।। सा विद्या या विमुक्तये ।।
स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड
"ज्ञानतीर्थ" परिसर, विष्णुपूरी, नांदेड - ४३१६०६ (महाराष्ट्र)
SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)
Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade
ACADEMIC (1-BOARD OF STUDIES) SECTION
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E-mail: bos.srtmun@gmail.com

विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०–२१ पासून मान्यता दिलेल्या व्होकेशनल कोर्सेसचे (बी.व्होक पदवी, ॲडव्हॉस डिप्लोमा, डिप्लोमा व सर्टिफिकेट) अभ्यासक्रम शैक्षणिक वर्ष २०२०–२१ पासून लागू करणे बाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०–२१ पासून मान्यता दिलेल्या व्होकेशनल कोर्सेसच्या (बी. व्होक पदवी, ॲडव्हान्स डिप्लोमा, डिप्लोमा व सर्टिफिकेटस) अभ्यासक्रमांना मा विज्ञान व तंत्रज्ञान विद्याशाखेने **दिनांक ३१ मे २०२१ रोजीच्या बैठकीतील केलेल्या शिफारशीप्रमाणे व मा. विद्यापरिषदेच्या दिनांक १२ जून २०२१ रोजीच्या बैठकीतील विषय क्रमांक २६/५१–२०२१ च्या** ठरावानुसार खालील अभ्यासक्रमांस मान्यता देण्यात आली आहे.

1. B. Voc. IT/Hardware and Networking.
2. B. Voc Software Development.
3. B. Voc. Medical Laboratory Technology.
4. B. Voc. Horticulture and Post-Harvest Technology.
5. B. Voc. Herbal Medicine.
6. B. Voc. Commercial Aquaculture.
7. B. Voc. Food Processing Technology.
8. B. Voc. Skill Based Zoology.
9. B. Voc. Vocational Biotechnology.
10. B. Voc. Plant Tissue Culture Secretary.
11. Advance Diploma Radiological Physics.
12. Diploma – Computer Hardware.
13. Diploma – Computer Network Assistant.
14. Diploma – PGDMLT.
15. Diploma – Embedded System Design.
16. Diploma- Biofertilizer.
17. Diploma- Fisheries and Farm Management.
18. Diploma - Bee Keeping.

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी. ही विनंती.

जा.क्र.:शैक्षणिक–१/परिपत्रक/व्होकेशनल अभ्यासक्रम/N-२०२०–२१/६८

दिनांक : ०५.०७.२०२१

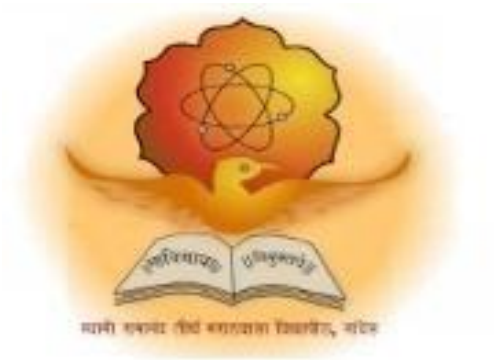
स्वाक्षरित
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :
१) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

SwamiRamanandTeerthMarathwadaUniversity,

Nanded(Maharashtra)

(NAAC Re-accreditedwith‘B++’Grade)



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SEMESTER FIRST (THEORY PORTION)

Sr.	Paper	Title of the paper	TOTAL MARKS	INTERNAL MARKS	EXTERNAL MARKS
1	Paper I	Anatomy and Physiology	100/04	50/02	50/02
2	Paper II	Clinical Biochemistry	100/04	50/02	50/02
3	Paper III	Clinical Pathology, Haematology and Blood Banking	100/04	50/02	50/02
4	Paper IV	Instrumentation, Lab Management and Quality control	100/04	50/02	50/02
5	Paper V	Medical Microbiology, Immunology and Serology	100/04	50/02	50/02
			500/20	250/10	250/10

SEMESTER SECOND (PRACTICAL PORTION)

