plasma, deproteinization of sample, handling of specimens for testing, preservation of specimen, transport of specimen, factors affecting the clinical results, effect of storage on sample.

References:

1. D M Vasudevan, (2011),Text book of Medical Biochemistry,6th edition Jaypee Publishers
2. M N Chatterjea & Rana Shinde,(2012),Text book of Medical Biochemistry,8th edition, Jayppe Publications
3. Singh & Sahni,(2008),Introductory Practical Biochemistry,2nd edition, Alpha Science
4. Lehninger,(2013),Principles of Biochemistry,6th edition, W H Freeman
5. U Satyanarayan,(2008), Essentials of Biochemistry,2nd edition, Standard Publishers
6. Medical laboratory Procedure Manual (T-M) by K.L. Mukerjee 1987, Vol.I, II & III Tata McGraw Hill Publication.
7. Text book of Medical Biochemistry by Ramakrishna
8. Text Book of Clinical chemistry by Norbert Teitz 4. Principles and Techniques of Practical Biochemistry by Wilson and Walker.
9. Clinical Chemistry - Principle and techniques by Rj Henry, Harper & Row Publishers.
10. Schaum's Outline of Biochemistry.Philip W. Kuchel, Ph.D, Simon Easterbrook-Smith, Vanessa Gysbers, J. Mitchell Guss
11. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology
12. Pearson's Biochemistry.Christopher K. Mathews, Kensal E. van Holde,Dean R. Appling,Spencer J. Anthony-Cahill
13. Biochemistry. Donald Voet, Judith G. Voet

B20MT1050	MICROBIOLOGY-I	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of study of microbial cell structure and function and basic principles of sterilization, disinfection and Microscope.

Course Objectives:

1. To learn the fundamental aspects of microbiology including taxonomy and classification
2. To understand about different kinds of microscopes used in the microbiology laboratory
3. To learn about gram staining for the identification of bacteria
4. To learn about disinfection methods used to control contamination of microorganisms

Pedagogy

Mode of Teaching using ICT and Board

Course Outcomes:

CO1. Ascertain about the fundamental aspects of microbiology including taxonomy and classification.

CO2. Acquire the knowledge of microscopes used in the microbiology laboratory.

CO3. Ascertain the knowledge of gram staining method used in microbiology.

CO4. Acquire the knowledge of about disinfection methods used to control contamination of microorganisms.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	PO 2	PO 3	PO 4	PO5	PO 6	PO7	PO8	PSO 1	PSO2	PSO3
B20MT1050	CO1	3	1	3	3	2	1	3	2	1	1	1
	CO2	3	3	2	3	1	1	2	3	1	2	2
	CO3	2	3	2	3	2	1	2	3	2	1	1
	CO4	1	3	2	3	2	3	2	3	2	2	1

Course Contents:

UNIT-I **12Hrs**

Fundamentals of Microbiology: Introduction, History and Scope of Microbiology.Microbes and origin of life, History and scope of Microbiology as a modern science, Contribution of Scientists to the field of Microbiology- Antony Von Leewenhoek, Edward, Jenner, LazaroSpallanzani, Louis Pasteur, Joseph Lister, Robert Koch, Alexander Flemming and lwanovsky. Introduction to bacterial

UNIT-II **12Hrs**

Instruments used in Microbiology: Microscopy: Study of compound microscope – magnification, numerical aperture, resolution and components of microscope. Bright Field Microscope, Dark Field Microscope, Phase Contrast Microscope, Fluorescence Microscope, Transmission Electron Microscope, Scanning Electron Microscope.

UNIT-III **12Hrs**

Stains and Staining TechniquesNature of dyes, Physical and chemical theories of staining, Staining techniques –principle, procedure and applications of a) Simple staining – negative staining

b) Differential Staining- Grams and Acid fast staining

c) Structural staining – cell wall, endospore, flagella and capsular staining.

UNIT-IV **12Hrs**

Methods to Control Microorganism: Definition of sterilization, Autoclave and serum inspirator. Various physical methods of sterilization –UV radiation, ionizing radiation, ultrasonic and sonic vibrations, filtration, Types of drying: dry heat (flaming, incineration, hot air) Hot-Air oven& moist heat (pasteurization, boiling) Autoclave, factors affecting sterilization and sterilization indicators. Definition of disinfection, types, qualities of good disinfectants. Chemical disinfectants – phenol and its compounds, alcohol, halogen, heavy metals and quaternary ammonium compounds, aldehyde, gaseous compound, abuse of disinfectants, Precautions while using the disinfectants.

References:

1. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication
2. RobertyCruckshank – Medical Microbiology – The Practice of Medical Mircrobiology
3. Medical Microbiology by R. Cruickshanketal ,vol.I ELBS

B20MT1060	PATHOLOGY- I	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of study of Basic Concepts of Pathology and terminologies used in the subject.

Pedagogy

Mode of Teaching using ICT and Board

Course Objective

1. To discuss about the history, basic concept of pathology, safety and basic histotechnology
2. To reveal blood composition blood cell & plasma, coagulation factors and blood cell formation
3. To discuss about RBC, hemoglobins, oxygen dissociation curve and study of blood group
4. To explain about sectioning, staining of tissue and various types of stain

Course Outcomes

CO1. To aware about the history and basic concept of pathology, safety and basic histotechnology.
CO2. To know about blood cell & plasma composition, coagulation factors and stage of blood cell formation.
CO3. To know about RBC, normal and abnormal hemoglobins, oxygen transport and blood group system.
CO4. To learn about sectioning, staining of tissue and aware about various types of stain

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO 8	PSO1	PSO2	PSO3
B20MT1060	CO1	3	3	1	2	1	1	2		1	1	1
	CO2	2	2	1	--	--	--	1		1	1	2
	CO3	3	2	1	2	--	1	1		2	2	2
	CO4	3	3	2	3	--	1	1		2	1	1

Course Contents:

UNIT-I **12Hrs**

Introduction to Pathology: Introduction & History of pathology, Basic definitions in pathology, laboratory organization, care & maintenance of equipment used in histotechnology lab,Safety measures in histotechnology lab Reception, Recording, Labelling and transportation of tissue specimens, Basic concepts of fixation and various types of fixative used in histopathology and cytopathology

UNIT-II **12Hrs**

Overview of hemostasis and coagulation, Stages of platelets development, Primary and Secondary hemostasis, Role of platelets, Role of coagulation factors, Coagulation inhibitory system, Fibrinolysis. Leukopoiesis, Stages of Leukocyte Maturation, Features of Cell Identification, leucocytosis and leucocytopenia, neutrophilia, eosinophilia, basophilia, monocytosis, lymphocytosis, neutropenia, lymphopenia, causes and significance, toxic granulation, Morphological alterations in neutrophil, effect of HIV on blood cell parameter.

UNIT-III **12Hrs**

RBCs, formation, morphology, cytoskeleton, anisocytosis, poikilocytosis, metabolism, role of 2, 3-BPG and oxygen dissociation curve. Haemoglobin, its synthesis and types, normal and abnormal hemoglobins, extravasccular and intravascular hemolysis. Methods of blood group determination, forward and reverse grouping, Slide & Tube method, Gel method, other blood group system such as Lewis, MNS, Kell Duffy etc.

UNIT-IV **12Hrs**

Cryostat, frozen sections of fresh, fixed and unfixed tissue, freeze drying, rapid frozen sections and staining for emergency diagnosis Dye chemistry, Stains and dyes, natural dye, acidic dye, basic dye, neutral dyes, fluorescence dye, mordant, accelerators, accentuators, metachromasia, metachromatic dyes. Leishmann stain.

Short term training

1. Origin, development, morphology, maturation, function and fate of blood cells, nomenclature of blood cells.
2. Various methods of blood collection, anticoagulants-mechanism and uses.
3. Counting chamber- hemocytometry. Enumeration of RBC including various counting chambers, diluting fluids for RBC count.

4. Hemoglobinometry. Principles and methods of quantitating Hb. Concentration of blood including knowledge of errors and quality control in various method. Abnormal hemoglobin and its investigation.
5. Leukemias – definition, causes, classification, detection of leukemia. Total leucocyte count in leukemias. Multiple myeloma.
6. Blood Coagulation and disorders of hemostasis. Principles and methods of assessment of coagulation. BT, CT, Prothrombin time, partial thromboplastin time, chrombic time.

References:

1. Textbook of Pathology, 6th Edition, 2013 by Harsh Mohan
2. A Short Textbook of Pathologyby Sajal Md Tahminur Rahman, Charu Hosne Ara Tahmin, Sajani Tabassum Tahmin, Sarnali Tanjila Tahmin (2013)Edition
3. Text book of Medical Laboratory Technology
4. Robbins and Cotran pathologic basis of disease (2009)

B20MT1070	HUMAN ANATOMY-I (Pratical)	L	T	P	C
Duration:3 hrs/wk		0	0	2	2

Prerequisites:

Students on Completion of study of how to handle and use microscope.

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To demonstrate about heart, vessel, atery and vein
2. To see microscopic image of artery and vein in heart
3. To know about histology of lymph node, spleen, tonsil & thymus
4. To learn radiograph, angiogram, demonstration about reflection and parts of urinary system
5. To know about histology of kidney, ureter, urinary bladder
6. To learn about histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary
7. To know about radiographs of abdomen-IVP, retrograde cystogram and pelvis – hysterosalpingogram

Course Outcomes:

CO1. To get knowledge of heart, vessel, atery and vein and achieve visual knowledge of artery and vein in heart

CO2. Ready to explain about lymph node, spleen, tonsil & thymus

CO3. Able to explain radiograph, angiogram, demonstration about reflection and parts of urinary system and able to discuss about histology of kidney, ureter, urinary bladder

CO4. Able to discuss about histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary and handle radiographs of abdomen-IVP, retrograde cystogram and pelvis – hysterosalpingogram.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO6	P7	PSO 1	PSO2	PSO3
B20MT1070	CO1	2	2	3	3	1	2	3	1	1	2
	CO2	3	2	2	3	3	2	2	2		1
	CO3	2	3	3	3	3	2	3	2	1	2
	CO4	1	3	3	3	2	2	3	1		2

Practicals

1. Demonstration of heart and vessels in the body
2. Histology of large artery, medium sized artery & vein, large vein
3. Microscopic appearance of large artery, medium sized artery & vein, large vein Pericardium.
4. Histology of lymph node, spleen, tonsil & thymus
5. Normal chest radiograph showing heart shadows, normal angiograms.
6. Demonstration of reflections
7. Demonstration of parts of urinary system
8. Histology of kidney, ureter, urinary bladder
9. Radiographs of abdomen-IVP, retrograde cystogram
10. Demonstration of section of male and female pelves with organs in situation
11. Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary
12. Radiographs of pelvis – hysterosalpingogram.

B20MT1080	CLINICAL POSTING-I	L	T	P	C
Duration: 3 hrs/wk		0	0	2	2

Prerequisites:

Students on Completion of B20MT1020, 1030, 1040, 1050 & 1060

Students during their clinical postings are able to understand the concepts of clinical diagnosis & apply the holistre approach in meeting the health needs of individual in a scientific manner.

To evaluate the effectiveness of clinical skill training on exam performance as compared with the conventional teaching practice they will be posted to assess their perceptions of the importance of skill lab training in hospitals and diagnostic laboratories.

SEMESTER-II

B20MT2010	Language-I: Communicative English	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites

Knowledge of intermediate English Grammar and LSRW skills

1. To develop basic communication skills in English for the learners of Bachelor of Science.
2. To prioritize listening and reading skills among the learners.
3. To simplify writing skills needed for academic as well as workplace context.
4. To examine that the learners use the electronic media such as internet and supplement the learning materials used in the classroom.

Pedagogy

Mode of Teaching using ICT and Board

Course Outcomes:

On completion of the course, learners will be able to:

CO1. Interpret audio files and comprehend different spoken discourses/ excerpts in different accents (Listening Skills).

CO2. Demonstrate speaking ability with clarity, confidence and comprehension and communicate with one or many listeners using appropriate communicative strategies (Speaking Skills).

CO3. Make use of reading different genres of texts adopting various reading strategies (Reading Skills).

CO4. Develop the ability to write cohesively, coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic (Writing Skills).

Mapping of Course Outcomes with programme Outcomes

Course Code	POS/ COs	PO1	PO2	PO3	PO4	PO5	PO6	P7	PO8	PSO1	PSO2	PSO3
Course Code	POS/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PS O1	PS O2	PS O3
B19MT2010	CO1	3	2	3	3	2	1	1	2	1	1	2
	CO2	2	3	2	3	1	1	3	2	2	1	2
	CO3	2	2	3	3	1	2	3	2	2	2	2
	CO4	2	3	3	3	2	3	3	3	2	1	1

Course Contents:

UNIT –I **12 Hrs**

Language acquisition: Grammar: Active and passive voice

Listening & Speaking: Listening to informal conversations and interacting

Reading: Developing analytical skills; Deductive and inductive reasoning

Writing: Giving Instructions; Dialogue Writing

UNIT – II **12 Hrs**

Persuasive Skills:

Grammar: Compound words; Phrasal verbs

Listening: Listening to situation based dialogues

Speaking: Group Discussions

Reading: Reading a short story or an article from newspaper; Critical reading

Writing: Formal letters (Accepting/ inviting/ declining); Personal letters (Inviting your friend to a function, congratulating someone for his / her success, thanking one's friends / relatives)

UNIT – III **12 Hrs**

Cognitive Skills: Grammar: Homonyms; Homophones,**Listening:** Listening to conversations; Understanding the structure of conversations,**Speaking:** Presentation Skills,**Reading**: Extensive reading

Writing: Report Writing (Feasibility/ Project report - report format – recommendations/ suggestions - interpretation of data using charts, PPT); Precis Writing

UNIT – IV

Employability Skills: Grammar: Idioms; Single Word Substitutes,**Listening:** Listening to a telephone conversation; Viewing model interviews (face-to-face, telephonic and video conferencing)

Speaking: Interview Skills, Mock Interviews **Reading:** Reading job advertisements and the profile of the company concerned

Writing: Applying for a job; Writing a cover letter with résumé / CV

- ***Note: The teaching material for grammar exercises, reading, writing, listening and speaking will be strictly related to Medical contexts.***

References:

1. Bansal, R.K. and J.B. Harrison. *Spoken English*. Orient Blackswan, 2013.
2. Raman, Meenakshi and Sangeeta Sharma. *Technical Communication*. Oxford University Press, 2015.
3. Thorpe, Edgar and Showick Thorpe. *Objective English*. Pearson Education, 2013.
4. Dixson, Robert J. *Everyday Dialogues in English*. Prentice Hall India Pvt Ltd., 1988.
5. Turton, Nigel D. *ABC of Common Errors*. Mac Millan Publishers, 1995.
6. Samson, T. (ed.) *Innovate with English.* Cambridge University Press, 2010.
7. Kumar, E Suresh, J. Savitri and P Sreehari (ed). *Effective English*. Pearson Education, 2009.
8. Goodale, Malcolm. *Professional Presentation*. Cambridge University Press, 2013.

B20MT2011	**Language-II: Kannada**	**L**	**T**	**P**	**C**
Duration: 3 hrs/wk		**1**	**1**	**0**	**2**

Prerequisites:

- PÀ£ÀßqÀ ¨sÁµÉAiÀÄ §UÉUÉ ¥ÁæxÀ«ÄPÀ w¼ÀÄªÀ½PÉ CUÀvÀå.
- ¨sÁµÉAiÀÄ£ÀÄß NzÀ®Ä ªÀÄvÀÄÛ §gÉAiÀÄ®Ä w½¢gÀ¨ÉÃPÀÄ.
- ¥ÀzÀ« ¥ÀÆªÀð ²PÀëtzÀ°è PÀ£ÀßqÀ ¨sÁµÉAiÀÄ£ÀÄß N¢gÀ¨ÉÃPÀÄ.

Pedagogy

Mode of Teaching using ICT and board

Course Objectives:

1. ¨sÁµÉ, ¸Á»vÀå, EwºÁ¸À ªÀÄvÀÄÛ ¸ÀA¸ÀÌøwUÀ¼À£ÀÄß PÀ£ÀßqÀ, PÀ£ÁðlPÀPÉÌ ¸ÀA§A¢ü¹zÀAvÉ ¥ÀjZÀ¬Ä¸À¯ÁUÀÄvÀÛzÉ.
2. «zÁåyðUÀ¼À ¸ÀªÀðvÉÆÃªÀÄÄR ¨É¼ÀªÀtÂUÉUÉ C£ÀÄªÁUÀÄªÀAvÉ ºÁUÀÆ CªÀgÀ°è ªÀiÁ£ÀªÀ ¸ÀA§AzsÀUÀ¼À §UÉÎ UËgÀªÀ, ¸ÀªÀiÁ£ÀvÉ ªÀÄÆr¹, ¨É¼É¸ÀÄªÀ ¤nÖ£À°è ¥ÀoÀåUÀ¼À DAiÉÄÌAiÀiÁVzÉ.
3. CªÀgÀ°è ¸ÀÈd£À²Ã®vÉ, ±ÀÄzÀÞ ¨sÁµÉ, GvÀÛªÀÄ «ªÀÄ±Áð UÀÄt, ¤gÀUÀð¼À ¸ÀA¨sÁµÀuÉ, ¨sÁµÀt PÀ¯É ºÁUÀÆ §gÀºÀ PË±À®åUÀ¼À£ÀÄß ¨É¼É¸ÀÄªÀÅzÀÄ UÀÄjAiÀiÁVzÉ
4. ¸ÀàzsÁðvÀäPÀ ¥ÀjÃPÉëUÀ½UÉ C£ÀÄPÀÆ®ªÁUÀÄªÀAvÀºÀ «µÀAiÀÄUÀ¼À£ÀÄß UÀªÀÄ£ÀzÀ°èèlÄÖPÉÆAqÀÄ ¸ÀÆPÀÛ ¥ÀoÀåUÀ¼À£ÀÄß DAiÉÄÌ ªÀiÁrPÉÆ¼Àî¯ÁVzÉ.

Course Outcomes:

CO1. ¸ÁªÀiÁfPÀ, gÁdQÃAiÀÄ, zsÁ«ÄðPÀ, ¸ÁA¸ÀÌøwPÀ ºÁUÀÆ °AUÀ¸ÀA§A¢ü «ZÁgÀUÀ¼ÉqÉ UÀªÀÄ£ÀºÀj¸ÀÄªÀÅzÀgÉÆA¢UÉ «zÁåyðUÀ¼À°è ZÀZÁð ªÀÄ£ÉÆÃ¨sÁªÀªÀÅ ¨É¼ÉAiÀÄÄvÀÛzÉ.

