।। 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
Phone: (02462) 229542
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Website: www.srtmun.ac.in
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.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड.

UGC Sanctioned Vocational Course

Syllabus for,

Certificate, Diploma, Advanced Diploma and B. Voc. Degree in

HERBAL MEDICINE

(CBCS Pattern)

Semester I & II

Faculty: Science and Technology

w.e.f.-2020-2021

Introduction:

Skills and knowledge are the driving forces of economic growth and social development for any country. Presently, the country faces a demand - supply mismatch, as the economy needs more 'skilled' workforce than that is available. In the higher education sphere, knowledge and skills are required for diverse forms of employment in the sector of education, health care manufacturing and other services. Potentially, the target group for skill development comprises all those in the labour force, including those entering the labour market for the first time, those employed in the organized sector and also those working in the unorganized sector.

Government of India, taking note of the requirement for skill development among students launched National Vocational Education Qualification Framework (NVEQF) which was later on assimilated into National Skills Qualifications Framework (NSQF). Various Sector Skill Councils (SSCs) are developing Qualification Packs (QPs), National Occupational Standards (NOSs) and assessment mechanisms in their respective domains, in alignment with the needs of the industry. In view of this, the UGC implemented the scheme of Community Colleges from 2013-14 in pilot mode on the initiative of the MHRD. Thereafter, realizing the importance and the necessity for developing skills among students, and creating work ready manpower on large scale, the Commission decided to implement the scheme of Community Colleges as one of its independent schemes from the year 2014-15. The Commission also launched another scheme of B.Voc. Degree programme to expand the scope of vocational education and also to provide vertical mobility to the students admitted into Community Colleges for Diploma programmes to a degree programme in the Universities and Colleges. While these two schemes were being implemented, it was also realized that there is a need to give further push to vocational education on a even larger scale. Accordingly, 'Deen Dayal Upadhyay Centres for Knowledge Acquisition and Upgradation of Skilled Human Abilities and Livelihood (KAUSHAL)' was also incorporated. Since all these three provisions serve a common purpose, all these schemes are merged into a single scheme for providing skill based education under National Qualification Framework.

Swami Ramanand Teerth Marathwada University has several initiatives towards academic excellence, quality improvement and administrative reforms. In view of this priority and in keeping with Vision and Mission, process was already initiated towards introduction of semester system, grading system and credit system. University had implemented Choice Based Credit System (CBCS) pattern at UG level from the academic year 2016-2017 progressively.

Revision and updating of the curriculum is the continuous process to provide an updated education to the students at large. In view of this priority and in-keeping with Vision and Mission, process of revision and updating the curriculum is initiated and implemented at UG level from the academic year 2019-2020 progressively. Presently there is wide diversity in the curriculum of different Indian Universities which inhibited mobility of students in other universities or states. The CBCS provides choice for students to select from the prescribed courses .The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning. Our university has already introduced the choice based credit system. The semester system accelerates the teaching-learning process and enables vertical and horizontal mobility in learning.

Type of Courses and Awards:

There will be full time credit-based modular programmes, wherein banking of credits for skill and general education components shall be permitted so as to enable multiple exit and entry. The multiple entry and exit enables the learner to seek employment after any level of Award and join back as and when feasible to upgrade qualifications / skill competencies either to move higher in the job profile or in the higher educational system. This will also provide the learner an opportunity for vertical mobility to second year of B.Voc. degree programme after one year diploma and to third year of B.Voc degree programme after a two year advanced diploma. The students may further move to Masters and Research degree programmes mapped at NSQF Level 8 – 10.

Aims and Objectives:

i) To provide judicious mix of skills relating to a profession and appropriate content of general education.

ii) To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.

iii) To provide flexibility to students by means of pre-defined entry and multipleexit points.(iv) To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements.

iv) Such diploma graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.

v) To provide vertical mobility to students coming out of 10+2 with vocational subjects and Community Colleges.

OBJECTIVES OF THE COURSE:

1. To provide an updated education to the students at large in order to know the importance and scope of the discipline and to provide mobility to students from one university or state to other.
2. To update curriculum by introducing recent advances in the subject and enable the students for current opportunities.
3. To provide knowledge of Herbal medicine as the basic objective of Education
4. To develop a scientific attitude to make students open minded, critical and curious
5. To develop an ability to work on their own and to make them fit for the society
6. To expose the students to contribute in different pharmaceutical industries and research institutes.
7. To develop skill in practical work, experiments, equipments and laboratory use along with collection and interpretation of herbal products and their utilization.
8. To make aware of natural resources and herbal remedies and its importance.
9. To develop ability for the application of the acquired knowledge in the fields of life so as to make our country self-reliant and self-sufficient.

OUTCOME OF THE COURSE:

1. This program will help to the students about the importance and need of Herbal medicine.
2. This program will help the students for their career development.
3. This program shall train and orient the students for Herbal medicine skills and serve as human resource for the industries, pharmaceutical sector and other organizations.
4. The programme also has a strong interdisciplinary component. Emphasis is given on the experimental learning through hands-on laboratory exercises, field trips and assignments.
5. This skill oriented course will provide job opportunities.

Table: Indicating Eligibility, Duration, Total Credits.