Sr.	Paper	Title of the paper	TOTAL Marks/ Credits	INTERNAL MARKS/ Credits	EXTERNAL MARKS/ Credits
1	Paper I	Anatomy and Physiology	100/04	50/02	50/02
2	Paper II	Clinical Biochemistry	100/04	50/02	50/02
3	Paper III	Clinical Pathology, Haematology and Blood Banking	100/04	50/02	50/02
4	Paper IV	Instrumentation, Lab Management and Quality control	100/04	50/02	50/02
5	Paper V	Medical Microbiology, Immunology and Serology	100/04	50/02	50/02
6	Training	Every Saturday full day training at GMC, Nanded and students should submit training book at the end of training and their presentation based on training	100/04	--	100/04
			600/24	250/10	350/14

Note:

1. **05 Theory papers will be conducted in the first semester and their theory examination will be conducted at the mid term.**
2. **05 Practical papers and training portion will be conducted in the second semester and their practical examination will be conducted at the end of the year.**
3. **Total number of theory lectures per theory paper will be from 60-80 hours per paper.**
4. **Total number of practical for each paper will be from 10-12.**
5. **Practicals will be based on theory syllabus**

Paper I: Anatomy and Physiology

Circulatory System: Structure of Heart, the Blood vessels, Pulmonary circuit, Blood pressure and its regulation.

Respiratory System: Nasal cavity, Paranasal sinuses, Naso-Pharynx, Larynx, Trachea and Chief Bronchi, the Lung, Mechanism of breathing.

Digestive System: Gastrointestinal tract and associated glands. Function of intestine. The process of digestion and absorption, the Liver, the functions of liver, the extra hepatic passage.

Urinary System: The kidney, Physiological process involved in excretion. mechanism of urine formation osmoregulation by kidney.

Nervous System: Components, parts of Nervous System, Brain, meninges, Nerve terminals, Motor and sensory pathways, Cranial Nerves, Spinal cord & their Blood Supply.

Endocrine System: The Endocrine glands and their functions, Regulation of endocrine secretion and effect of hyper and hypo secretion of endocrine glands. The suprarenal gland, the pineal body, thymus gland, pancreas, sex glands.

Male & Female Reproductive System: The Testis, the Scrotum, the Penis, the male genital ducts, the Auxiliary genital glands, the Ovary, the Uterine tube, the Uterus, the Vagina, the External genitalia, the Gestation period, definition of Gonads, definition of Gamete, Sperm, Structure of Sperm, Ovum, Semen, Morphology of Semen.

The Blood and Lymph: Structure and composition. The development of Blood, Hemopoietic Tissues, Nature of Tissues. The stem cell, Development of Lymphoid, Lymph nodes, Lymphoid organs, Development of Myeloid elements. The marrow as an organ.

Epithelium: Characteristics of epithelial cells, the function of epithelium, the connective tissues (loose and dense), the constituents of connective tissues.

Cartilage: Hyaline, Elastic, Fibrous cartilage, Ligaments, Tendon, Regenerative ability of cartilage.

Skeletal & Muscular System: Osteology of human Skeleton, Bones, Development of Bones, General features of Bone, Classification of Bones, Chemical composition of Bones, Structures. Muscular system: Skeletal muscles, Smooth muscles, Muscular tissues, Cardiac muscle, Nerve supply and action, Forces exerted by muscle, Articulations; the joints; synarthroses, diarthroses, functional correlation of joints.

Paper II: Clinical Biochemistry

Health and Biosafety guidelines and proper disposal of wastes.Internal Quality Assurance and adaptation of Standard Operating Procedures (SOPs).Knowledge of preparing Format for Investigation Reports.Prepare manual (Standard Operational Protocols-SOPs), Maintain the record for Internal assessment.

Biomolecules and the Cell: The major complex biomolecules of cells and their major functions, chemical composition of normal man, Prokaryotic and Eukaryotic Cells, Comparison between Prokaryotic and Eukaryotic Cells.

Carbohydrates: Definition, Digestion of Carbohydrates, Entry of Glucose into Cells, Insulin dependent transport system of glucose, Major pathway of carbohydrate metabolism, Non-digestible Carbohydrates, Abnormalities of Carbohydrate, Glycolysis, Regulation of Glycolysis, Gluconeogenesis, Function of Glycogen, Glycogenolysis, Formation of Glucose, Glycogen storage diseases.