CO2. fÃªÀ£ÀzÀ°è §gÀÄªÀ C©ü¥ÁæAiÀÄ ¨ÉÃzsÀUÀ¼ÀÄ, ¸ÀªÀÄ¸ÉåUÀ¼À£ÀÄß DzsÀÄ¤PÀ ¸ÀAzÀ¨sÀðzÀ°è ªÀiÁ£À«ÃAiÀÄvÉAiÉÆA¢UÉ ¤ªÀð»¸ÀÄªÀAvÉ ¥ÉæÃgÉÃ¦¸ÀÄvÀÛzÉ.

CO3. ¸ÁªÀiÁfPÀ CjªÀÅ ªÀÄÆr¸ÀÄvÀÛzÉ

CO4. GvÀÛªÀÄ ¸ÀAªÀºÀ£À PÀ¯ÉAiÀÄ£ÀÄß ¨É¼É¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß FqÉÃj¸ÀÄvÀÛzÉ.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P O 2	PO 3	PO 4	PO 5	PO6	PO7	PO8	PSO1	PSO 2	PSO3
B20MT2011	CO1	2	2	3	3	2	3		2	2	2	2
	CO2	3	3	2	3	2	3		3	3	2	1
	CO3	2	3	2	3	2	3		3	3	1	1
	CO4	1	3	2	3	2	3	3	2	1	2	2

Course Contents:

Unit-I: ªÀÄzsÀåPÁ°Ã£À PÁªÀå

12 Hrs

1. ZÀAzÀæªÀÄw «¯Á¥À - gÁWÀªÁAPÀ
2. ºÀUÉUÀ¼À£ÀÄ »ArzÀ£ÀÄ ªÀÄ£ÀzÉÆ¼ÀUÉ - PÀÄªÀiÁgÀªÁå¸À
3. ªÀÄÄ½îrzÀ ªÀÄgÀ£ÉÃjzÀAvÁzÀÄzÀÄ - ®Qëöä㱀À
4. UÉÆÃgÀPÀë ¥Àæ¸ÀAUÀ - ZÁªÀÄgÀ¸À

Unit-II: ªÀÄzsÀåPÁ°Ã£À PÁªÀå

12 Hrs

1. wæ¥À¢UÀ¼ÀÄ - ÀªÀðdÕ ºÉ¼ÀªÀ£À
2. ªÀÄÄAzÀPÉÌ ¯ÉÃ¸ÀÄAlÄ £ÀªÀÄUÉ – PÀmÉÖ VjAiÀÄªÀÄä
3. UÀÄgÀÄ«£À UÀÄ¯ÁªÀÄ£ÁUÀÄªÀ vÀ£ÀPÀ - ¥ÀÄgÀAzÀgÀ zÁ¸ÀgÀÄ
4. PÀgÉzÀÄ PÉÆlÖ£ÀÄ ±Á¥ÀªÀ£ÀÄ - PÀ£ÀPÀzÁ¸ÀgÀÄ

Unit-III: ¯ÉÃR£ÀUÀ¼ÀÄ

12 Hrs

1. ªÉÆÃPÀë ºÀÄqÀÄPÀÄvÀÛ ¦æÃwAiÀÄ §AzsÀ£ÀzÀ°è - ¦. ®APÉÃ±À
2. gÁªÀÄ-PÀÈµÀÚ-²ªÀ - ÉÆÃ»AiÀiÁ
3. ªÀiÁ£À«ÃAiÀÄvÉ CAvÁgÀ¯Áè - zÉÃªÀ£ÀÆgÀÄ ªÀÄºÁzÉÃªÀ
4. ¨sÀÆvÁ¬Ä ªÀÄÄ¤zÁ¼ÀÄ - ªÀÄÄgÁj §¯Áè¼À

Unit-IV: ¥ÀæªÁ¸À PÀxÀ£À

12 Hrs

1. £À£ÉÆß¼ÀV£À ºÁqÀÄ PÀÆå¨Á - f.J£ï. ªÉÆÃºÀ£ï

¥ÀgÁªÀÄ±Àð£À UÀæAxÀUÀ¼ÀÄ :

1. ªÀÄÄUÀ½ gÀA.²æÃ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 2014
2. ¹ÃªÀiÁwÃvÀ PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ ¸ÀA¥ÀÄl 1,2,3,4,5 ªÀÄvÀÄÛ 6, PÀÄªÉA¥ÀÄ PÀ£ÀßqÀ CzsÀåAiÀÄ£À ¸ÀA¸ÉÜ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ, ªÉÄÊ¸ÀÆgÀÄ. 2014
3. ºÀA¥À £ÁUÀgÁdAiÀÄå, ¸ÁAUÀvÀå PÀ«UÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
4. PÁ¼ÉÃUËqÀ £ÁUÀªÁgÀ, wæ¥À¢, gÀUÀ¼É ªÀÄvÀÄÛ eÁ£À¥ÀzÀ ¸Á»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
5. ¸ÀA. ¨É£ÀUÀ¯ï gÁªÀÄ gÁªï ªÀÄvÀÄÛ ¥Á£ÀåA ¸ÀÄAzÀgÀ ±Á¹ÛçÃ, ¥ÀÄgÁt £ÁªÀÄ ZÀÆqÁªÀÄtÂ, ¥ÀæPÁ±ÀPÀgÀÄ ¥Àæ¸ÁgÁAUÀ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ. 2010
6. ¸ÀA. §¸ÀªÀgÁdÄ J¯ï. ¸ÀªÀðdÕ£À ªÀZÀ£ÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 2012
7. ªÀÄgÀÄ¼À¹zÀÝ¥Àà PÉ, µÀlà¢ ¸Á»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
8. ¸ÀA. ¸ÉÃvÀÄgÁªÀÄ gÁªï C.gÁ., ²æÃ ®Qëöä£À£À eÉÊ«Ä¤ ¨sÁgÀvÀ(ªÀÄÆ®-vÁvÀàAiÀÄð-¸ÀavÀæ), ¥ÀæPÁ±ÀPÀgÀÄ PÁªÀÄzsÉÃ£ÀÄ ¥ÀÄ¸ÀÛPÀ ¨sÀªÀ£À, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
9. ¸ÀA. f.J¸ï.¨sÀmï., PÀÄªÀiÁgÀªÁå¸À£À PÀuÁðl ¨sÁgÀvÀ PÀxÁªÀÄAdj ¥ÀæªÉÃ±À, ¥ÀæPÁ±ÀPÀgÀÄ CPÀëgÀ ¥ÀæPÁ±À£À, ºÉUÉÆÎÃqÀÄ, ¸ÁUÀgÀ. 2006
10. QÃvÀð£ÁxÀ PÀÄvÀðPÉÆÃn, PÀ£ÀßqÀ ¸Á»vÀå ¸ÀAUÁw, ¥ÀæPÁ±ÀPÀgÀÄ PÀÄvÀðPÉÆÃn ªÉÄªÉÆÃjAiÀÄ¯ï læ¸ïÖ, zsÁgÀªÁqÀ. 2009
11. ±ÁªÀÄgÁAiÀÄ vÀ.¸ÀÄ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQ£À ªÉAPÀtÚAiÀÄå ¸ÁägÀPÀ UÀæAxÀªÀiÁ¯É, ªÉÄÊ¸ÀÆgÀÄ -2014
12. ²ªÀgÀÄzÀæ¥Àà f.J¸ï. PÀ£ÀßqÀ ¸Á»vÀå ¸À«ÄÃPÉë, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2019.

B20MT2012	Hindi-II (Languge)	L	T	P	C
Duration: 3 hrs/wk		1	1	0	2

Prerequisites:

- अध्येताओं, पी.यू.सी के स्तर पर द्वितीय भाषा के रूप में हिन्दी का अध्ययन करना हुआ हो।
- हिन्दी साहित्य के इतिहास का संक्षिप्त ज्ञान की आवश्यकता है।
- हिन्दी व्याकरण का अवबोधन आवश्यक है।

- चिन्दी-अंग्रेजी अनुवभद से संबंचधत जभनकभरी जरुरी ि ै |

Pedagogy

Mode of teaching Using ICT and Board

Course Objectives:

1. स ंदर्भन ुसभर उचित र्भषभ कभ प्रय ोग करन े क ी दक्षतभ क ो छभत ्ो ं म ें उत्पन्न करनभ |
2. सभचित्य क े मभध्यम स े समभज एव ं मभनवीय म ूल ्ो ं क ो समझभकर, उन म ूल ्ो ं क ी रक्षभ ि े तु प्र ेररत करनभ |
3. छभत ्ो ं म ें प ुस्तक पठन एव ं ल ेखन क ी अक ृ चतम प्रव ृचि स ्थभचपत करनभ |
4. अध्य ेतभओ ं म ें सभचित्य क े मभध्यम स े प्रर्भव ी एव ं क ु शल स ं ि भर कभ चवकभस करनभ |

Course Outcomes:

अध्ययन की समभप्ति पर अध्येतभ –

CO1. सभमभचजक मूल् एवं नैचतक जवभबदे ि ी को स्वीकभर कर सकतभ ि ै |**CO2.** सभचित्य की प्रभसंचगकतभ को जीवन में समझने की दक्षतभ रखतभ ि ै |
CO3. समभज म ें अ ंतचनचित पद्दचतयभ एव ं चवि भरधभरभओ ं कभ व्यभख्यभन करन े म ें सक्षम बन सकतभ ि ै | **CO4.** सभचित्य क े मभध्यम स े प्रर्भव ी एव ं क ु शल स ं ि भर कभ चवकभस कर सकतभ ि ै |

Mapping of Course Outcomes with Programme Outcomes

Course Code	POS/ COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PS01	PS02
B20MT2012	CO1	2	3	1	3	2	3	2	2	1	1
	CO2	1	2	2	3	2	2	3	1	1	1
	CO3	3	3	2	3	3	3	3	1	1	1
	CO4	1	2	2	3	3	2	3	2	1	2

Course Contents:

इकाई – 1: प्रभीन कचवतभ, आधुचनक कचवतभ **12 hrs.**

कबीर के दोिे

कचवतभ –जचलयभवभलभ बभग मेंं बसंत- सुर्द्रभकु मभरी

ि ौिभन कचवतभ – सुर्भष की मृत्यु पर - धमवीर भरती

इकाई – 2: मध्यकभलीन कचवतभ, आधुचनक कचवतभ **12 hrs.**

रसखभन के दोिे

कचवतभ – िमभरी चजन्दगी - के दभरनभथ अग्रवभल

कचवतभ –ि लनभ िमभरभ कभम ि ै ।- चशवमंगल चसंि सुमन

इकाई – 3: मध्यकभलीन कचवतभ, आधुचनक कचवतभ **12 hrs.**

मीरभबभई के पद

कचवतभ – मेरे सपने बहुत नि ीं ि ैं-

चगररभज कु मभर मभथुर कचवतभ – अर्ी न ि ोगभ

मेरभ अंत – चनरभलभ

इकाई – 4: अनुवभद, चनबंध **12 hrs.**

अनुवाद : चिन्दी – अंग्रेजी

लनबंा :

1. भरत मेंं चकसभनोंं की स्थचत
2. चनवभि न आयोग कभ महत्व
3. प्रेस की आजभदी चकतनी सभथक
4. भरतीय नभरी
5. सभचित्य कभ उद्देश्य

References

1. पभठ्य पुस्तक – रेवभ चवश्वचवद्यभलय
2. सुबोध व्यविभररक चिन्दी – िॉ. कु लदीप गु ि
3. अचर्नव व्यविभररक चिन्दी – िॉ.परमभनन्द गु ि
4. चिन्दी सभचित्य कभ इचतिभस - ि ॉ. नभगेन्द्र
5. आधुचनक चिन्दी सभचित्य कभ इचतिभस - िॉ. बच्चन चसंि
6. चिन्दी सभचित्य कभ नवीन इचतिभस - िॉ. लभल सभि ब चसंि
7. शुद्ध चिन्दी कै से बोले कै से चलखे- पृथ्वीनभथ पभण्डे
8. कभयभलय अनुवभद चनदेशकभ
9. चिन्दी चनबंध संग्रि

B20MT2013	Additional English	L	T	P	C

Duration: 3 hrs/wk	(Languge-II)	1	1	0	2

Prerequisites:

Knowledge of intermediate English Grammar and LSRW skills.

Pedagogy

Mode of Teaching using ICT and board

Course Objectives:

1. To ensure the development of the linguistic prowess of the students
2. To motivate the students to appreciate literature
3. To help students build strong language fundamentals
4. To promote an appreciable reading habit among the students

Course Outcomes:

On completion of the course, learners will be able to:

CO1. Demonstrate a thorough understanding of sensitive and critical social issues.

CO2. Develop reading skills and vocabulary range

CO3. Critically analyse a piece of prose or poetry

CO4. Express their opinion in a coherent and communicable manner

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P7	PO8	PSO1	PSO2	PSO3
B20MT2013	CO1	2	2	3	3	3	3	3	2	2	2	3
	CO2	3	2	2	3	3	3	3	3	3	2	2
	CO3	2	3	3	3	3	3	3	2	2	3	3
	CO4	1	3	3	3	3	3	3	2	1	3	3

Course Contents:

Unit – I **12 Hrs**

Literature: Toru Dutt - Casuarina Tree**;** Robert Frost – Stopping by Woods on a Snowy Evening**;** Tomas Rivera–The Harvest**;** C.V. Raman – Water – The Elixir of Life; **Language:** Degrees of Comparison

Unit – II **12 Hrs**

Literature: Tadeusz Rozewicz – Pigtail**;** Jyoti Lanjewar – Mother**;** Sowvendra Shekhar Hansda – The Adivasi Will Not Dance**;** Harriet Jacobs – Excerpt from *Incidents in the Life of a Slave Girl***; Language:** Prefix and Suffix

Unit – III **12 Hrs**

Literature: Kamala Das – An Introduction**;** Usha Navrathnaram – To Mother; Rabindranath Tagore – The Exercise Book**;** Jamaica Kincaid – Girl**; Writing Skills:** Dialogue Writing

Unit – IV **12 Hrs**

Literature: Rudyard Kipling – The Absent-minded Beggar; Sir Arthur Conan Doyle – The Hound of the Baskervilles; Aldous Huxley – The Beauty Industry**; Writing Skills:** Story Writing

Reference Books:

1. Agrawal, K.A. *Toru Dutt the Pioneer Spirit of Indian English Poetry - A Critical Study*. Atlantic Publications, 2009.
2. Latham, Edward Connery (ed). *The Poetry of Robert Frost*. Holt Paperbacks, 2002.
3. Gale, Cengage Learning. *A Study Guide for Tomas Rivera's The Harvest*. Gale, Study Guides, 2017.
4. Basu, Tejan Kumar. *The Life and Times of C.V. Ram*an. PrabhatPrakashan, 2016.
5. Rozewicz, Tadeusz. *New Poems*. Archipelago, 2007.
6. Manohar, Murli. *Critical Essays on Dalit Literature*. Atlantic Publishers, 2013.
7. Hansda, SowvendraShekhar. *The Adivasi Will Not Dance: Stories*. Speaking Tiger Publishing Private Limited, 2017.
8. Jacobs, Harriet. *Incidents in the Life of a Slave Girl*. Createspace Independent Publication, 2014.
9. Das, Kamala. *Selected Poems*. Penguin Books India, 2014.
10. Tagore, Rabindranath. *Selected Short Stories of Rabindranath Tagore*. Maple Press, 2012.
11. Gale, Cengage Learning.*A Study Guide for Jamaica Kincaid's Girl*. Gale, Study Guides, 2017.
12. Kipling, Rudyard. *The Absent-Minded Beggar*. Hardpress Publishing, 2013.
13. Doyle, Arthur Conan. *The Hound of the Baskervilles*. General Press, 2017.
14. Dixson, Robert J. *Everyday Dialogues in English*. Prentice Hall India Pvt Ltd., 1988.
15. Turton, Nigel D. *ABC of Common Errors*. Mac Millan Publishers, 1995.
16. Samson, T. (ed.) *Innovate with English.* Cambridge University Press, 2010.
17. Kumar, E Suresh, J. Savitri and P Sreehari (ed). *Effective English*. Pearson Education, 2009.

B20MT2020	HUMAN ANATOMY- II	L	T	P	C
Duration: 3 hrs/wk		3	0	0	3

Prerequisites:

Students on Completion of study of outline of respiratory, digestive and endocrine system

Pedagogy

Mode of Teaching using ICT and board

Course Objectives:

1. To learn the fundamental aspects of respiratory and digestive system
2. To study the fundamental aspects of urogenital system
3. To study the fundamental aspects of endocrine system
4. To learn about the anatomical techniques related to human anatomy

Course Outcomes:

CO1. Ascertain about the fundamental aspects of of respiratory and digestive system
CO2. Acquire the knowledge of urogenital system
CO3. Ascertain the knowledge of endocrine system
CO4. Acquire the knowledge of anatomical techniques related to human anatomy.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P7	PO 8	PSO1	PSO2	PSO3
B20MT2020	CO1	3	2	3	3	2	1	1	2	1	1	2
	CO2	2	3	2	3	1	1	3	2	2	1	2
	CO3	2	2	3	3	1	2	3	2	2	2	2
	CO4	2	3	3	3	2	3	3	3	2	1	1

Course Contents:

UNIT-I **12Hrs**

Respiratory System & Digestive System: Respiratory system: Basic anatomy of nose, nasal cavity, Paranasal air sinuses, larynx, trachea, and bronchi. Gross and microscopic structure of lungs, Diaphragm and Pleura.

Digestive system: basic anatomy of oesophagus, stomach, small intestine, large intestine, liver, pancreas

UNIT–II **12Hrs**

Genito Urinary System: Genitourinary system: Basic anatomy of kidney and associated organs- Ureters, Urinary Bladder and Urethra Gross structure of both male and female reproductive organs male reproductive organs, female reproductive organs

UNIT-III **12Hrs**

Endocrine System Endocrine System: Brief anatomy of Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal

UNIT-IV **12Hrs**

Anatomical Techniques**:** Embalming of human cadaver, Museum Techniques, Basic principles of Karyotyping.

References:

1. Human Anatomy by Inderbir Singh
2. Ross & Wilson Anatomy & Physiology in Health & Illness by Waugh (A)
3. Text Book of Human histology by Inderbir Singh
4. Theory and Practice of Histological Techniques by Bancroft (JD)
5. Human Genetics by Gangane (SD)
6. Ross & Wilson,(2014),Anatomy & Physiology in health & illness,11th edition, Elsevier Publications
7. Chaurasia B D, (2016), Human Anatomy, 7th edition, CBS publishers
8. Gerard J. Tortora and Bryan H.Derrickson, (Principles of Anatomy and Physiology, 14th edition, Wiley Publications.

B20MT2030	HUMAN PHYSIOLOGY- II	L	T	P	C
Duration: 3 hrs/wk		3	0	0	3

Prerequisites:

Students on Completion of study of outline of excretory, nervous, reproductive and endocrine system**.**

Pedagogy

Mode of Teaching using ICT and board

Course Objectives:

1. To learn about excretory system.
2. To known about respiratory system, transport of oxygen and carbon dioxide and respiratory disease
3. To get aware about endocrine system and disease related to hyper and hypo hormones
4. To learn about reproductive system in male and female and basis of contraception

Course Outcomes:

CO1. Able to understand the physiology and working principle of excretory system
CO2. Ready to understand respiratory system, transport of oxygen and carbon dioxide and respiratory disease.
CO3. Achieve knowledge about endocrine system and disease related to hyper and hypo hormones
CO4. Ready to understand about reproductive system in male and female and basis of contraception.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	P7	PO8	PSO 1	PSO2	PSO3
B20MT2030	CO1	3	2	2	2	1	1	2	3	2	1	2
	CO2	3	3	2	3	2	1	2	3	1	2	2
	CO3	2	3	2	3	1	2	2	2	1	1	2
	CO4	2	2	2	3	2	3	2	3	1	2	2

Course Contents:

UNIT-I **12Hrs**

Organs of Excretory System: Kidneys, Structure of Nephron, Mechanism of Excretion, Urine

formation (Glomerular filtration and Tubular reabsorption), Clearance tests & values of insulin, PAH and urea clearance. Electrolytes: their balances and imbalances Introduction of acidosis and alkalosis Muscle nerve physiology, types of muscles, their gross structural and functional difference with reference to properties. Structure in brief, mechanism of muscle contraction, isotonic and isometric contractions, energy sources of muscle contractions, motor unit.

UNIT-II **12Hrs**

Structure of neuron, nerve impulse, myelinated and non-myelinated nerve. Brief account of resting membrane potential, action potential and conduction of nerve impulse. Function of important structure and spinal cord, type of nerves according to function, Autonomic nervous system-organization & function. Neuro-muscle transmission. Various parts of nervous system, C.S.F., Functions of muscle spindle and motor tracts including reflexes, cutaneous receptors, joint receptors, sensory pathways. Ascending reticular formation, EEG, functions of cerebellum, basal ganglia, thalamus & hypothalamus, vestibular apparatus and functions. Special senses-general organization & functions (vision, hearing, taste & smell)

UNIT- III **12Hrs**

Endocrine System: Names of endocrine glands & their secretions, functions of various hormones. Brief account of endocrine disorders. Common endocrinological disorder such as diabetes mellitus, hyper & hypothyroidism, dwarfism, gigantism, tetany.

UNIT-IV **12Hrs**

Reproductive System: male & female reproductive organs, Reproductive cycle in female including menstrual cycle sex hormones, secondary sexual characteristics, puberty, spermatogenesis, oogenesis, menstrual cycle, pregnancy, menopause, contraceptive measures. Basis of contraception.

References:

1. Ross & Wilson,(2014),Anatomy & Physiology in health & illness,11th edition, Elsevier Publications
2. Sujit Chaudhury,(2011),Concise Medical Physiology,6th edition, NCBA
3. Sembulingam k,(2012),Essentials of Medical Physiology,6th edition, Jaypee Publications
4. Guyton and Hall,(2011) Textbook of Medical Physiology,12th Edition,Saunder/Elsevier

5. Gerard J. Tortora and Bryan H. Derrickson, (Principles of Anatomy and Physiology,14th edition,Wiley publications
6. Textbook of Medical Physiology by G.K. Pal.
7. Review of Medical Physiology by Ganong.
8. Samson Wrights Applied Physiology.
9. Text book of Medical physiology by A.B. Das Mahapatra.

B20MT2040	BIOCHEMISTRY-II	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of study of basics of biomolecules**.**

Pedagogy

Mode of Teaching using ICT and board

Course Objectives:

1. To understand the knowledge of biomolecules like carbohydrates, proteins, lipids, nucleic acids and vitamins
2. Recognize and understand their physical, chemical and biological properties

Course Outcomes:

CO1. Identify the chemical elements and the difference between simple sugars and complex carbohydrates and to recognize the structure of an amino acid and their function.

CO2. Summarize the function of proteins, recognize the importance of the 3D shape of a protein and the role of non-covalent bonds in maintaining the shape of a protein. Compare and contrast saturated, mono-unsaturated, and poly-unsaturated fatty acids.

CO3. Acquire the knowledge about the fundamentals of nucleic acids in biochemical processes.

CO4. Correlate knowledge of vitamins which makes students easier to study about medical biochemistry.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO8	PSO 1	PSO2	PSO3
B20MT2040	CO1	3	1	1	3	1	2	2	1	2	1	1
	CO2	3	1	1	3	1	2	2	1	1	1	2
	CO3	3	1	1	3	1	2	3	1	1	1	1
	CO4	3	1	1	3	1	2	2	1	2	2	1

Course Contents:

UNIT-I **12Hrs**

Carbohydrates: Classification, function, importance, structure, digestion & absorption.Amino acids: Classification, Structure, Properties and Biological functions.

UNIT-II **12Hrs**

Proteins: Classification, function, importance, structure, digestion & absorption. Lipids: Classification of lipids, Classification of fatty acids, Saturated & Unsaturated fatty acids, their biological functions, digestion and absorption, introduction of lipoproteins.

UNIT-III **12Hrs**

Nucleic acids: Structure, Function and types of DNA and RNA, Nucleotides, Nucleosides, Nitrogen bases, purines and pyrimidines and role of Nucleic acid. Overview of porphyrins, their precursors, primary and secondary disorders ofPorphyrin metabolism – diagnostic laboratory methodologies including appropriate Specimen collection and preservation techniques related to porphyrins.

UNIT-IV **12Hrs**

Vitamins: classification, function and disease associated with vitamins, hypervitaminosis. Minerals and ions: Requirement, function and biological importance of Calcium, Iron, Iodine, Zinc, Phosphorus, Copper, Sodium and Potassium.

Reference Books:

1. D M Vasudevan, (2011),Text book of Medical Biochemistry,6th edition Jaypee Publishers
2. M N Chatterjea & Rana Shinde,(2012),Text book of Medical Biochemistry,8th edition, Jayppe Publications
3. Singh & Sahni,(2008),Introductory Practical Biochemistry,2nd edition, Alpha science
4. Lehninger,(2013),Principles of Biochemistry,6th edition, W H Freeman
5. U Satyanarayan, (2008), Essentials of Biochemistry, 2nd edition, Standard Publishers
6. Medical laboratory Procedure Manual (T-M) by K.L. Mukerjee 1987, Vol.I, II & III Tata McGraw Hill Publication.

B20MT2050	MICROBIOLOGY-II	L	T	P	C
Duration:4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of **study of structure of bacteria and its classification.**

Pedagogy

Mode of Teaching using ICT and board

Course Objectives:

1. To learn the fundamental aspects of bacteria with respect to structure, function and composition and also types of bacterial growth
2. To study bacterial media compositions and culture techniques
3. To study morphology, pathogenicity, clinical features and lab diagnosis with respect to various bacterial cultures
4. To learn about an antimicrobial agents, sensitivity testing & antibiotic susceptibility testing of microorganisms

Course Outcomes:

CO1. Ascertain about the fundamental aspects of bacteria with respect to structure, function and composition and also types of bacterial growth

CO2. Acquire the knowledge of bacterial media compositions and culture techniques

CO3. Ascertain the knowledge of morphology, pathogenicity, clinical features and lab diagnosis with respect to various bacterial cultures

CO4. Acquire the knowledge of antimicrobial agents, sensitivity testing & antibiotic susceptibility testing of microorganisms.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS/ COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO8	PSO1	PSO 2	PSO3
B20MT2050	**CO1**	3	2	1	3	1	1	2	2	2	2	1
	CO2	3	2	2	3	1	1	2	2	1	2	2
	CO3	3	3	3	2	2	2	3	3	1	2	2
	CO4	2	3	3	3	2	2	3	3	2	2	1

Course Contents:

UNIT-I **12Hrs**

Bacteriology: Composition and detailed structure of Gram-positive and Gram- negative cell walls, Cell membrane: Structure, function and chemical composition of bacterial cell membranes. Cytoplasm: Ribosome, mesosomes, inclusion bodies, nucleoid, chromosome and plasmids, Endospore: Structure, formation.Growth and nutrition of bacteria: Meaning of growth of bacteria;

Types of bacterial growth with definition of generation time; Definition of growth curve including its phases; Multiplication of bacteria; Factors that affect growth, oxygen; requirement, carbon dioxide requirement, temperature, pH, light & osmotic effect.

UNIT-II **12Hrs**

Bacteriological Media & Culture Techniques: Introduction of culture media; Basic requirements & uses of culture media; Classification of culture media: Based on their consistency (solid, liquid, semisolid), Based on constituents/ingredients (simple, complex, synthetic or defined, special), Based on Oxygen requirement (aerobic & anaerobic media); Types of culture methods (streak culture, stab culture, pour plate method, spread plate broth culture); Anaerobic culture methods:Chemical or biological method, Reduction of Oxygen; Automated methods (Bactec- blood culture method).

UNIT-III **12Hrs**

Description, morphology, pathogenecity, clinical features and lab diagnosis of Gram positive cocci – staphylococci, streptococci. Gram negative cocci – Neisseria, Gram positive bacilli – Corynebacterium, Mycobacterium, Actinomyces, Listeria, Bacillus, Clostridia. Gram negative bacilli–Enterobacteriaceae, Pseudomonas, Alcaligenes, Vibrio, Aeromonas, plesiomonas, Campylobacter, Bacteroides, Fusobacterium, Brucella, Haemophilus, Bordetella. Pasteurella, Francisella, Spirochaetes, Chlamydia, Rickettsia, Mycoplasma, L forms, etc.

UNIT-IV **12Hrs**

Anti-microbial Agents, Sensitivity Testing&Antibiotic susceptibility testing: Introduction of antimicrobial agents; Definition of anti-microbial agents;classification and uses, Ideal qualities of an antimicrobial agent; Mechanism of action of anti-microbial drugs; Resistance of bacteria to antimicrobial drugs; Definition of antimicrobial sensitivity testing; Measurement of anti- microbial activity techniquesin bacteriology; MIC & MLC.

Reference Books:

1. Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013)
2. Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication

B20MT2060	**PATHOLOGY- II**	**L**	**T**	**P**	**C**
Duration:4 hrs/wk		**2**	**1**	**0**	**3**

Prerequisites:

Students on Completion of B20MT1060

Pedagogy

Mode of Teaching using ICT and board

Course Objectives:

Provide basic about blood, their preservation technique, blood bank, antigen and antibody reaction

1. To aware about blood and hemoglobulin related disease, pathogenesis and related test.
2. To discuss about minerals and vitamins related disease, Infectious and non-infection disease.
3. To make aware about transfusion related disease screen, transfusion related test and equipment or component

Course Outcomes:

CO1. To learn basic about blood and its grouping & their preservation technique, blood bank, antigen and antibody reaction,

CO2. To known about anemia its pathogenesis and diagnostic related test.

CO3. To learn about minerals and vitamins related disorders, Infectious and non-infection disease.

CO4. To get knowledge about transfusion related disease screening, transfusion related test and equipments and separation of removal of components of blood.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P7	PO8	PSO 1	PSO2	PSO3
B20MT2060	CO1	3	1	2	2	--	1	1	--	1	1	2
	CO2	3	2	2	3	--	1	2	--	1	2	1
	CO3	3	3	2	1	--	1	2	--	2	1	2
	CO4	3	3	2	3	--	1	2	--	1	1	2

Course Contents:

Unit 1

Blood components and its preparation, preservation, storage and transportation Indications for different blood component transfusion, Blood transfusion reaction and its type, HDN, Introduction of stem cell banking and bone marrow transplantation. Basic Principles of Blood Banking, Antigen, Antibody, naturally occurring antibody, Complement, ABO & Rh blood group system, Anticoagulants and preservative used in blood bank, Donor selection criteria, Blood collection and processing

UNIT-II **12Hrs**

Anaemia and its classification, pathogenesis, laboratory investigations and management, Iron deficiency anaemia, metabolism of iron, pathogenesis, laboratory investigations and management, principle and procedure of special test. Megaloblastic anaemia, pernicious anaemia, pathogenesis, laboratory investigations. Haemolyticanaemia, pathogenesis and laboratory investigations, principle and procedure of special test.

UNIT-III **12Hrs**

Diseases: Protein energy malnutrition, deficiency diseases of vitamins and minerals, nutritional excess and imbalances. Role and effect of metals (Zinc, Iron and Calcium) and their deficiency diseases, Aetiology and pathophysiology of diabetes, arteriosclerosis, myocardial infarction, respiratory diseases (COPD), Parkinson disease. Infectious Diseases: pathogenesis & overview of modes of infections, prevention and control with suitable examples like Typhoid, Dengue

UNIT-IV **12Hrs**

Transfusion transmissible infectious disease screen, Coomb'test, Cross matching, Compatibility testing, Antibody Screening & Identification, Grading of Reaction/Agglutination. Apheresis, indications of hemapheresis, plasmapheresis, plateletspheresis, plasmapheresis. Quality control of reagents, equipments, blood components used in transfusion medicine. Role of NACO, Indian Red Cross Society, DGHS and blood transfusion services.

Demonstrations:

1. Definition, sources and types histological specimens, kinds of histological

presentations.

2. Labeling, fixation, properties of fixing fluids, classification and composition of fixing fluids. Advantages and disadvantages of secondary fixatives. Postchroming.

3. Principle and methods of staining of Blood smears and bone marrow smears. Supravital stain. Recticulocyte count. Heinz bodies.

4. Description of morphology of normal and abnormal red cells.Blood differential WBC counting. Recognition of abnormal cell. Anaemia – definition etiology

   classification and laboratory diagnosis.

5. Hemolytic anaemia, definition, causatives, laboratory investigations. Auto hemolysis, acid hemolysis.

Reference Books:

1. Essentials of Anatomic Pathology by Liag Cheng (2006)
2. Pettit JE and Hoffbrand AV. Essential Haematology. (Latest edition.) Blackwell Scientific
3. Dacie and Lewis. Practical Haematology.(Latest edition.) Churchill Livingstone.
4. Hoffbrand AV and Pettit JE. Clinical Haematology (Atlas) Gower Medical Publishing. London. (Latest edition)
5. Denise M. Harmening. Modern Blood Banking and Transfusion Practices (Latest edition)
6. Michael F. Murphy. Practical Transfusion Medicine(Latest Edition)
7. Goodright SH, Hathaway WE Disorder of Haemostasis and Thrombosis- A Clinical Guide. Latest edition, McGraw- Hill.
8. Harmening DM. Modern Blood Banking and Transfusion Practices. Latest edition. Jean-Francois Vilain.

B20MT2070	YOGA / SPORTS / MUSIC / DANCE/ THEATRE	L	T	P	C
Duration: 2 hrs/wk		2	0	0	2

Note: Music, Dance, and Theater courses are offered by the School of Performing Arts, whereas the Sports and Yoga courses are offered by the Department of Physical Education. The students have to choose any **ONE** of these courses.

YOGA FOR HEALTH

Prerequisites:

Students who has knowledge and interest in various co-curricular activities.

Pedagogy

Mode of Teaching using ICT and board

Course Objectives:

- To prepare the students for the integration of their physical, mental and spiritual faculties;
- To enable the students to maintain good health;
- To practice mental hygiene and to attain higher level of consciousness;
- To possess emotional stability, self control and concentration; and

Course Outcomes:

On completion of the course learners will be able to:

CO1. Practice yoga for strength, flexibility, and relaxation.
CO2. Learn techniques for increasing concentration and decreasing anxiety
CO3. Become self disciplined and self-controlled
CO4. Improve physical fitness and perform better in studies

Course Contents:

Yoga: Introduction, **Surya Namaskara: -** 12 counts

UNIT-II:

Asanas: Sitting- Vajrasana, Dandasana, Padmasana, Matsyasana, Paschimottasana, Shirasasana.

Asanas: Standing- Tadasana, Trikonasana, Parshwa konasana, Veerabadrasana.

UNIT-III:

Asanas: Prone Position- Bhujangasana, Dhanurasana.

Asanas: Supine Position- Sarvangasana, Halasana.

Mudras- Dhyana mudra, , Namaste mudra, Nasika mudra

UNIT-IV:

Pranayams: - Anuloma – Viloma, Basthrika, Bhramari.

Dhyana & its types: Competition format, Rules and their interpretations

SPORTS (VOLLEYBALL)

Prerequisites:

Students who has knowledge and interest in various co-curricular activities.

Pedagogy

Mode of teaching using ICT and board

Course Objectives:

To learn the rules, fundamental skills, and strategies of volleyball

1. To develop skills in passing, setting, serving, spiking, and blocking.
2. To learn basic offensive and defensive patterns of play.
3. To develop a positive attitude towards volleyball as a lifetime sport and to improve physical fitness through participation in volleyball.

Course Outcomes:

On completion of the course learners will be able to:

CO1. Learn basic skills and knowledge associated with volleyball.
CO2. Apply these skills while playing volleyball and exhibit improved performance
CO3. Improve physical fitness and practice positive personal and lifestyle.
CO4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Contents:

UNIT-I

- Introduction about Volleyball
- Players Stance, Receiving and passing
- The Volley (Overhead pass), The Dig (Underhand pass), Service Reception

UNIT-II

- Service- Under Arm Service, Tennis Service, Side Arm Spin Service, Round Arm Service, High spin service, Asian serve / American serve (floating)
- Setting the ball- Set for attack, Back set, Jump set

UNIT-III

- Smash/Spike- Straight smash, Body turn smash, Wrist outward smash, Wrist inward smash
- Block- Single block, Double block, Three-man block
- Rolls- Overhead pass & back rolling, One hand underhand pass with side rolling, Forward dive

UNIT-IV

- Attack Combination, Defense Systems, Libero play
- Court marking, Rules and their interpretations and Duties of officials

SPORTS (BASKETBALL)

Prerequisites:

Students who has knowledge and interest in various co-curricular activities.