Proteins: Definition, simple, conjugate and derived proteins, Nutritional classification of proteins (structural function and dynamic function), Major elements of protein, Digestion of protein by pancreatic proteases, Abnormalities of protein digestion, Amino acids, Formation of Ammonia, Function of Ammonia, Phenylketonuria (PKU), Urea Cycle, Blood Urea, Non–Protein Nitrogen (NPN), Biosynthesis of Creatine, Clinical importance of Creatine and Creatinine. Plasma Proteins: Separation of Plasma Proteins, Abnormal Electrophoretic pattern; Multiple Myeloma, Nephrotic Syndrome, Primary Immunodeficiency, Antitrypsin deficiency, Albumin–Globulin (A/G) ratio.

Lipids: Definition, Digestion of Lipids by Pancreatic Enzymes, Degradation of Triglycerols and Cholesterol esters, Phospholipids, Plasma Lipids, Role of Bile Salt in Lipid absorption, Peptic Ulcer, Pancreatitis, Triglycerols (The body fuel reservoir). Lipoproteins: Definition, Classification, Chylomicrons, Very Low Density Lipoproteins (VLDL), Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL), Free Fatty Acids – Albumins (Hyperlipoproteinuria, Hypolipoproteinuria), Clinical Significance & Medical importance.

Vitamins: Classification, Fat soluble and water-soluble Vitamins, Biochemical function of Vitamins.

Enzymes: Diagnostic importance of enzymes, Amylase, Lipase, Serum Glutamate Pyruvate Transaminase (SGPT), Serum Glutamate Oxaloacetate Transaminase (SGOT), Alkaline Phosphatase, Lactate Dehydrogenase (LDH), Creatine Phosphokinase (CPK), Y-Glutamyl Transpeptidase – Clinical Significance.

Hormones: Definition, Classification, Hypothalamic and Pituitary Hormones, Glycoprotein, Hormones, TSH, FSH, LH, Thyroid Hormones, LaboratorydiagnosisofT3, T4,TSH–byELISA.HormonesofAdrenal cortex, Hormones of Gonads, Diabetes insipidus,.

Paper III: CLINICAL PATHOLOGY, HAEMOTOLOGY AND BLOOD BANKING

Clinical Pathology:

Introduction to clinical pathology and safety measures in lab.
Quality Control- External and Internal.
Complete urine examination CSF examination, examination of other body fluid, semen analysis.
Norms of biomedical waste and discarding infected blood.
Transportation of different clinical material to distant laboratories.
Basic concepts of Jaundice.

Haematology:

Introduction- composition of blood, its formation and function, transformation and preservation of blood serum and plasma etc: Organic and inorganic components of plasma.
Anticoagulants: Definition and their different types, function, reagent and buffers.

Haemoglobin: Definition and porphyrins, normal and abnormal Haemoglobin, physiological variations. Estimation by : Colorimetric method, specific gravity method, chemical method, Gasometrical method.Clinical Importance:

Blood cells: RBC, WBC, platelets, total count, normal values, abnormal values and their physiological variation.Factors affecting values.Limitation and significance. Preparation of peripheral smear and examination study of different blood count.Reticulocyte counting: Method, normal values and significance.Morphology of normal and abnormal forms of WBC.Differentials Leucocyte count (DLC), Erythrocyte sedimentation rate (ESR), Packed cell volume (PCV)Blood cell indices (Normal and abnormal values)Osmatic fragility test, (Normal and abnormal values)

Coagulation mechanism and coagulation factor, Coagulation test: Bleeding time (BT), Clotting time (CT), Whole blood coagulation time, Clot retraction test, Prothronbin time (PT), Tourniquet test, Activated partial Thrombioplastin time (APTT), Sickling test, L. E. Cell test, Bone Marrow examination (Different site's and needle test).

Automation in Haematology, an elementary knowledge of use of isotopes in Haematology

Blood Banking:

Blood banking introduction-Immunohaematology, screening and selection of donor, collection and storage of blood.Blood grouping, ABO, RH and other system of grouping.Subgroup A and subgroup B.Bombay blood group and their antibodies.ABO grouping – Slide and tube test, Reverse grouping, source of error, rouleaux formation, RH grouping – slide and tube test.

Cross matching, reasons of cross matching, coombs test, direct and indirect, principle, procedure, sources of errors, control, interpretation and clinical application.Blood transfusion Techniques: Preparation and properties of anticoagulants solution, criteria for selection of donor, screening test for donor, methods of blood collection.

Organization of blood bank, preparation and uses of various components of blood.
Transfusion reaction.