Pedagogy

Mode of teaching using ICT and board

Course Objectives:

1. To develop technical skills in passing, in ball handling, individual offense, individual defense, rebounding, screen, team offense, team defense and fast break.
2. To learn basic offensive and defensive strategies of play.
3. To develop a positive attitude towards Basketball as a lifetime sport and to improve physical fitness through participation in Basketball.
4. To develop positive understanding and appreciation of the basketball game.

Course Outcomes:

On completion of the course learners will be able to:

CO1. Learn basic skills and knowledge associated with basketball.

CO2. Apply these skills while playing basketball and exhibit improved performance

CO3. Improve physical fitness and practice positive personal and lifestyle.

CO4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Contents:

UNIT-I

- Basketball: Introduction
- Grip; Player stance- Triple threat stance and Ball handling exercises
- Passing (Two hand/one hand)- Chest pass, Bounce Pass, Over head pass, Underhand pass, Hook Pass, Behind the back pass, Baseball pass, Side arm pass and passing in running.
- Receiving-Two Hand receiving, One hand receiving, Receiving in stationary position, Receiving while jumping, Receiving while running.

UNIT-II

- Dribbling- How to start dribble, How to stop dribble, High / Low dribble with variations
- Shooting- Layup shot and its variations, One hand set shot, One hand jump shot, Free throw, Hook shot, Tip-in shot.
- Stopping- Stride/Scoot, Pivoting and Faking /Feinting footwork.

UNIT-III

- Rebounding- Defensive rebound, Offensive rebound, Box out, Rebound Organization.
- Individual Defensive- Guarding the man with the ball and without the ball.
- Offensive drills, Fast break drills, Team Defense/Offense, Team Tactics

UNIT-IV

- Court marking, Rules and their interpretations

SPORTS (FOOTBALL)

Pre requisites

Students who has knowledge and interest in various co-curricular activities.

Pedagogy

Course Objective

1. To develop skills in passing, receiving, controlling the ball, dribbling, shielding, shooting, tackling, beating a defender and heading in football.
2. To learn basic offensive and defensive patterns of play
3. To use different parts of the body in utilizing the above skills while playing football
4. To develop a positive attitude towards football as a lifetime sport and to improve physical fitness through participation in football.

Course Outcomes:

On completion of the course learners will be able to:

CO1. Learn basic skills and knowledge associated with football.
CO2. Apply these skills while playing football and exhibit improved performance
CO3. Use the knowledge and understanding to perform, refine and adapt the above skills and related skills with precision, accuracy, fluency and clarity in any situation.
CO4. Improve physical fitness and practice positive personal and lifestyle.

Course Contents:

UNIT-I

1. **Football: Introduction**

- Kicks- Inside kick, Instep kick, Outer instep kick, Lofted kick, Chipping, Volley, Half Volley
- Trapping- Trapping rolling the ball, Trapping bouncing ball with sole

UNIT-II

- Dribbling- With instep and outer instep of the foot.
- Heading- From standing, running and jumping.
- Feinting- With the lower limb and upper part of the body.

UNIT-III

- Tackling- Simple tackling, Slide tackling.

- Throw-in- Standing and Sliding
- Goal Keeping- Collection of balls, Ball clearance, throwing and deflecting.

UNIT-IV

- Ground marking, Rules and their interpretations

SPORTS (TRACK AND FIELD)

Prerequisites:

Students who has knowledge and interest in various co-curricular activities.

Pedagogy

Mode of Teaching using ICT and Board

Course Objectives:

1. To teach students the skilled techniques in sprints, relay running, hurdles, long jump, high jump, and shot put and practice them.
2. To develop competence among students in demonstrating all the techniques covered in the course.
3. To make students understand some of the scientific and empirical principles and their rationale underlying the development of skilled performance.
4. To inculcate among students the habit of team work and cooperative learning and develop competence in detecting / correcting technique errors.

Course Outcomes:

On completion of the course learners will be able to:

CO1. Display competencies in executing basic techniques and skills associated with select track and field events.

CO2. Develop basic skills and techniques to improve one's running posture and take-off position for different jumps.

CO3. Learn regular practice of select track and field events and improve physical fitness

CO4. Appreciate track and field events by applying sports science knowledge to explain the execution of

Course Contents:

Unit-I

- Athletics: Introduction
- Track Events - Steeple Chase, Race Walking, Middle and Long distance races
- Race walking - Technique, Faults and Officiating.
- Middle and Long distance races – Technique and Training

Unit-II

- Jumping Events - High Jump and Triple Jump: Basic Skills and techniques
- High Jump - Straddle Roll & Flop Technique, Approach, Take-off, Technique in the air, Clearance over the bar & Landing
- Triple Jump – Hop, Step and Jump Technique, Approach, Take-off & Landing

Unit-III

- Throwing Events - Discus Throw and Hammer Throw: Basic Skills and techniques
- Discus Throw - Standing and Rotatory techniques, Grip, Stance, Rotation Technique, Power stance, Release and Reverse (Follow through)
- Hammer Throw - Grip, Swings, Rotation foot work, Release and Follow through

Unit-IV

- Rules, Officiating and Marking - Ground / Sector Marking, Interpretation of Rules.

Reference Books

1. Arthur E. Ellison (ed) (1994). Athletic Training and Sports Medicine.
2. Ballisteros, J.M. (1998). Hurdles Basic Coaching Manual, IAAF.
3. Bosen K.O. (1993). Teaching Athletics Skills and Technique.
4. Bosen K.O. (1990). Study Material on Hurdles for the Regular Course Students.
5. Doherty K. (1995). Track and Field Omni book.
6. Martin, David E. Peter N. Coe (1991). Training Distance Runner.
7. Howard S. (1981). Science of Track and Field Athletics.
8. Briggs Graeme (1987). "Track and field coaching Manual", Australian Track and Field Coaches Association. Rothmans Foundation National Sports Division.
9. Carr, Gerry (1999). "Fundamentals of Track and Field. Track Athletics Title G.V. 1060 5.e. 368.
10. I.A.A.F. Level-II (2001). Text Book on Jumping Event.
11. Jarver, Jesse (1987). "The Jumps", Track and Field Coaching Manual Australia.

DRAMATICS

Prerequisites:

Students with background in Theatre Arts/ Keen interest in Dramatics.

Pedagogy

Mode of Teaching using ICT and Board

Course Objectives:

- To imbibe the acting skills.
- To understand the broader applications of theatre studies in allied arts forms.
- To be able to use body language for better communication.
- Students shall also be able to understand voice modulation and Navarasas.

Course Outcomes:

On successful completion of this course, students should be able to:

CO1. Freely express improvisation in non-verbal communication.

CO2. Shall hone good acting skills and be able to emote better.

CO3. Be able to put up a theatre act and play a key role.

CO4. Be able to differentiate good acting and understand the importance of good lyrics, stage Crafting, music, dance, costume and lighting.

Course Contents:

UNIT – 1

Working on Body:

Body and its analysis. Understanding physical abilities (Anga, Pratyanga and Upanga). Challenges of the body. Using body as metaphor and language. The class's bodies as a collective, an ensemble, a collaborative team.

UNIT – 2

Sound and Movemen**t:**

Awareness of creating sound patterns, voice modulations, rhythm in speech and diaologues. Understanding the rhythm and patterns of movements like walking, framing, shaping, primitive and animal movements.

UNIT – 3

Characterization and Improvisation:

Observation of people around. Getting into the role and living it. Developing a character from establishment (pace and rhythm). Improvisation techniques of body and mind.

UNIT – 4

Group work and Production:

Develop a theme, concept or a play and include all the theatre skills, stage craft, costuming and put up an act. Choosing theme and characters.

Reference Books:

1. All about Theatre – Off stage – Chris Hogget.
2. Rangadalli Anataranga – K V Subbanna
3. The Indian Theatre – Hemendranath Das Gupta.
4. A Practical handbook for an Actor – Milisa Bruder, ee Milchel Cohn, Madeleine Oliek et al, Zigler Publisher.

INDIAN CLASSICAL DANCE FORMS (Bharathanatyam, Kuchipudi , Mohiniyattam)

Prerequisites:

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Background of classical dance training or any other dance forms.

Note: Non-classical dancers can also join

Pedagogy

Mode of teaching using ICT and board

Course Objectives:

- To be able to understand the fine nuances of Classical dance.
- To understand the importance of health through Indian classical dance, strengthen the body capacity.
- To understand mythology and its characters in Indian classical dance form through lessons of Abhinaya.
- To develop an understanding about the Indian classical dance forms and its universal application.

Course Outcomes:

CO1. To be able to identify and appreciate the classical dance forms.

CO2. To be able to execute basics of Adavus with finesse.

CO3. To be able to express through abhinaya.

CO4. To be able to perform to perform the fundamentals in the chosen dance form.

Course Contents:

Unit 1

An introduction to Indian classical dance forms

Bharatanatyam, Kuchipudi, Mohiniyattam

Unit 2

Learning of Fundamentals

Exercises and Adavus- I (Bharathanatyam, Kuchipudi, Mohiniyattam)

Unit 3

Adavus –II (Bharathanatyam, Kuchipudi, Mohiniyattam)

Unit 4

Reference Books

1. *Indian classical dance forms –U S Krishna Rao,U K Chandrabhaga Devi*
2. *Classical Dances –Sonal Mansingh, Avinash Parischa*
3. *Kuchipudi – Sunil Kothari*
4. *Bharatanatyam An in depth study- Saroja vydyanathan*
5. *Mohiniyattam – Bharathi Shivaji*

PERCUSSION INSTRUMENT (TABLA AND MRIDANGAM)

Prerequisites:

Students with background in Percussion instruments and knowledge of Rhythm/ Keen interest in studying Mridagam / Tabala.

Pedagogy

Mode of teaching using ICT and board

Course Objectives:

- To understand the Rhythmology.
- To understand the importance of Laya, Taala.
- To be able to understand the fine finger techniques of playing the instrument.

Course Outcomes:

On successful completion of this course, students should be able to:

CO1. To be able to set instrument to Sruthi.

CO2. To be able to play the fundamentals on instrument.

CO3. To be able to learn and perform a particular taala.

Course Contents:

UNIT 1

1. Introduction to Musical Instruments
2. Percussion Instruments
3. Mridangam and its History

1. Adi Talam and its various forms

2. Definitions and recitation of different gathis

UNIT 2

3. Introduction to Tala System

4. Definitions of 5 jaathis and their recitation

UNIT 3

1. Tisra Jaathi

2. Khanda Jaathi

3. Misra jaathi

4. Sankeerna Jaathi

UNIT 4

1. Learning of Jathi Formation

2. Basic jathis

3. Jathis for Dance forms

4. Some Basic Definitions of Korvai, Teermanam etc.

Reference Books:

1. Mridangam- An Indian Classical Percussion Drum – Shreejayanthi Gopal
2. Theory and practice of Tabala – Sadanand Naimpally.
3. Theory and practice of Mridangam – Dharmala Rama Murthy
4. The Art of the Indian Tabala – Srdjan Beronja.

B20MT2080	HUMAN PHYSIOLOGY-I	L	T	P	C
Duration: 3 hrs/wk		0	0	2	2

Prerequisites:

Students on Completion of **B20MT1030**

Pedagogy

Mode of teaching using ICT and board

Course Objectives:

1. To measure clotting time, bleeding time and blood pressure
2. To auscultate heart sound, artificial respiration process and determination of vital capacity
3. To use haemoglobinometry, counting blood cell and determination of blood group
4. To learn differential WBC counting and Leishman's staining

Course Outcomes:

CO1. Able to check clotting time, bleeding time and blood pressure

CO2. Able to diagnose ausculate heart sound, artificial respiration process and determination of vital capacity

CO3. Able to handle the haemoglobinometry, counting blood cell and detrmination of blood group

CO4. Ready to do differential WBC counting, Leishman's staining, ESR determination and packed cell volume calculation.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO8	PSO1	PSO 2	PSO3
B20MT2080	CO1	1	3	2	2	3	2	3	3	1	1	2
	CO2	1	3	3	3	1	1	3	3	2	2	1
	CO3	1	3	3	3	1	2	2	3	1	1	2
	CO4	2	3	2	3	1	2	2	2	2	2	1

Course Contents:

Practicals

1. Determination of Clotting Time, Bleeding Time
2. Blood pressure Recording
3. Auscultation for Heart Sounds
4. Artificial Respiration
5. Determination of vital capacity
6. Haemoglobinometry
7. White Blood Cell count, Red Blood Cell count, Calculation of Blood indices
8. Determination of Blood Groups
9. Leishman’s staining and Differential WBC count

10. Determination of packed cell Volume
11. Erythrocyte sedimentation rate [ESR]

B20MT2090	CLINICAL POSTINGS-II	L	T	P	C
Duration: 5 hrs/wk		0	0	3	3

Prerequisites:

Students on Completion of **B20MT1080**

Course Objectives:

Upon completing the clinical postings students will be able to demonstrate competency in various skills. These skills may be obtained in the outpatient, inpatient, and long term care settings

SEMESTER-III

B20MT3010	BIOCHEMISTRY-III	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of study of B19M1040, B20MT2040 and basic concepts of analytical chemistry

Pedagogy

Mode of teaching using ICT and board

Course Objective

1. Understand the basic knowledge and use of centrifugation in biochemical experiments
2. Understand about the fundamental concept of electrophoresis and chromatographic techniques and their applications in clinical biochemistry
3. Understand about radioactive elements and their application in medical laboratory
4. Understand the basic knowledge and use of flame photometry, turbidometry

Course Outcomes:

CO1. Learn the centrifugation method that has to be used in medical laboratory.

CO2. Apply knowledge on fundamental concept of electrophoresis and their applications in clinical biochemistry.

CO3. Apply knowledge on fundamental concept of chromatographic techniques and HPLC and their applications in clinical biochemistry.

CO4. Acquire the knowledge about the fundamentals of radioactive elements, flame photometry, turbidometry and atomic absorption spectroscopy and their application in medical biochemistry laboratory.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P 7	PO8	PSO1	PSO2	PSO3
B20MT3010	CO1	3	3	2	3	1	1	2	3	1		2
	CO2	3	3	2	3	1	1	2	3	2	1	2
	CO3	3	3	2	3	1	1	2	3	2	1	1
	CO4	3	3	2	3	1	1	2	3	1	1	2

Course Contents:

UNIT-I **12Hrs**

Centrifugation: Basic principles of centrifugation. RCF and sedimentation coefficient. Centrifugation, fixed angle and swinging bucket rotors, differential centrifugation, density gradient centrifugation and Ultracentrifugation.

UNIT-II **12Hrs**

Theory and types of electrophoresis, description of technique. Methods for detecting and quantitating separated zones of proteins. Role of electrophoretic technique in clinical biochemistry. Fundamental concepts of biophysical phenomena like osmosis, dialysis, colloidal state, viscosity, absorption, osmotic pressure, surface tension and their application in relation to the human body.

UNIT-III **12Hrs**

Chromatography – Basic concepts, Working principles, types and applications of Chromatography - Paper Chromatography, Thin Layer Chromatography, Ion Exchange Chromatography, Affinity Chromatography, Gel Filtration Chromatography, Gas Chromatography and HPLC role in clinical biochemistry.

UNIT-IV **12Hrs**

Elementary concepts of radioactivity, radioisotopes, their application in medicines andagriculture isotopic dilution analysis, radioactivity counting techniques. Working Principles and application of flame photometry, turbidometry and atomic absorption spectroscopy.

Reference Books:

1. D M Vasudevan, (2011),Text book of Medical Biochemistry,6th edition Jaypee Publishers
2. M N Chatterjea & Rana Shinde,(2012),Text book of Medical Biochemistry,8th edition, Jayppe Publications
3. Singh & Sahni,(2008),Introductory Practical Biochemistry,2nd edition, Alpha Science
4. Lehninger, (2013), Principles of Biochemistry,6th edition, W H Freeman
5. U Satyanarayan,(2008), Essentials of Biochemistry,2nd edition, Standard Publishers
6. Medical laboratory Procedure Manual (T-M) by K.L. Mukerjee 1987, Vol.I, II & III Tata McGraw Hill Publication.
7. Text book of Medical Biochemistry by Ramakrishna
8. Text Book of Clinical chemistry by Norbert Teitz 4. Principles and Techniques of Practical Biochemistry by Wilson and Walker.
9. Clinical Chemistry - Principle and techniques by Rj Henry, Harper & Row Publishers.
10. Schaum's Outline of Biochemistry.Philip W. Kuchel, Ph.D, Simon Easterbrook-Smith, Vanessa Gysbers, J. Mitchell Guss
11. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology
12. Pearson's Biochemistry.Christopher K. Mathews, Kensal E. van Holde,Dean R. Appling,Spencer J. Anthony-Cahill
13. Biochemistry. Donald Voet, Judith G. Voet

B20MT3020	MICROBIOLOGY-III	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of **study of structure of fungi and its classification.**

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To learn the fundamental aspects of fungus with respect to structure, function

also laboratory diagnosis of fungal infections

2. To study about mycoses and its classification, morphology, pathogenicity, clinical features
3. and also lab diagnosis of superficial mycoses, subcutaneous mycoses and dermatophytes
4. To study about morphology, pathogenicity, clinical features and lab diagnosis of systemic mycoses

Course Outcomes:

CO1. Ascertain about the fundamental aspects of fungus with respect to structure, function and classification and also laboratory diagnosis of fungal infections

CO2. Acquire the knowledge of mycoses and its classification, morphology, pathogenicity, clinical features and also lab diagnosis of superficial mycoses, subcutaneous mycoses and dermatophytes

CO3. Ascertain the knowledge about morphology, pathogenicity, clinical features and lab diagnosis of systemic mycoses

CO4. Acquire the knowledge about morphology, pathogenicity, clinical features and lab diagnosis of opportunistic fungi.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO8	PSO1	PSO2	PSO3
B20MT3020	CO1	3	3	2	3	3	2	1	2	1	2	2
	CO2	3	3	2	3	3	2	1	2	2	2	2
	CO3	3	3	2	3	2	3	1	2	2	1	1
	CO4	3	3	2	3	2	3	1	2	2	2	1

UNIT-I **12Hrs**

Mycology: Introduction of Mycology: Definition, Ultrastructure of fungal cell**,** general properties and classification - Superficial, Sub-Cutaneous mycoses, Systemic mycoses, Opportunistic mycoses. Culture, Morphology and identification of contaminant and pathogenic fungi. Laboratory diagnosis of common superficial, subcutaneous, and deep fungal infections of man.

UNIT-II **12Hrs**

Definition of mycoses & Classification Morphology, Pathogenicity, Clinical features and lab diagnosis of:

1. Superficial Mycoses, Malsezzia furfur, Tinea nigra, Tinea pedis.
2. Subcutaneous Mycoses
3. Mycetoma
4. Rhinosporidium
5. Sporotrichosis
6. Dermatophytes
7. Microsporum
8. Epidermophyton
9. Trichophyton

UNIT-III **12Hrs**

Morphology, pathogenicity, clinical features and lab diagnosis of

Systemic Mycoses

1. Histoplasmosis
2. Blastomycosis
3. Coccidiodosis
4. Paracoccidiodosis

UNIT-IV **12Hrs**

Morphology, pathogenicity, clinical features and lab diagnosis of Opportunistic Fungi

1. Aspergillosis
2. Penicillosis
3. Zygomycosis
4. Pneumocystis
5. Mycotoxins

References:

1. Rippon – Medical Mycology
2. Emmons – Medical mycology
3. Goering R., Dockrell H., Zuckerman M. and Wakelin D. (2007) Mims' Medical Microbiology. 4th edition. Elsevier

4. Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education

B20MT3030	PATHOLOGY- III	L	T	P	C
Duration:4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of study of basic studies on tissue, cells and stains used in study of tissue

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To provide basic about blood, their preservation technique, blood bank, antigen and antibody reaction
2. To aware about blood and hemoglobulin related disease, pathogenesis and related test.
3. To discuss about minerals and vitamins related disease, Infectious and non-infection disease.
4. To make aware about transfusion related disease screen, transfusion related test and equipment or component

Course Outcomes:

CO1. To learn histopathogenesis of cancer cells/tissue.
CO2. To known about development of tissue, organs and clinical features
CO3. To learn about histopathology techniques of tissue.
CO4. To get knowledge about various methods of staining techniques involved in histopathology

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO 2	PSO3
B20MT3030	CO1	3	1	1	1	1	1	1	--	1	1	2
	CO2	3	1	1	2	1	1	2	--	2	2	1
	CO3	2	3	2	2	--	1	2	--	1	1	2

	CO4	1	3	3	3	--	1	2	--	2	1	1

Course Contents:

UNIT-I **12Hrs**

Introduction of histopathology, Tissue Renewal and Repair, healing and fibrosis, cirrhosis, introduction of oedema, hyperaemia, congestion,Cancer: Definitions, nomenclature, characteristics of benign and malignant neoplasm, metastasis, Carcinogens and cancer, concept of oncogenes, tumour suppressor genes, DNA repair genes and cancers stem cells.

UNIT-II **12Hrs**

Tissue and its types, Location and function, Causes and mechanisms of cell injury, reversible and irreversible injury. Introduction of hyperplasia, hypoplasia, hypertrophy, atrophy, metaplasia, necrosis and apoptosis. General features of acute and chronic inflammation: Vascular changes, cellular events, Cells and mediators of inflammation, Phagocytosis and its mechanism. haemorrhage, haemostasis, thrombosis, embolism, infarction, shock and hypertension.

UNIT-III **12Hrs**

Grossing of tissues, whole mount, sections, smears, tissue processing and its steps, manual and automated method, components & principle of automatic tissue processor. Processing of bones and teeth, Embedding media, its type and properties. Microtome, its type and working, various type of microtome,Microtome knives, its type and knife sharpening, Section cutting, fault and remedies, Section adhesive.

UNIT-IV **12 Hrs**

Progressive, regressive, vital, supravital staining, types of Hematoxylin

Haematoxylin and eosin staining, use of control sections in tissue staining, mounting and mounting media, advantages & disadvantages.Decalcification, decalcification methods, types of decalcifying fluid.Staining of carbohydrates: preparation of Schiff reagent, PAS staining, Alcian blue, staining of glycogen, Amyloid, other staining method Connective tissue & its staining: Trichrome staining, verhoeff stain, WeigertResorcin stain, Gordon's and Sweet stain, Gomori's method, von Geison stain, PTAH stain.

Short term training:

1. Tissue processing, dehydration and cleaning.
2. Embedding. Water soluble substances, embedding in paraffin nitrocellulose.
3. Equipment for sectioning microtome, knife, honing and stropping. Types, care and use of

microtome.

4. Technique for sectioning – frozen section. Technique for sectioning – Paraffin embedded tissue. Errors in sectioning and remedies. Attaching blocks tocarriers.
5. Technique of processing bone for histological studies. Mounting and covering. Mounting media.

References:

1. Quick reference handbook for surgical Pathologists by Justin A Bishop and Natasha
   a. Rekhtam (2011)
2. Pathology and The Pathology of Neoplasia, Paul Bogner 2014
3. Histology for Pathologist by Stacey E Mills MD, 4th edition, 2012
4. Wheater's Basic Pathology: A Text, Atlas and Review of Histopathology by Geraldine O'Dowd (latest edition) @ Wheater's Basic Histopathology by Alan Stevens. James S. Lowe, Barbara Young., 6th edition, 2014
5. Theory and Practice of Histological Techniques. Bancroft JD and Stevens A..
   a. Churchill Livingstone., 7th edition, 2013.
6. The Practice of Surgical Pathology: A beginners's guide to the diagnostic process
   a. by Diana Weedman Molavi, 2008.
7. Rosai, Juan. Rosai and Ackerman's Surgical Pathology. Tenth ed. 2 vols: Mosby
   a. Elsevier, 2011.
8. Lester, Susan C. Manual of Surgical Pathology. Third ed.: Mosby, 2010

B20MT3040	OPEN ELECTIVE Biochemistry in Daily Life	L	T	P	C
Duration: 4 hrs/wk		4	0	0	4

Prerequisites:

Fundamental understanding of DNA, RNA, Proteins, Carbohydrates and conception of food and medicines.

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

The overall objectives of the course are:

- To provide the students with theoretical information on micronutrients, water and electrolytes in nutritional biochemistry and their functions in metabolism.
- To provide the students with theoretical information on Various Diseases
- To develop knowledge about malnutrition and obesity
- To impart knowledge about various diseased conditions and their prevention

Course Outcomes:

After completing the course, the student should be able to

CO1 - Attain knowledge about importance of water, macro and micro nutrients, malnutrition and obesity.

CO2 - Analyse the causes, symptoms of various diseased conditions and their prevention.

CO3 - Understand the report of blood biochemical test

CO4 - Analyse the symptom of different diseases in human being

Mapping of Course Outcomes with programme Outcomes

Course Code	POS/ COs	PO1	P2	PO3	PO4	PO5	PO6	P7	PO8	PSO1	PSO2	PSO3
B20MT3040	CO1	1	2	3		2	3		3	2	2	1
	CO2	1	2	2			2	3	3	2	1	1
	CO3	2	2	3		2	3			1	2	1
	CO4	2	3	2			3		3	1	2	2

Course Contents:

Unit 1 **13hrs**

Nutrition

Water; General consideration, role of water in life Balanced diet. Nutritional importance of Energy giving, Body building and Protective foods (Vitamins and Minerals) Dietary fiber. Malnutrition diseases, Overweight and obesity.

Unit 2 **13hrs**

Diseases 1
Incidence, symptoms, Prevention and dietary management. of various Diseases:

Diabetes, diseases of Liver, & Pancreas-Hepatitis: alcoholic liver diseases. Renal disease: Acute and Chronic renal failure. Dialysis, medical and nutrition therapy.

Unit 3 **13hrs**

Diseases 2

Incidence, symptoms, Prevention and dietary management. of various Diseases:

Gastrointestinal diseases, Gastritis, Peptic, stomach and duodenal ulcer, Diarrhoea, constipation. Cancer and HIV/AIDS: Types, stages of cancer, and colon cancer. HIV infection and social issues.

Unit 4 **13hrs**

Interpretation of Diagnostic Reports

Commonly used bio chemical tests for diagnosis of various diseases and their interpretation. Total blood count, Blood glucose and urea; serum lipid–cholesterol, LDL and HDL triglyceride, and serum proteins. Urine creatinine, Glucose and protein (albumin). Enzymes: SGPT, SGOT

Reference Books:

1. Physical Biochemistry. Kansal Edward Van Halde. Prentice Hall.
2. Practical Clinical Biochemistry, ed. Harold Varley, 4th edn. CBS Publishers (1988).
3. Practical Clinical Biochemistry: Methods and Interpretation, ed. Ranjna Chawla, Jaypee Brothers Medical Publishers (1996).
4. Practical and Clinical Biochemistry for Medical Students, ed. T.N. Pattabhiraman, Gajanna Publishers (1994).
5. Hawk's Physiological Chemistry, ed. Oser, 14th Edn.(1976), Tata-McGrawHill.

6. Kuby Immunology; Oven, Punt, Stranford, 7th Edn. W. H. Freeman (2013).
7. Hepatology- A clinical text book by k Mauss, Berg, Rockstroh, Sarrazin, Wedemeyer H (2017)
8. Hepatology: a Textbook of Liver Disease, 4th edition by Zakim, Boyer 2003.
9. Text book of Diabetes 5th edition by Richard I. G. Holt, Clive Cockram, Allan Flyvbjerg, Barry J. Goldstein John Wiley & Sons 2011.
10. Molecular Biology of the Cell; 6 thEdn. Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, Peter Walter; Garland Science (2014).

B20MT3050	SKILL DEVELOPMENT (Health Care)	L	T	P	C
Duration: 2 hrs/wk		2	0	0	2

Prerequisites:

Students should have very good communication and in-depth knowledge of various human diseases.

Pedagogy

Mode of Teaching is ICT and Board

Course Objectives:

1. Know the principles of Communication for health and educating the patients for acute and chronic diseases.

2. Apply the principles of environmental and occupational health in the design of health programmes aimed at improving health status.

Course Outcomes:

CO1. Develop the awareness of health care system in various aspects.

CO2. Able to aware about environment sanitation and maintaing the hygenic condition.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO1	PSO2	PSO3
B20MT3050	CO1	2	1	1	1				2	2	1	1
	CO2	2	1	2	1	2			2	2	2	2

Course Contents:

UNIT I

Health Education- Meaning, Definition, Objectives and Importance

Communication for Health - Information: Definition and Components.The process of communication.Methods & media of communication.The concept of Information Education and communication (IEC) for health.Health Ethics.

Patient Education for Common Acute Diseases - Dental Diseases, Diarrhea, Vomiting. Cough, Cough & breathlessness (Bronchitis), Asthma, Skin Diseases (e. g. scabies, boils and infected wounds).

Patient Education in Chronic Diseases – Diabetes, Asthma and Chronic Bronchitis, Hypertension, Arthritis, Ischemic Heart Disease, Obesity, Cancers, Other Chronic Diseases.

Sexuality Education and Family Life Education- Prevention of STDs (Syphilis, Gonorrhoea, Pelvic Inflammatory Disease (PID)). Prevention & control of HIV/AIDS.

UNIT II

Personal Hygiene- Essentials of personal hygiene including personal grooming, Hand washing and its importance, Methods and pitfalls in hand washing, Prevention of food poisoning through proper personal hygiene.

Environmental Sanitation- Essentials of sanitation, Human faeces – methods of appropriate disposal, Faecal – oral contamination and Faecal – oral diseases, Methods of sanitation and hygiene to break faeco – oral transmission of diseases, Disposal of solid and liquid waste.

Public Relations in Health Care Service Institutions - Principles of Public Health. Immunization. National Health Programmes. Importance of Human Relationship in Healthcare Institutions.

Definition of public relation.Role and importance of public relations in health care service institutions.Role of General Health Assistant (GHA) in the hospitals.Staff-patient

relationship.Doctor-patient relationship.Personal hygiene of hospital staff.Empathy Vs sympathy in patient care.

Reference Books:

1. Control of Communicable Diseases in Man: Benenson A S
2. Manson's Tropical Diseses:Cook G, Zumla A
3. Hunters Tropical Medicine and emerging infectious diseases: Strickland GT
4. Training modules of various national & international institutes and national health programmes.

B20MT3060	BIOCHEMISTRY-I (Practicals)	L	T	P	C
Duration: 6 hrs/wk		0	0	4	4

Prerequisites:

Students should have studied **B20MT1060, B20MT2060, B20MT1040, and B20MT2040**

Pedagogy

Mode of Teaching is ICT and Board

Course Objectives:

1 To learn separation of serum and plasma from whole blood
2. To learn how to prepare reagents like normal and molar solutions
3. To understand accuracy and precision of histogram
4. To get a knowledge of qualitative analysis of biomolecules like carbohydrates, amino acids and proteins

Course Outcomes:

CO1. Acquire the knowledge of various biological specimen collection.
CO2. Ascertain about serum and plasma separation from whole blood.
CO3. Acquire the knowledge about the preparation of different kind of reagents.
CO4. Ascertain about histogram accuracy and precision using statistical methods.

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO1	PSO2	PSO3
B20MT3060	CO1	3	3	3	3	1	1	3	2	2	1	1
	CO2	3	2	1	3	1	3	1	3	2	1	2
	CO3	3	1	1	3	1	3	1	2	2	2	1
	CO4	3	3	3	3	1	3	2	3	1	1	2

Course Contents:

Practicals

1. Collection of blood, Urine and Gastric juice,separation of serum and plasma and Deproteinization of blood sample
2. Preparation of different percentage solutions and Molar and Normal solutions
3. Accuracy, precision and quality control – Demonstration and preparation of two Methods using histogram, F-test and Barr test.
4. Demonstration of photo colorimeter ,spectrophotometer and pH meter
5. Qualitative analysis of carbohydrates
6. Qualitative analysis of proteins and amino acids
7. Protein precipitation, dialysis and separation of proteins
8. Electrophoresis of serum, CSF and urine proteins.

B20MT3070	MICROBIOLOGY-I	L	T	P	C
Duration: 6 hrs/wk	(Practicals)	0	0	4	4

Prerequisites:

Students should have studied **B20MT1050.**

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To learn about the microscope and its parts and also glassware's used in microbiology lab
2. To learn about autoclave and hot air oven and also sterilization of glassware's used in microbiology lab
3. To learn about different culture media used in microbiology lab
4. To learn about the identification of microorganisms
5. To get a knowledge of gram staining methods used for the identification of microorganisms in microbiology lab

Course Outcomes:

CO1. Acquire the knowledge of microscope and its parts and also glassware's used in Micro-biology lab

CO2. Ascertain about autoclave and hot air oven and also sterilization of glassware's used in microbiology lab

CO3. Acquire the knowledge about different culture media used in microbiology lab

CO4. Acquire the knowledge of gram staining methods used for the identification of Micro-organisms in microbiology lab

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO2	PSO3
B20MT3070	CO1	3	3	2	2	1	2	2	2	2	2	1
	CO2	3	3	2	2	1	3	2	2	1	1	2
	CO3	3	3	1	2	1	2	3	3	2	1	2
	CO4	3	3	1	2	1	3	3	3	2	1	1

1. Demonstration of Microscope and its parts
2. Demonstration of glassware used in microbiology.
3. Demonstration of autoclave and sterilization of glass wares.
4. Demonstration of Hot air oven and sterilization of glass wares.
5. Demonstration of commonly used culture media - Nutrient broth, Nutrient agar, Blood agar, Mac conkey medium, LJ media, Robertson Cooked meat media, Martin Rose Bengal Agar.

B20MT3080	PATHOLOGY-I (Practicals)	L	T	P	C
Duration: 3 hrs/wk		0	0	2	2

Prerequisites:

Students should have studied **B20MT1060, B20MT2060**

Pedagogy

Method of Teaching Using ICT and board

Course Objectives:

1. To discuss about the history, basic concept of pathology, safety and basic histotechnology
2. To reveal blood composition blood cell & plasma, coagulation factors and blood cell formation
3. To discuss about RBC, hemoglobins, oxygen dissociation curve and study of blood group
4. To explain about sectioning, staining of tissue and various types of stain

Course Outcomes:

CO1. To aware about the basics of tissue processing in histotechnology
CO2. To get the knowledge of various equipments used in the technique
CO3. To learn about sectioning, staining of tissue and aware about various types of stain
CO4. To know about Microtomy

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO1	PSO2	PSO3
B20MT3080	CO1	1	3	2	2	--	1	2	--	2	1	1
	CO2	1	3	3	2	--	--	1	--	2	2	1
	CO3	2	3	2	3	--	--	--	--	1	1	2

1. Tissue processing, dehydration and cleaning.
2. Labeling, fixation, properties of fixing fluids, classification and composition of fixing fluids.
3. Embedding. Water soluble substances, embedding in paraffin nitrocellulose.
4. Equipment for sectioning microtome, knife, honing and stropping. Types, care and use of microtome.
5. Technique for sectioning – frozen section. Technique for sectioning – Paraffin embedded tissue. Errors in sectioning and remedies. Attaching blocks to carriers.
6. Technique of processing bone for histological studies. Mounting and covering. Mounting media.
7. Principle and methods of staining of Blood smears and bone marrow smears. Supravital stain. Recticulocyte count.

B20MT3090	**CLINICAL POSTINGS-III**	**L**	**T**	**P**	**C**
Duration: 3 hrs/wk		**0**	**0**	**2**	**2**

Prerequisites:

Students should have studied **B20MT2020, B20MT2030, B20MT2040, B20MT2050, and B20MT2060**

Course Objectives:

During their clinical postings students get exposed to end-of-rotation examinations, site visits, SOAP notes and clinical year assignments.

B20MT4010	BIOCHEMISTRY-IV	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students should have studied **B20MT1080, B20MT2090, and B20MT3090**

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To understand the basic knowledge in clinical laboratory of automation and selection of appropriate
2. instruments and reference values for specimens in medical laboratory experiments
3. To understand about the fundamental concept of laboratory tests and statistical techniques used for
4. the evaluation of analytical methods accuracy

Course Outcomes:

CO1. Acquire the knowledge about the fundamentals of clinical laboratory automation, proper instruments and reference values for specimens in medical laboratory experiments.

CO2. Acquire the knowledge about laboratory tests and statistical tools used for the assessment of analytical methods precision.

CO3. Ascertain the knowledge about kidney function test in medical laboratory.

CO4. Acquire the knowledge about analytical tools used in medical laboratory for liver disorders, stomach, pancreas and intestinal tract.