Paper IV: INSTRUMENTATION, LAB MANAGEMENT AND QUALITY CONTROL

Instrumentation:

Basic laboratory instruments: Principle and working of pH meter, Laminar air flow, Centrifugation and types of centrifuge machine, Hot air oven, Incubator, Water bath.
Chromatographic techniques: Theory, principle and application of paper chromatography, Thin layer Chromatography (TLC), Gel filtration chromatography, Ion-exchange chromatography, HPLC and high pressure.

Electrophoretic techniques: Theory, principle and application of paper electrophoresis, starch, gel.

Spectroscopic techniques: Theory, principle and application of UV, Visible IR, NMR, fluorescence and Roman spectroscopy.

Radioisotope techniques: Uses of radioisotopes in life science, radio active labelling, principle and application of techniques.

Lab management and Quality Control:

Maintenance of patient record, prepare manual (standard) operational protocols (SOPs) and key the record for Internal assessment.
Maintenance of laboratory glassware and their record, maintenance of laboratory instrument of record.

Quality Control Assurance (QSA) and adaptation of SOP's (Standard Operational Procedure). Bio-safety Health and care, proper disposal and decay of waste.

Quality Control (Internal) Assurance in Microbiology Laboratory, Accuracy of investigations, Standardization of methods, Reliability of results, Knowledge of phlebotomy, Facilities of equipment, chemicals, reagents, glassware etc. Biohazard waste management and disposal options, sources of Health hazards and control of environmental pollution. Right method of collection, storage, transportation, and proper documentation of specimens and maintenance of records.

Paper V: Medical Microbiology, Immunology and Serology

Identification and biochemical characterization of clinically significant bacteria: Microscopy of stained smear, motility test, culture character, biochemical reactions: sugar fermentation, Indole production, catalase, oxidase coagulase test, urease production. Citrate utilization, Nitrate reduction, H2S production, PPA production, MR, VP test, Bacitracin, optochin, polymyxin B sensitivity, Esculin hydrolysis, Hippurate hydrolysis.

General Study of Human pathogens: *V. choleræ* and related genera, *Campylobacter* spp., *H. pylori* spp., Study of Hospital Associated (Nosocomial) Infections, safety measure & control policy. Definition of Virus, composition of viruses in general, Basic concept of Hepatitis Virus, Retrovirus, Polio Virus, Chicken Pox virus. Acquired Immune Deficiency Syndrome (AIDS), HIV-I & HIV-II infection, Safety measures & Control policy.

Morphology of Bacteria: Size, shape, arrangement, capsule, cell wall, chemical structure of cell wall, Gram positive and Gram negative cell wall, cytoplasm, nucleus, flagella, spores etc.

Smear Microscopy and Staining of Slides: Simple staining, Gram staining, Albert staining, Capsular staining, (India Ink), Hiss's method, Ziehl–Neelsen staining (AFB), Auramine–Rhodamine procedure.

Methods of sterilization (Physical & Chemical), disinfection, decontamination of spills and universal precaution in relative to patient care and disease. The definition of growth, growth curve, measurement of growth and maintenance of cultures. Different modes of nutrition in bacteria, Bacterial Reproduction, Generation time, bacterial count.

General principles of fungal detection, Identification of *Candida albicans, Cryptococcus neoformans, Aspergillus fumigatus*. Antimicrobial susceptibility testing: Diffusion method and dilution method, Interpretation of results, Drug resistance spectrum of antibiotics.

Infection: Definition, routes of infection and spread, source and reservoir of infections, definition: Parasite, Host, Vector, Contagious diseases, Infectious diseases, Epidemic, Endemic, Pandemic, Zoonosis, Epizootic. Basic knowledge of organisms and their identification causing UTI, sore throat, wound infection, diarrhea, dysentery, food poisoning, septicemia, meningitis, Enteric fever, Tuberculosis, Leprosy and Sexually Transmitted Disease (STD).

Protozoan: Global and National prevalence of parasitic diseases, Laboratory diagnosis and interpretation; Helminths: Cestodes, Taenia, Echinococcus, Nematodes : Intestinal tissue, Blood.

Immunology and Serology:

Immunity, autoimmunity, antigen, antibodies, Antigen-antibody reaction. ELISA, RIA, Western Blot Technique, PCR.