Course Code	POS / Cos	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO1	PSO2	PSO3
B20MT4010	CO1	3	3	2	3	1	2	2	3	1	1	2
	CO2	3	3	2	3	1	2	2	3	2	2	1
	CO3	3	3	1	3	1	1	2	2	1	1	2
	CO4	3	3	1	3	1	1	2	2	2	2	1

Course Contents:

UNIT-I **12Hrs**

Overview of approaches to clinical laboratory automation and its goal- general concepts used in automated instruments and specific applications of these concepts to selected instruments. Criteria to be used in evaluating and selecting appropriate laboratory instrumentation. Definition and concepts of reference values and related terminology – selection of individuals for determination of population based reference values- criteria for specimen collection and procedure for collecting data.

UNIT-II **12Hrs**

Analytical goals. Performance criteria for laboratory tests and quantitative means ofassessing the diagnostic capabilities of tests (Clinical relevance) - appropriate andoptional use of laboratory and data it generates. Goals of procedures and statistical techniques utilized for selecting and evaluating analytical quality and utility of procedures monitoring – quality assurance program. Overview of applicationof the computer in clinical Biochemistry laboratories.

UNIT-III **12 Hrs**

Kidneys and their physiological role – Laboratory tests to assess, detect and monitorrenal diseases. Overview of calcium and inorganic phosphate metabolism current laboratory and their Analytical assessment.

UNIT-IV **12Hrs**

Laboratory tests and analytical methods used in identification and evaluation of hepatobiliary disorders, stomach, pancreas and intestinal tract – procedure and tests used in the diagnosis and treatment of gastro intestinal diseases.

Reference Books:

1. D M Vasudevan, (2011),Text book of Medical Biochemistry,6th edition Jaypee Publishers

2. M N Chatterjea & Rana Shinde,(2012),Text book of Medical Biochemistry, 8th edition, Jayppe Publications

3. Singh & Sahni,(2008),Introductory Practical Biochemistry,2nd edition, Alpha Science

4. Lehninger,(2013),Principles of Biochemistry,6th edition, W H Freeman
5. Satyanarayan,(2008), Essentials of Biochemistry,2nd edition, Standard Publishers
6. Medical laboratory Procedure Manual (T-M) by K.L. Mukerjee 1987, Vol.I, II & III Tata McGraw Hill Publication.
7. Text book of Medical Biochemistry by Ramakrishna
8. Text Book of Clinical chemistry by Norbert Teitz 4. Principles and Techniques of Practical Biochemistry by Wilson and Walker.
9. Clinical Chemistry - Principle and techniques by Rj Henry, Harper & Row Publishers.
10. Schaum's Outline of Biochemistry.Philip W. Kuchel, Ph.D, Simon Easterbrook-Smith, Vanessa Gysbers, J. Mitchell Guss
11. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology
12. Pearson's Biochemistry.Christopher K. Mathews, Kensal E. van Holde,Dean R. Appling,Spencer J. Anthony-Cahill
13. Biochemistry. Donald Voet, Judith G. Voet

B20MT4020	MICROBIOLOGY-IV	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of **study of BASICS OF PARASITES AND PROTOZOANS**

Pedagogy

Mode of Teaching Using ICT and Board

Course Objective:

1. To study about Protozoa and its sub classifications and also morphology, pathogenicity, clinical
2. features and lab diagnosis different organisms related to Protozoa
3. To study about nematodes and their morphology, pathogenicity, clinical features and lab diagnosis
4. To learn the fundamental aspects of parasites and their infections and also analytical methods

Course Outcomes:

CO1. Ascertain about the fundamental aspects of parasites and their infections and also analytical methods in parasitology

CO2. Acquire the knowledge of Protozoa and its sub classifications and also morphology, pathogenicity, clinical features and lab diagnosis different organisms related to Protozoa

CO3. Ascertain the knowledge about nematodes and their morphology, pathogenicity, clinical features and lab diagnosis

CO4. Acquire the knowledge about morphology, pathogenicity, clinical features and lab diagnosis of Platyhelminthes.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 0 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO1	PSO2	PSO3
B20MT4020	CO1	3	2	3	3	1	1	2	3	1	1	2
	CO2	2	3	2	3	1	1	2	3	2	2	1
	CO3	3	3	2	2	1	1	2	3	1	1	2
	CO4	2	3	1	3	1	1	2	3	1	2	2

Course Contents:

UNIT-I **12Hrs**

Introduction of parasites, host, zoonosis, host parasites relationship, sources of infection, mode of infection, pathogenesis, and immunity in parasitic infection.

Diagnostic methods in Parasitology: Introduction, stool, urine, blood Culture methods, Immunological diagnosis and serology.

UNIT-II **12Hrs**

Protozoa

i. Intestinal Amoebae

a. E. Histolytica : Morphology , pathogenicity, clinical features and lab diagnosis

ii. Flagellates of intestine/genitalia

Morphology, pathogenicity, clinical features and lab diagnosis of a.Giardialamblia

b. Trichomonasvaginalis

Iii.Malarial Parasite

a.Plasmodiumvivax: Morphology, pathogenicity, clinical features and lab diagnosis

B.Differences between P. vivax, P. malaria, P. falcipaum&P.ovale.

UNIT-III **12Hrs**

Nematihelminthus: Intestinal Nematodes:

a. Ascaris: Morphology, pathogenicity, clinical features and lab diagnosis

b. Brief discussion about Enterobiusvermicularis (Thread worm) and Ancylostomaduodenale (Hook worm)

Tissue Nematodes: W. Bancrofti -Morphology, pathogenicity, clinical features and lab diagnosis

UNIT-IV **12Hrs**

Phylum Platyhelminths Morphology, pathogenicity, clinical features and lab diagnosis of a.Cestodes - T. solium, T. saginata& E. granulosus. (In brief) b.Trematodes - S. haematobium& F. hepatica (in brief)

References:

1. Chatterjee – Parasitology – Interpretation to Clinical medicine.
2. Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition
3. W.H. Freeman and Company, New York. Company, London.
4. Medical Parasitology – AjitDamle
5. Text Book of Parasitology by K.D. Chatterjee, Chatterjee medical Publishers, Calcutta.-4
6. Text book of Medical Parasitology by S.C. Parija.-4
7. Parasitic diseases in man by Richard Knight English Language Book Society (ELBS)-4
8. Medical Microbiology by R. Cruickshanketal, Vol.I ELBS-4

B20MT4030	**PATHOLOGY- IV**	**L**	**T**	**P**	**C**
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of **study of B20MT1060, B20MT2060, B20MT3030**

Prerequisites:

Mode of Teaching Using ICT and Board

Course Objective

1. To know about blood infection, disease and blood related disorder
2. To learn about sickle cell anaemia, etiology, pathogensis and their laboratory investigation
3. To understand platelets disorder, coagulation or bleeding related diorder and their laboratory test
4. To know about disorders of Protein

Course outcomes:

CO1. Able to understand about blood pathogen infection, disease and blood related disorder
CO2. To understand hemoglobin related disorders and their diagnosis
CO3. To get knowledge about leukemia, their types and laboratory method of investigation
CO4. To understand blood coagulation factor or protein, platelets disorder, and related laboratory test.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PSO1	PSO2	PSO3
B20MT4030	CO1	3	2	2	1	--	1	--	--	1	2	2
	CO2	2	2	2	2	--	--	--	--	2	2	1
	CO3	3	1	1	2	--	1	1	--	1	1	2
	CO4	2	3	3	1	--	1	--	--	1	2	2

Course Contents:

UNIT-I **12Hrs**

Aplastic anaemia, Anaemia of chronic disorders, Sideroblasticanaemia, HaemolyticAnaemia, etiology, pathogenesis, clinical features, laboratory investigations, Bone marrow examination, composition & functions, aspiration techniques, processing and staining. LE cells, its demonstration and significance, lupus anticoagulants, Blood parasites, Malaria, Trypanosomes, Filariasis, Leishmania

UNIT-II **12Hrs**

Hemoglobinopathies, qualitative and quantitative Sickle cell anaemia, sickle cell trait, etiology, pathogenesis, clinical features, and laboratory investigations, Disease management and prognosis

UNIT-III **12Hrs**

Leukemia and its classification, WHO and FAB classification, AML, ALL, CML, CLL, its etiology, clinical features, laboratory investigations Cytochemistryinvolved in diagnosis of various types of leukemia.

UNIT-IV **12Hrs**

Qualitative and quantitative disorders of platelets, hypercoaguable test, Disorders of secondary hemostasis, hemophilia and its lab diagnosis,Von-Willebrand disease, Disseminated intravascular coagulation, thrombosis, Disorder of fibrinogen, test for bleeding & coagulation disorders, correction studies for factor deficiency, quantitative factor assay.

Reference Books:

1. Leach M, Drummond M, Doig A. Practical Flow cytometry in Haematology Diagnosis. Latest edition, Wiley Blackwell Publisher
2. Bain BJ. Haemaglobinopathy Diagnosis. Latest edition. Blacwell Publishing.
3. Weatherall, DJ, Clegg JB The Thalassaemia Syndromes. Latest edition Wiley Blackwell Publisher
4. Parslow TG, Stites DP, Terr Al, Imboden JB. Medical Immunology. Lange Medical b. Books/McGraw-Hill Medical Publishing Division. c. Stites DP, Terr Al, Parslow TG. Basic & Clinical Immunology (latest edition). Lange
5. The Biology of Cancer (2013) by Robert A Weinberg. ISBN: 13: 9780815342205 / ISBN: 10: 0815342209.

B20MT4040	PHARMACOLOGY	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of study of B20MT1040 and outline of nervous, respiratory and cardiovascular system

Pedagogy

Mode of Teaching Using ICT and Board

Course objectives:

1. To know basic pharmacology, drug action, Metabolism and excretion, animal handling and technique related to pharmacology
2. To learn about drug action site either nervous system or local, different type of drug like Analgesics, antipyretics, anti-inflammatory agents and antirheumatic
3. To know drug action on respiratory, cardiovascular, blood and blood forming organs,

hormones and hormone antagonists

4. To understand chemotherapy and antibiotics working principle

Course outcomes:

CO1. Achieve basic knowledge of pharmacology, drug action, metabolism and excretion, animal handling and technique related to pharmacology

CO2. Get knowledge about drug action site either nervous system or local, different type of drug like analgesics, antipyretics, anti-inflammatory agents and antirheumatic

CO3. Able to know about drug action on respiratory, cardiovascular, blood and blood forming organs, hormones and hormone antagonists

CO4. Able to understand chemotherapy and antibiotics working principle

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / Cos	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO8	PSO1	PSO 2	PSO3
B20MT4040	CO1	3	3	2	1	1	1	2	3	1	2	2
	CO2	2	3	3	2	1	1	2	2	1	1	2
	CO3	3	2	3	1	1	2	3	2	1	1	1
	CO4	2	3	2	1	1	1	2	2	2		1

Course Contents:

UNIT-I **12Hrs**

General Pharmacology

Definitions and different branches of Pharmacology, Routes of drug administration, Absorption, Distribution, Metabolism and excretion of drugs, General mechanism of drug action, Animal used in experiments, Animal handling and ethics, Bioassay procedures(specific), Instruments used in Pharmacology, Clinical trials-basic aspects Classification, Mechanism of action, Therapeutic uses

and important adverse effects of the following categories of drugs.

UNIT-II **12Hrs**

Drugs Acting on the central nervous system & autonomic nervous system General anesthetics, Anxiolytic and hypnotic drugs, Psychotropic agents, Epilepsy and Anticonvulsant drugs, Narcotic analgesics and antagonists, Centrally acting muscle relaxation and antiparkinsonism agents, Analgesics, antipyretics, anti- inflammatory agents ant antirheumatic and antigout drugs, Central nervous system stimulant, Local anesthetics. Autonomic nervous system and neurohumoral transmission, Cholinergie or parasympatholytic drugs, Antincholinergie or parasympathomimetic drugs, Adrenergic or sympathomimetic drugs, Anti adrenergic or sympatholytic drugs, Drugs acting on autonomic ganglion, Neuromuscular blockers.

UNIT - III **12 Hrs**

(Drugs acting on various system) Drugs acting on respiratory system

Bronchodilators and analeptics, Nasal decongestants, expectorants and antitussive agents.

Drugs acting on cardiovascular system

Antiarrhythmic drugs, Cardiotonics, Antianginal drugs, Antihypertensive drugs, Drugs used in atherosclerosis

Drugs acting on Blood and Blood forming organs

Haematinics, Coagulants, Anticoagulants, Blood and plasma expanders

Drugs acting on gastrointestinal tract and respiratory system. Autocoids and chelating agents

Hormones and Hormone Antagonists

Antithyroid drugs, Hypoglycaemic agents, Sex hormones and oral contraceptives, Corticosteroids

UNIT – IV (Chemotherapy) **12Hrs**

General considerations, Antimetabolities, suifonamides and trimethoprim, Inhibitors of bacterical cell wall synthesis: penicillins, cephalosporins etc, Antibiotics inhibiting protein synthesis: Aminoglycosides, tetracyclines, chloramphenicol and macrolide antibiotics, Antibiotics affecting membrane permeable, Urinary antiseptics and miscellaneous antibacterial., Antituberculosis and antileprotic drugs, Antifungal drugs, Antiviral drugs, Antimalarial drugs, Antimoebial, antigiardial and miscellaneous antiprotozoan drugs, Antineoplastic drugs, Antiseptics and disinfectants

References:

1. Fundamentals of experimental Pharmacology by Dr. M.N. Ghosh.
2. Pharmacology & Pharmacotherapeutics by Satoskar (RS)
3. Essentials of Medical Pharmacology by Tripathi (KD)
4. Pharmacology by Rang (HP)

M20BC4010	SOFT SKILL TRAINING	L	T	P	C
Duration: 3 hrs/wk	(Computer Basics)	1	1	0	2

Prerequisites:

Students should have studied basics of computer and its parts.

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To understand the components of computer and basic knowledge in operating them.
2. To know about the softwere related to work in computer system and basic programming.

Course Outcomes:

CO1. Learn to operate the computer from the hard ware and software knowledge
CO2. Ready to work on Microsoft word, excel, PowerPoint and basic programming.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / Cos	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO 2	PSO3
B20MT4010	CO1			3			3		3	2	1	2
	CO2			3			3		3	1	1	2

Course content: **52hrs**

UNIT – 1: **12Hrs**

General features of a Computer. Generation of computers. Personal Computer, workstation, Mainframe Computer and super Computers. Computer applications – data processing, information processing, commercial, office automation, industry and engineering, healthcare, education, graphics and multimedia.

Computer organization. Central processing unit. Computer memory primary memory and secondary memory. Secondary storage devices – magnetic and optical media. Input and output units. OMR, OCR, MICR, scanner, mouse. Modem.

Computer hardware and software. Machine language and high level language. Application software. Computer program. Operating system. Computer virus, antivirus and Computer security. Elements of MS DOS and Windows OS. Computer arithmetic. Binary, octal and hexadecimal number systems. Algorithm and flowcharts. Illustrations. Elements of database and its applications.

UNIT – 2: **12 hours**

Word processing and electronic spread sheet. An overview of MS WORD, MS EXCEL and MS POWERPOINT. Elements of BASIC programming. Simple illustrations. Network of computers. Types of networks. LAN, Intranet and Internet. Internet applications. World Wide Web. E-mail, browsing and searching. Search engines. Multimedia applications.

List of Practical Assignments:

1. System use, keyboard, mouse operations. Word pad and paint brush. Creating a folder and saving a document.

2. Simple MS. DOS commands.

3. Windows operating system – icons, menus and submenus, my computer.

4. Desktop publishing – preparation of a document using MS.WORD.

5. Installation of a software, virus scanning – illustrations.

6. Spreadsheet calculations using MS.EXCEL.

7. BASIC programming – illustrations.

8. Internet use. Surfing, browsing, search engines, E-mail.

Reference Books:

1. Alexis Leon and Mathews Leon (1999): Fundamentals of information technology, Leon Techworld Pub.

2. Jain, S.K. (1999): Information Technology "O" level made simple, BPB Pub.

3. Jain, V.K. (2000): "O" Level Personal Computer Software, BPB Pub.

4. Rajaraman, V. (1999): Fundamentals of Computers, Prentice Hall India.

5. Hamacher, Computer Organisation, Mc Graw.

6. Sinha, Computer Fundamentals, BPB Pub.

B20MT4060	**BIOCHEMISTRY-II (Practicals)**	**L**	**T**	**P**	**C**
Duration: 4 hrs/wk		0	0	2	2

Prerequisites:

Students should have studied **B20MT1040, B20MT2030, and B20MT3060**

Pedagogy

Mode of Teaching Using ICT and Board

Course Objective

1. To learn about the analysis of normal urine and abnormal urine
2. To learn the quantitative analysis of urine glucose and GTT
3. To learn about urine analysis in relation with inborn errors of metabolism
4. To get knowledge of estimation of sugar, electrolytes and urea of Blood sample

Course Outcomes:

CO1. Acquire the knowledge of normal urine and abnormal urine analysis
CO2. Ascertain the knowledge about quantification of urine glucose and GTT
CO3. Acquire the knowledge about urine analysis with respect to inborn errors of metabolism
CO4. Acquire the knowledge about estimation of sugar, electrolytes and urea of blood sample

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / Cos	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO8	PSO1	PSO2	PSO3
B20MT4060	CO1	3	3	1	3	1	2	3	1	1	2	1
	CO2	3	3	1	3	1	2	3	1	1	1	2
	CO3	3	3	1	3	1	2	3	1	1	2	2
	CO4	3	3	1	3	1	2	3	1	1	1	1

Course content:

1. Analysis of Normal Urine AND abnormal Urine
2. Quantitative test for urine glucose and GTT
3. Estimation of non-protein nitrogenous compounds of blood: Blood urea, creatinine, creatinine clearance test (CCT)
4. Urine examination for detection of abnormal constituents
5. Analysis of Urinary calculi
6. Urine – screening for inborn errors of metabolism
7. Estimation of Blood sugar, Blood Urea and electrolytes
8. Demonstration of Strips and demonstration of Glucometer

B20MT4080	PATHOLOGY- II (Practicals)	L	T	P	C
Duration: 4 hrs/wk		0	0	2	2

Prerequisites:

Students should have studied **B20MT1030, B20MT1060, B20MT2060, B20MT2080, and B20MT3080**

Pedagogy

Mode of Teaching Using ICT and Board

Course Objective:

1. To know about RBC, WBC counting and ESR analysis of RBC
2. To make smear of peripheral and bone marrow
3. To know procedure of blood collection and storage
4. To analyse group of blood types and Rh factor system

Course Outcomes:

CO1. Ready to do RBC, WBC counting and ESR analysis of RBC
CO2. Ready to prepare smear of peripheral and bone marrow
CO3. To gain knowledge about procedure of blood collection and storage
CO4. Able to analyse group of blood types and Rh factor system

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / Cos	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO2	PSO3
B20MT4080	CO1	1	3	2	2	--	--	1	--	2	2	2
	CO2	1	3	3	2	--	--	1	--	1	2	1
	CO3	2	2	2	2	--	1	1	--	2		1
	CO4	1	2	2	1	--	--	1	--	1	2	2

Course Contents

1. Principles and methods of determining PVC calculation and interpretation of red cell indices.
2. ESR: introduction, factors affecting ESR, principles and methods of determining ESR, increasing and decreasing conditions of ESR.
3. WBC: introduction, development of WBC, diluting fluids. Absolute eosinophil count, errors in sampling, mixing, diluting and counting.
4. Cell counting, advantages and disadvantages, uses and mechanism of cell counting, quality control in cell counts.
5. Preparation of peripheral smear and bone marrow smear. Thin smear, thick smear. Buffy coat smear, wet preparation. Romanowsky stain. Preparation advantages and disadvantages.
6. Preparation of donor and collection of blood. Solution and apparatus used. Storage of blood. Preparation and storage of plasma. Preparation of packed red cells.
7. Principles involved in Blood grouping. ABO system and the methods used. Factors influencing the results of blood grouping, Rh system. Rh antigen. Principles and methods used.

References:

1. Leach M, Drummond M, Doig A. Practical Flow cytometry in Haematology Diagnosis. Latest edition, Wiley Blackwell Publisher
2. Bain BJ. Haemaglobinopathy Diagnosis. Latest edition. Blacwell Publishing.
3. Weatherall,DJ, Clegg JB The Thalassaemia Syndromes. Latest edition Wiley Blackwell Publisher
4. Parslow TG, Stites DP, Terr Al, Imboden JB. Medical Immunology. Lange Medical b. Books/McGraw-Hill Medical Publishing Division. c. Stites DP, Terr Al, Parslow TG. Basic & Clinical Immunology (latest edition). Lange
5. The Biology of Cancer (2013) by Robert A Weinberg. ISBN: 13: 9780815342205 / ISBN: 10: 0815342209.

B20MT4090	CLINICAL POSTINGS	L	T	P	C
Duration: 6 hrs/wk		0	0	4	4

Prerequisites:

Students who undergoes will be able to elicit the appropriate focused history and identify the characteristic symptoms associated with diagnoses across the lifespan. Also develop the ability to recommend and interpret appropriate diagnostic studies/findings.

SEMESTER -V

B20MT5010	BIOCHEMISTRY- V	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students should have studied Basic Concepts of Enzymes, terminologies with respect to enzymes and classification of enzymes.

Pedagogy

Mode of Teaching Using ICT and Board

Course Objective:

1. To understand the basic knowledge of enzymes and coenzymes in relation with biochemical
2. processes
3. To understand about the fundamental concept of enzyme kinetics and enzyme inhibitors. To get knowledge of isoenzymes and their clinical significance
4. To understand the basic knowledge of automation along with the maintenance of clinical chemistry analyzers used in Hospital Laboratory Management.

Course Outcomes:

CO1. Acquire knowledge about structure, classification and the mechanisms of action of enzymes.

CO2. Acquire the knowledge about the basic and application of coenzymes in biochemical processes

CO3. Acquire the knowledge about automation along with the maintenance of clinical chemistry analyzers used in hospital laboratory.

CO4. Ascertain the knowledge about enzyme kinetics and enzyme inhibitors as well as isoenzymesand their clinical significance

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO8	PSO1	PSO2	PSO3
B20MT5010	CO1	3	1	1	3	1	2	2	1	2	1	2
	CO2	3	1	1	3	1	2	2	1	2		1
	CO3	3	1	1	3	1	2	2	1	2	2	1
	CO4	3	2	3	3	1	1	2	3	2	1	1

Course content:

UNIT-I **12Hrs**

Introduction to enzymes, classification of Enzymes, concept of lock and key and induced fit theory.

Concept of activation energy and binding energy. Factors affecting enzyme activity.

UNIT-II **12Hrs**

Coenzyme: Classification, various types and function, structure of NAD+, NADP+, FAD and FMN, PPP. UNITs for measuring enzyme activity, factors affecting enzyme level in serum/ plasma. Clinical assay & its type, kinetic assay and end point assay for the enzymes.

UNIT-III **12Hrs**

Enzyme kinetics, the Michaelis-Menten equation and its physiological significances, Enzyme Inhibition, types of inhibitors of enzyme.Isoenzymes, their tissue distribution and clinical significance: ALT, AST, ALP, GGT, CPK, CK-MB, LDH, troponin, myoglobin, amylase, Lipase, ACP.

UNIT-IV **12Hrs**

Basic Concepts of Automation, principle, working and maintenance of various clinical chemistry analyzers, point of care testing, Hospital Laboratory Management.

References:

1. D M Vasudevan, (2011),Text book of Medical Biochemistry,6th edition Jaypee Publishers
2. M N Chatterjea & Rana Shinde,(2012),Text book of Medical Biochemistry,8th edition, Jayppe Publications
3. Singh & Sahni,(2008),Introductory Practical Biochemistry,2nd edition, Alpha science
4. Lehninger,(2013),Principles of Biochemistry,6th edition, W H Freeman
5. U Satyanarayan,(2008), Essentials of Biochemistry,2nd edition, Standard Publishers
6. Medical laboratory Procedure Manual (T-M) by K.L. Mukerjee 1987, Vol.I, II & IIITata McGraw Hill Publication.
7. Text book of Medical Biochemistry by Ramakrishna
8. Text Book of Clinical chemistry by Norbert Teitz 4. Principles and Techniques of Practical Biochemistry by Wilson and Walker.
9. Clinical Chemistry - Principle and techniques by Rj Henry, Harper & Row Publishers.
10. Schaum's Outline of Biochemistry.Philip W. Kuchel, Ph.D, Simon Easterbrook-Smith, Vanessa Gysbers, J. Mitchell Guss
11. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology
12. Pearson's Biochemistry.Christopher K. Mathews, Kensal E. van Holde,Dean R. Appling,Spencer J. Anthony-Cahill
13. Biochemistry. Donald Voet, Judith G. Voet

B20MT5020	MICROBIOLOGY-V	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students on Completion of **study of structure of virus and its classification.**

Pedagogy

Mode of Teaching Using ICT and Board

Course Objective:

1. To learn the fundamental aspects of virology (including morphology, properties, and classification) and taxonomy of virology
2. To study about viral diseases and Diagnosis methods
3. To study about oncogenic viruses (DNA and RNA related)
4. To study about antiviral compounds and viral vaccination with examples Ascertain about the **aspects of virology (including morphology, properties)**

Course Outcomes

CO1. Acquire the knowledge of viral diseases and Diagnosis methods

CO2. Ascertain the knowledge about oncogenic viruses (DNA and RNA related)

CO3. Acquire the knowledge of antiviral compounds and viral vaccination with example

CO4. Ascertain about the fundamental aspects of virology (including morphology, properties, and classification) and virology taxonomy

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO1	PSO2	PSO3
B20MT5020	CO1	3	2	2	3	1	2	3	3	1	1	1
	CO2	2	3	3	3	1	3	2	2	1	1	2
	CO3	3	2	3	3	1	2	2	3	2	1	1
	CO4	2	3	3	3	1	2	2	3	2	1	1

Course content:

UNIT-I **12Hrs**

Virology: Introduction: Discovery of viruses, nature and definition of viruses, Morphology, General properties,Classification of DNA and RNA Virus, viroids, virusoids and Prions. Viral taxonomy: Classification and nomenclature of different groups of viruses, Modes of viral transmission

UNIT-II **12Hrs**

Common viral diseases –Structure, pathogenesis, Symptoms,Diagnosis of HIV, Hepaptitis A and B, Influenza, Chicken pox, Polio, Rabies, Measles, Mumps, Dengue, Ebola, Chikungunya, Japanese Encephalitis.

UNIT-III **12Hrs**

Introduction to oncogenic viruses, DNA viruses -Human Papilloma Virus and Epstein-Barr virus andOncogenic RNA Viruses- Hepatitis-C Virus, HumanT-cell lymphotropic virus(HTLV), concepts of oncogenes and proto-oncogenes.

UNIT-IV **12Hrs**

Antiviral compounds, classification with examples and their mode of action, interferon and their mode of action, General principles of viral vaccination with examples.

References:

1. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication
2. Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013)
3. Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication
4. Goering R., Dockrell H., Zuckerman M. and Wakelin D. (2007) Mims' Medical Microbiology. 4th edition. Elsevier
5. Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education
6. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication
7. Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication

B20MT5030	**PATHOLOGY- V**	**L**	**T**	**P**	**C**
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students should have studied Basic structure of cell and its cell organelles and also basic concepts of Immunology, **B20MT1050**

Prerequisites:

Mode of Teaching Using ICT and Board

Course Objective:

1. To know Basic structure and function of cell and organelle, cell cycle and study about cytology technique
2. Preparation for fine needle aspiration cytology (FNAC) smear and different staining for cytological study
3. To learn about Immunocytochemistry, Immunohistochemistry, staining technique and all type

of microscope working principle

4.To know about vaccine, cell & humoral mediated response, interferons, chemical messengerand cancer immunotherapy

Course Outcomes:

CO1. To understand cell and organelle function, cell cycle and cytological technique

CO2. To gain knowledge about fine needle aspiration cytology (FNAC) smear and different staining technique in cytological study

CO3. To get aware about Immunocytochemistry, Immunohistochemistry, different type of staining technique and all type of microscope for analysis

CO4. To understand vaccine, cell & humoral mediated response, interferons, chemical messenger and cancer immunotherapy.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P 7	PO8	PSO 1	PSO2	PSO3
B20MT5030	CO1	3	1	1	1	--	--	--	--	1	1	2
	CO2	2	3	2	2	1	--	1	--	2	1	1
	CO3	3	3	2	2	--	--	--	--	2	1	1
	CO4	3	1	1	2	--	--	--	--	2	2	1

Course content:

UNIT-I **12Hrs**

Cell: basic structure and function, cell organelles, cell cycle, Instruments used in cytology, preparation of buffers, stains. Instruments and equipments used in cytology Fixation and Fixatives used in cytology, Adhesive and mounting media, Cell block and cytospin technique, staining such as PAP, Diff-quick, MGG, H&E, Shorr staining, significance of PAPHPV, Destaining and restaining of slides, Cover slipping

UNIT-II **12Hrs**

Aspiration and exfoliative cytology, Processing and Staining FNAC, Pap staining, Progressive & Regressive, Hormonal cytology in different age groups,Collection and processing of sputum, BAL, CSF, Pleural, peritoneal and pericardial fluid, Gynaecologic sample.

UNIT-III **12Hrs**

Introduction of Immunocytochemistry, Immunohistochemistry: principle, types, applications, antigen retrieval, APAAP, PAP Staining, Sex chromatin demonstration, different markers and its applications, Automation in cytology, Liquid based preparation & automated screening device.Microscopy: Light, compound, phase contrast, fluorescence Museum techniques. Electron microscopy: Principle and working, fixation, processing and staining of tissue Fluorescence Microscope: Principle and working

UNIT-IV

Antibody-mediated response, vaccines, cell-mediated response, Interferons, cytokines, hormones, enzymes, antibodies and derivatives in anti-infective and cancer therapy. Cancer immunotherapy.

References:

1. Leach M, Drummond M, Doig A. Practical Flow cytometry in Haematology Diagnosis. Latest edition, Wiley Blackwell Publisher
2. Bain BJ. Haemaglobinopathy Diagnosis. Latest edition. Blacwell Publishing.
3. Weatherall,DJ, Clegg JB The Thalassaemia Syndromes. Latest edition Wiley Blackwell Publisher
4. Parslow TG, Stites DP, Terr Al, Imboden JB. Medical Immunology. Lange Medical b. Books/McGraw-Hill Medical Publishing Division. c. Stites DP, Terr Al, Parslow TG. Basic & Clinical Immunology (latest edition). Lange
5. The Biology of Cancer (2013) by Robert A Weinberg. ISBN: 13: 9780815342205 / ISBN: 10: 0815342209.

B20MT5040	SOFT SKILL TRAINING (Communicative Medicine)	L	T	P	C
Duration: 3 hrs/wk		1	1	0	2

Prerequisites:

Students should have good communication in English or regional language, B20MT3050, knowledge of current scenario of health care in India and also around world.

Pedagogy

Mode of Teaching Using ICT and board

Course Objective

1. Know the structure and functioning of the health system at the National levels and its historical perspectives.
2. Identify the socio-cultural dimension in Health and disease.

Course Outcomes:

CO1. By knowing the principles of health Information System and applying this knowledge in facilitating the learning process in groups of people involved in health.

CO2. Socio -cultural dimension knowledge helps in designing and implementation of an integrated Health and development program.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO2	PSO3
B20MT5040	CO1	1					3	2	2	2	1	1
	CO2						2		2	2		1

Course content:

Unit 1 **6 hrs**

Concept of Health & Disease. History of medicine, evolution of public health, alternative systems of medicine. Definition and concepts of public health. Holistic concepts of health including concept of spiritual health, appreciation of health as a relative concept. Health profile of India.

Unit 2 **6 hrs**

Determinants of health characteristics of agent, host and environmental factors in health and disease and the multifactorial etiology of disease. Understanding the natural history of disease and application of interventions at various levels of prevention. Health indicators.

Unit 3 **6 hrs**

Social and Behavioral Sciences- Clinico-social, cultural and demographic evolution of the individual, family and community Humanities and Community Medicine Social organizations with special reference to family Religion, its evolution as a special instance of the evolution of social institutions. Major tenets of the common religions in India & their influence on health & Disease.

Unit 4 **6 hrs**

Assessment of barriers to good health and health seeking behavior. Health economics Doctor patient relationship.Social problems e.g. child abuse, juvenile delinquency, drug addiction, alcoholism, marital maladjustment, domestic violence, suicide and attempted suicide. Psychology and its concepts The Psycho analytic theory, Human personality, its foundations, development and organization.Hospital psychology.

Reference Books:

1. Oxford Text book of Public Health: Detels R, McEwen J, Beaglehold R
2. Control of Communicable Diseases in Man: Benenson A S
3. Manson's Tropical Diseses:Cook G, Zumla A
4. Hunter's Diseases of Occupations: Baxter PJ, Admas PH
5. Hunters Tropical Medicine and emerging infectious diseases: Strickland GT
6. An introduction to sociology: Bhusan and Sachdeva
7. Clinical Epidemiology- the Essentials : Fletcher
8. Epidemiology and Management for Health Care for all: Sathe PV, Sathe AP
9. Training modules of various national & international institutes and national health programmes

B20MT5050	BIOCHEMISTRY- III (Practicals)	L	T	P	C
Duration: 4 hrs/wk		0	0	2	2

Prerequisites:

Students should have studied B20MT5010 and should have the knowledge of various enzymespresent in different parts of the body

Prerequisites:

Mode of Teaching Using ICT and Board

Course Objective:

1. To learn about the enzyme analysis (amylase, Alkaline Phosphatase, Acid Phosphatase, SGOT
2. SGPT, LDH and CPK
3. To learn the estimation of enzyme related to cardiac profile
4. To learn about the determination of Troponin I and estimation of enzyme related to pancreas

Course Outcomes:

CO1. Acquire the knowledge of enzyme investigation
CO2. Ascertain the knowledge about quantification of enzyme related to cardiac profile
CO3. Acquire the knowledge about the determination of Troponin I and estimation of enzyme related to pancreatic disorder
CO4. Acquire the knowledge about ACP assessment and Antenatal profile

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO2	PSO3
B20MT5050	CO1	3	3	1	2	1	2	3	3	1	2	2
	CO2	3	3	1	2	1	2	3	3	1	1	1
	CO3	3	3	1	2	1	2	3	3	2	1	1
	CO4	3	3	1	2	1	2	3	3	2	1	2

Course content:

1. Enzymes: amylase (salivary and Pancreatic), Alkaline Phosphatase, Acid Phosphatase, SGOT, SGPT, LDH and CPK- demonstration on auto analyzer.
2. To perform enzyme estimation of Cardiac profile.
3. Determination of Troponin I.
4. To perform enzyme estimation of pancreatic disorder.
5. To perform estimation of ACP.
6. Antenatal profile.
7. Estimation of bicarbonate.
8. Arterial blood gas analysis.

B20MT5060	**MICROBIOLOGY-V (Practicals)**	**L**	**T**	**P**	**C**
Duration: 4 hrs/wk		0	0	2	2

Prerequisites:

Students should have studied **B20MT2050, B20MT3020, and B20MT4020**

Pedagogy

Mode of Teaching Using ICT and Board

Course Objective:

1. To learn about saline and iodine mount methods (parasitology) used in microbiology lab
2. To learn about the identification of fungal cultures (mycology)
3. To learn about serological tests performed in microbiology lab
4. To learn about anaerobic culture methods

Course Outcomes:

CO1. Acquire the knowledge of saline and iodine mount methods (parasitology) used in microbiology lab

CO2. Ascertain about the identification of fungal cultures (mycology) and about the identification of microorganisms

CO3. Acquire the knowledge of serological tests performed in microbiology lab

CO4. Acquire the knowledge on anaerobic methods

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO2	PSO3
B20MT5060	CO1	3	3	2	3	1	2	3	2	2	1	1
	CO2	3	3	2	3	2	1	3	3	2	2	1
	CO3	2	3	2	3	1	1	3	3	1	1	2
	CO4	1	3	2	1	1	2	2	2	1	2	2

Course content:

1. **Parasitology**:
   a) Saline mount
   b) Iodine mount

2. **Mycology:**
   a) Slide culture technique
   b) KOH mount
   c) Identification of fungal cultures
      Colony characteristics and Microscopic examination of Candida, Cryptococcus, Trichophyton, Microsporum, Aspergillus Niger, Asp fumigatus, Fusarium, Penicillium (Permanent slides).

3. Demonstration of common serological tests – WIDAL, VRDL, ELISA and C - reactive protein test.
4. Anaerobic culture methods.

B20MT5070	PATHOLOGY-III (Practicals)	L	T	P	C
Duration: 4 hrs/wk		0	0	2	2

Prerequisites:

Students should have studied **B20MT1030, B20MT2060, B20MT3010, and B20MT4030**

Pedagogy

Mode of Teaching using ICT and Board

Course Objectives:

1. To get aware about spectro and photocolorimeter analysis
2. To learn qualitative analysis of carohydrarte, protein and amino acid
3. To know dialysis procedure and Electrophoresis of serum, CSF and urine proteins
4. To learn basic solution or buffer preparation and F-test and Barr test analysis

Course Outcomes:

CO1. Ready for identification of abnormal hemoglobin using spectroscopy, electrophoresis.

CO2. Able to do benign leucocyte, platelet related reactions

CO3. Ready to do LE cell disorder diagnosis, protozoan disorders, different methods of blood transfusion and their matching.

CO4. Ready to do Cross Matching

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO2	PSO3
B20MT5070	CO1	1	3	3	2	--	1	1	1	1	1	2
	CO2	1	3	3	2	--	1	1	1	2	2	1
	CO3	1	3	3	2	--	1	1	1	2	1	2

Course content:

1 Methods of identification of abnormal hemoglobin including spectroscopy. HB electrophoresis. Alkali denaturation Test. Sickle cell preparation.

2 Various benign leucocyte reaction – Leukocyposis. Neutrophilia, Eosinophilia, Lymphocytosis. EBV Infections, leucopenias.

3 Thrombocytopenia, thrombocythemias, platelet function test, platelet count. Clot retraction test.

4 LE cell – definition, morphology causative agents. Various methods of demonstrating LE cells. Blood parasites. Malaria, LD bodies, microfilaria and methods of demonstration

5 Cross matching. Compatibility test, direct and indirect Coomb's test – Principle involved and the methods used. Blood transfusion and its Hazards.

B20MT5080	**CLINICAL POSTINGS**	**L**	**T**	**P**	**C**
Duration: 6 hrs/wk		0	0	4	4

Prerequisites:

Students should have studied B20MT4010, B20MT4020, B20MT4030, B20MT4040, B20MT4060, B20MT4070, and B20MT4080

SEMESTER-VI

B20MT6010	BIOCHEMISTRY- VI	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students should have studied concept of hormones, various types and its functions.

Prerequisites:

Mode of Teaching Using ICT and Board

Course Objectives:

1. To understand the basic knowledge of hormones, their functional mechanisms and regulation
2. To understand about the knowledge of thyroid function test and disorder to thyroid dysfunction
3. To understand the importance of Infertility profile in medical biochemistry

Course Outcomes:

CO1. Acquire the knowledge about the hormones, their functional mechanisms and regulation.
CO2. To learn the importance of thyroid function test and correlate with thyroid dysfunction.
CO3. Acquire the knowledge about Infertility profile in medical biochemistry.
CO4. Acquire the knowledge about toxicology and screening of drugs.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO1	PSO2	PSO3
B20MT6010	CO1	3	2	2	3	1	2	1	2	2	2	1
	CO2	3	3	1	3	1	3	1	2	1	1	2
	CO3	3	3	1	3	1	3	1	2	2	2	1
	CO4	3	3	1	3	1	3	1	2	1	1	2

Course content:

UNIT-I **12Hrs**

Hormones, classification of hormones, organs of endocrine system their secretion and function, regulation of hormone secretion, mechanism of action.

UNIT-II **12Hrs**

Thyroid function test: Thyroid hormones, biological function, hypothyroidism, hyperthyroidism, determination of T3, T4, TSH, FT3, FT4, TBG, Disorder associated with thyroid dysfunction.

UNIT-III **12Hrs**

Infertility profile: LH, FSH, TSH, Estrogen, progesterone, total testosterone, free testosterone, DHEA-S, 17- Ketosteroids, prolactin, their estimation and clinical significance, reference range, hypo and hyper secretion, triple test.

UNIT-IV **12Hrs**

Growth hormone, ACTH, aldosterone, cortisol their estimation and clinical significance, reference, hypo and hyper secretion.Introduction of toxicology, alcohol poisoning, lead poisoning, zinc poisoning, mercury poisoning drugs abuse, screening procedure for drug screening, spot tests, hair and urine test, immunoassay for drugs.

Reference Books:

1. D M Vasudevan, (2011),Text book of Medical Biochemistry,6th edition Jaypee Publishers
2. M N Chatterjea & Rana Shinde,(2012),Text book of Medical Biochemistry,8th edition, Jayppe Publications
3. Singh & Sahni,(2008),Introductory Practical Biochemistry,2nd edition, Alpha Science
4. Lehninger, (2013), Principles of Biochemistry,6th edition, W H Freeman
5. U Satyanarayan,(2008), Essentials of Biochemistry,2nd edition, Standard Publishers
6. Medical laboratory Procedure Manual (T-M) by K.L. Mukerjee 1987, Vol.I, II & III Tata McGraw Hill Publication.
7. Text book of Medical Biochemistry by Ramakrishna
8. Text Book of Clinical chemistry by Norbert Teitz 4. Principles and Techniques of Practical Biochemistry by Wilson and Walker.
9. Clinical Chemistry - Principle and techniques by Rj Henry, Harper & Row Publishers.
10. Schaum's Outline of Biochemistry.Philip W. Kuchel, Ph.D, Simon Easterbrook-Smith, Vanessa Gysbers, J. Mitchell Guss
11. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology
12. Pearson's Biochemistry.Christopher K. Mathews, Kensal E. van Holde,Dean R.

Appling,Spencer J. Anthony-Cahill
13. Biochemistry. Donald Voet, Judith G. Voet

B20MT6020	MICROBIOLOGY-VI	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students should have studied concept of sterilization and disinfection, various kinds of micro-organisms, **BT19MT1040**

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To learn the fundamental aspects of biosafety (importance, principles and guidelines)
2. To study about I/v fluids especially related to sterility, collection, processing and transportation
3. To study about nosocomial infection and role of microbiology lab to controlling it
4. To study the fundamental aspects of biomedical waste management in a medical microbiology
5. laboratory

Course Outcomes:

CO1. Ascertain about the fundamental aspects of biosafety (importance, principles and guidelines)
CO2. Acquire the knowledge of I/v fluids especially related to sterility, collection, processing and transportation
CO3. Ascertain the knowledge about nosocomial infection and role of microbiology lab to controlling it
CO4. Acquire the knowledge about fundamental aspects of biomedical waste management in a medical microbiology laboratory.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO1	PSO2	PSO3
B20MT6020	CO1	3	2	3	3	2	3	2	1	1	1	2
	CO2	3	3	3	2	2	2	2	3	2	2	1
	CO3	3	3	2	3	3	2	1	2	1	1	1
	CO4	2	2	3	3	3	2	1	3	1	1	2

Course content:

UNIT- I **12Hrs**

Biosafety-Definition, Importance, Principles of Biosafety- Laboratory practices and procedures for the Microbiology laboratory, Biosafety guidelines, 4 Biosafety levels, safety equipment, facility design, Biologic safety cabinets.

UNIT- II **12Hrs**

Sterility testing of I/v fluids, Collection, transportation and processing of I/v fluids for bacterial contamination, Recording the result and interpretation.

UNIT- III **12Hrs**

Nosocomial Infection:

Introduction, sources and types of Nosocomial infection, Bacteriological surveillance of hospital environment. Role of Microbiology lab in control of nosocomial infection.

UNIT- IV **12Hrs**

Biomedical waste management in a Medical Microbiology laboratory: Types of the waste generated and their sources, Types of Hospital Risk Wastes, Hospital Non- Risk Waste, Risk from Waste, Techniques to Segregation of Waste, Treatment, Disposal Lab organization, management, recording of results and quality control in Medical Microbiology Lab. Safety measures in Microbiology Laboratory.

References:

1. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication
2. Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013)
3. Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication
4. Goering R., Dockrell H., Zuckerman M. and Wakelin D. (2007) Mims' Medical Microbiology. 4th edition. Elsevier
5. Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education
6. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication
7. Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication
8. Laboratory bio safety manual, World Health OrganizationGeneva 2004

B20MT6030	PATHOLOGY- VI	L	T	P	C
Duration: 4 hrs/wk		2	1	0	3

Prerequisites:

Students should have studied concept of genetics, blood and blood components

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To know cytogenetics, types of human chromosomes, karyotypic analysis and about different cell culture.
2. To identify sex chromosome, banding techniques, Oncogene,role of NACO and Indian Red Cross Society
3. To estimate iron and iron binding capacity in blood, haemoglobin estimation, platelet count and blood related test
4. Demonstration about minerals, pigments and different enzymes present in tissue, microorganism present on tissue.

Course Outcomes:

CO1. To understand cytogenetics, sex and other chromosomes in human, chromosome karyotype analysis and different type of cell culture.

CO2. To get knowledge about chromosome identification, Oncogene and about social organization

CO3 To know about NACO and Indian Red Cross Society

CO3. To get awareness about iron and iron binding capacity, haemoglobin content, platelet count in blood

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO2	PSO3
B20MT6030	CO1	3	1	1	1	--	1	2	--	2	1	2
	CO2	3	1	--	--	3	2	3	--	1	2	2
	CO3	1	2	2	2	--	--	1	--	1	2	2
	CO4	1	2	1	2	--	--	1	--	1		2

Course content:

UNIT-I **12Hrs**

Introduction to cytogenetics, terminology, classification and nomenclature of human chromosomes. Methods of karyotypic analysis. Culture of bone marrow cells, peripheral blood lymphocytes, solid tumors & skin fibroblasts

UNIT-II **12Hrs**

Characterization of human chromosomes by various banding techniques, Sex chromatin identification, Chromosomes in neoplasia and oncogenesApheresis, indications of hemapheresis, plasmapheresis, plateletspheresis, plasmapheresis Quality control of reagents, equipments, blood components used in transfusion medicine. Role of NACO, Indian Red Cross Society, DGHS and blood transfusion services.

UNIT-III **12Hrs**

Estimation of iron, TIBC, Transferrin, Ferritin. Estimation of Plasma haemoglobin, Vit.B12, Folic acid, FIGLU test, Schiling test, Parietal cell antibodies, G-6-PD, Osmotic fragility test, Heinz bodies. Perls Prussian staining, Platelet count, Platelet aggregation test, PT, INR APTT, Mixing experiments in PT and APTT, Thrombin time.

UNIT-IV **12Hrs**

Demonstration of minerals and pigments in tissue sample, Demonstration and identification of lipids, Demonstration of enzymes, diagnostic application and the demonstration of phosphatases, dehydrogenases, oxidases and peroxidases, Demonstration of microorganism on tissue specimens, Bacteria, AFB, Actinomyces, spirochetes, fungi. Demonstration of nucleic acids, Processing and staining of bone marrow sample. Fixation, Processing and section cutting of bones. Decalcification.

Reference Books:

1. Leach M, Drummond M, Doig A. Practical Flow cytometry in Haematology Diagnosis. Latest edition, Wiley Blackwell Publisher
2. Bain BJ. Haemaglobinopathy Diagnosis. Latest edition. Blacwell Publishing.
3. Weatherall,DJ, Clegg JB The Thalassaemia Syndromes. Latest edition Wiley Blackwell Publisher
4. Parslow TG, Stites DP, Terr Al, Imboden JB. Medical Immunology. Lange Medical b. Books/McGraw-Hill Medical Publishing Division. c. Stites DP, Terr Al, Parslow TG. Basic & Clinical Immunology (latest edition). Lange
5. The Biology of Cancer (2013) by Robert A Weinberg. ISBN: 13: 9780815342205 / ISBN: 10: 0815342209.

B20MT6040	BIOCHEMISTRY-VI (Practicals)	L	T	P	C
Duration: 4 hrs/wk		0	0	2	2

Prerequisites:

Students should have studied concept of liver function, lipids and minerals

Pedagogy

Mode Of Teaching Using ICT and Board

Course Objectives:

1. To learn about the estimation of bilirubin and total and conjugates urobilinogen
2. To learn about the determination of free and total acid and gastric stimulation
3. To learn about the determination of serum lipids such as cholesterol, triglycerides and lipoprotein
4. To learn about the determination of inorganic ions

Course Outcomes:

CO1. Acquire the knowledge of bilirubin and total and conjugates urobilinogen investigation

CO2. Ascertain the knowledge about the determination of free and total acid and gastric stimulation

CO3. Acquire the knowledge about the determination of serum lipids such as cholesterol, triglycerides and lipoprotein fractionation

CO4. Ascertain about the determination of inorganic ions like calcium, serum phosphate, chloride, sodium and potassium

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO 2	PSO 3
B20MT6040	CO1	3	3	1	2	1	2	3	3	1	1	1
	CO2	3	3	1	2	1	2	3	3	1	2	2
	CO3	3	3	1	2	1	2	3	3	1	1	2
	CO4	3	3	1	2	1	2	3	3	2	1	1

Course content:

1. Liver function tests: estimation of bilirubin – total and conjugates urobilinogen.
2. Gastric analysis: Determination of free and total acid, gastric stimulation.
3. Lipid determination of serum lipids – cholesterol, triglycerides and lipoprotein fractionation.
4. Inorganic ions – Determination of calcium, sodium and potassium in serum and urine
5. Inorganic ions – Determination of calcium in serum and urine, serum phosphates, chloride sodium and potassium.
6. RFT
7. Cardiac markers.

(Relevant charts on the above topics for interpretation and diagnosis)

B20MT6050	MICROBIOLOGY-IV (Practicals)	L	T	P	C
Duration: 4 hrs/wk		0	0	2	2

Prerequisites:

Students should have studied **B20MT5020, B20MT5060**

Prerequisites:

Mode of Teaching Using ICT and Board

Course Objectives:

1. To learn about the biomedical waste management related to microbiology lab
2. To learn about the TORCH profile related to microbiology lab
3. To learn about the embryonated egg inoculation
4. To learn about the ELISA test used for different virology diseases

Course Outcomes:

CO1. Acquire the knowledge of biomedical waste management related to microbiology lab

CO2. Ascertain about the TORCH profile related to microbiology lab

CO3. Acquire the knowledge of embryonated egg inoculation performed in microbiology lab

CO4. Ascertain about the ELISA test used for different viral diseases and about the test used for influenza, dengue, chikungunya diagnosis in microbiology lab.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO1	PSO2	PSO3
B20MT6050	CO1	3	3	3	2	1	2	2	3	1	2	2
	CO2	2	3	3	1	1	3	2	3	1		2
	CO3	2	3	3	1	1	3	2	3	1	2	2
	CO4	2	3	3	1	1	2	3	3	2	1	1

Course content:

1. Visit to hospital for demonstration of biomedical waste management.
2. TORCH profile.
3. Demonstration of embryonated egg inoculation.
4. Virology exercise: ELISA test for HIV, Hepatitis B, Western blot.
5. Diagnostic test for Influenza, Dengue, Chikungunya.

B20MT6060	PATHOLOGY-IV (Practicals)	L	T	P	C
Duration: 4 hrs/wk		0	0	2	2

Prerequisites:

Students should have studied concept of various micro-organisms and different types of stains.

Pedagogy

Mode of Teaching Using ICT and Board

Course Objectives:

1. To know about RBC, WBC counting and ESR analysis of RBC
2. To make smear of peripheral and bone marrow
3. To know procedure of blood collection and storage
4. To analyse group of blood types and Rh factor system

Course Outcomes:

CO1. Ready to do different types of staining for bacteria.
CO2. To gain knowledge about Collagen Staining
CO3. Able to identify the neuron cell, histology of eye ball and other cell tissues.
CO4. To know about Fat Molecules Staining

Mapping of Course Outcomes with programme Outcomes

Course Code	POS / COs	PO 1	P 2	PO 3	PO 4	PO 5	PO 6	P 7	PO 8	PSO 1	PSO 2	PSO3
B20MT6060	CO1	1	3	3	2	--	1	1	1	1	2	2
	CO2	1	3	3	2	--	1	1	1	2	1	2
	CO3	1	3	3	2	--	1	1	1	2	1	1
	CO4	1	3	3	2		1	1	1	2	1	1

Course content:

1. Staining – theory, types of staining agent. Mordents and differentiation. H & E staining. Types of hematoxillin and its preparation. Eosin stock stain and other counter stain used.

2. Demonstration of pigments and minerals (malarial, mercury, bile, lipofuscin, calcium, iron, copper). Stains for bacteria including AFB, fungi, and amoeba.

3. Demonstration of neuron, neuroglia, myelin and axon. Processing of eye ball for histology.

4. Demonstration of fat, iron, amyloid, bile in large sections of tissue.

5. Demonstration of collagen, reticulin, elastin andfat. 3 Demonstration of amyloid, glycogenand mucin.

B20MT6070	**INTERNSHIP**	**L**	**T**	**P**	**C**
Duration: 8 Wks		0	0	8	8

The students will be posted for three months in a hospital or diagnostics where they handle the patients perform tests and interpret the results

CAREER OPPORTUNITIES AND PLACEMENT

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

1. Willingness to learn
2. Self motivation
3. Team work
4. Communication skills and application of these skills to real scenarios
5. Requirement of gathering, design and analysis, development and testing skills
6. Analytical and Technical skills
7. Computer skills
8. Internet searching skills
9. Information consolidation and presentation skills
10. Role play
11. Group discussion, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Director and supported by dynamic trainers, counselorsand placement officers and other efficient supportive team does handle all aspects of Internships andplacements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of Medical Laboratory Technology is knowledge in the subject, butalso the skill to do the job proficiently, team spirit and a flavour of innovation. This kept in focus, theCDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including interpersonal skills that will fetch them a job of repute in the area of his / her interest and march forward to make better career. The School of Applied sciences also has emphasisedsubject based skill training through lab practice, internship, project work, industry interaction and many such skilling techniques. Special training is also arranged for those interested in entrepreneurialventure. The students during their day to day studies are made to practice these skill techniques as these are inbuilt in the course curriculum. Concerned teachers also continuously guide and monitor the progress of students.

The University has also established University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director to facilitate skill related training to REVA students and otherunemployed students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre thestudents shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation)under Pradhan Mantri Kaushal Vikas Yojana.

The University has also signed MOU's with Multi-National Companies, research institutions, and universities abroad to facilitate greater opportunities of employability, students' exchange programsfor higher learning and for conducting certification programs.

LIST OF FACULTY MEMBERS

Sl. No	Name of the Teacher	Designation	Contact No.	E-mail
1	Dr. Jayashree S	Professor & HOD	7760884884	jayashrees@reva.edu.in
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8	Dr. Satish Kumar Murari	Assistant Professor	9686088514	satishkumar.m@reva.edu.in