Exit Points /Awards	**Eligibility**	**Normal Duration**	**Skill Component Credits**	**General Education Credits**	**Total Credits for Award**	**NSQF Level**	**Medium of instruction**
B. Voc. Degree	**12th** pass or **Diploma** in relevant field after 10th	Six semester	108	72	180	7	English
Advanced Diploma		Four semester	72	48	120	6	
Diploma		Two semester	36	24	60	5	
Certificate		One semester	18	12	30	4	

Swami Ramanand Teerth Marathwada University, Nanded
Syllabus structure for B.Voc. Degree in Herbal Medicine

	Paper No.	Course Number	Course Title	Hr/Week	Type of Course	Credits	Marks		Total
							ESA	CIA	
Sem. I		**General Education Component**							
	Paper-I	BAAGE -101	Communication Skills	4	GE	4	75	25	100
	Paper-II	BAAGE -102	Basics of Computer	4	GE	4	75	25	100
	Paper-III	BAAGE -103	*Activity based on Paper-I & II	1	GE	1	-	25	25
		Skill Courses							
	Paper-IV	HMED-104	Indian system of medicine	4	CC	4	75	25	100
	Paper-V	HMED-105	Systematics of Plants	4	CC	4	75	25	100
	Paper-VI	HMED-106	Bioinstrumentation and Analytical techniques	4	CC	4	75	25	100
		Practical Skill Courses							
	Paper-VII	HMED-107	Practical based on Paper-IV	3	PR	3	50	25	75
	Paper-VIII	HMED-108	Practical based on Paper-V	3	PR	3	50	25	75
	Paper-IX	HMED-109	Practical based on Paper-VI	3	PR	3	50	25	75
	Paper No.	**Course Number**	**Course Title**	**Hr/Week**	**Type of Course**	**Credits**	**Marks**		**Total**
							ESA	**CIA**	
Sem. II		**General Education Component**							
	Paper-X	BAAGE -110	Personality Development	4	GE	4	75	25	100
	Paper-XI	BAAGE -111	Environmental Study	4	GE	4	75	25	100
	Paper-XII	BAAGE -112	*Activity based on Paper-X & XI	1	GE	1	-	25	25
		Skill Courses							
	Paper-XIII	HMED-113	Plant Biochemistry	4	CC	4	75	25	100
	Paper-XIV	HMED-114	Plant Histology, anatomy and embryology	4	CC	4	75	25	100
	Paper-XV	HMED-115	Basic microbiology	4	CC	4	75	25	100
		Practical Skill Courses							
	Paper-XVI	HMED-116	Practical based on Paper-XIII	3	PR	3	50	25	75
	Paper-XVII	HMED-117	Practical based on Paper-XIV	3	PR	3	50	25	75
	Paper-XVIII	HMED-118	Practical based on Paper-XV	3	PR	3	50	25	75

Note:

1. The ESA part of practical and Industrial Project should be completely assessed and evaluated by external examiner.

2. The external examiner should be appointed for practical and industrial training ESA part.

3. * Sign denotes that internal assessment should be based on seminar/Interview skill/expected component of the course.

4. Student should submit the Report based on summer industrial training.

5. For VI semester students can opt Elective-I or Elective-II pattern.

6. Student should submit the certificate of three months industrial training from respective industries.

ESA: End Semester Assessment,

CIA: Continues Internal Assessment,

GE: General Education Component,

CC: Core Skill Courses,

PR: Practical Skill Courses,

CIA of 25 Marks (Theory): 15 Marks for college level internal test & 10 Marks for Assignment,

CIA of 25 Marks (Practical): 15 Marks for college level internal practical test & 10 Marks for Record Book and Field Note Book submission

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B.VOC. FIRST YEAR

HERBAL MEDICINE

SEMESTER-I

THEORY PAPER-I: COMMUNICATION SKILLS (BAAGE-101)

Periods: 45 **Credits: 04**

Unit I: Basic Grammar: (13 Periods)

Introduction, Grammar Word Classes (Open & Closed), Sentence – Kinds – Transformation, Phrase, Clause and its kinds, Simple, Complex & Compound sentences, (Only definitions & Structure), Tenses - Use of verbs in the Sentences

Unit II: Vocabulary: (10 Periods)

Morphology, Synonyms & Antonyms, One Word Substitution, Homophones & Homonyms

Unit III: Communication Skills: (10 Periods)

Definition & Types, Communication Cycle & Barriers, Principles for Effective Communication, Varieties in English (Indian, British & American).

Unit IV: Writing Skills: (12 Periods)

Letters (Formal & Informal), Report Writing (Scientific and Formal), Memorandum, Curriculum Vitae, Personal Employment Interview, Group Discussion. Phonetics: 44 sounds, consonants, vowels & Diphthongs, Transcription of words, Accent, Syllable cluster and Intonation.

Reference Books:

1. Developing of Communication Skills -Krishna Mohan & Meera Banerji
2. A Practical English Grammar A.J. Thomson –Oxford
3. Mastering English Grammar – S.H.Burton
4. Technical Communication- Raman Sharma- Oxford
5. Written Communication in English – Sarah Freeman Orient Longman Pvt. Ltd.
6. A Course in Phonetics & Spoken English -J.Sethi & P.V.Dhamija
7. Radiance-Tense

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SEMESTER-I

THEORY PAPER-II: BASICS OF COMPUTER (BAAGE-102)

Periods:45 **Credits: 04**

Unit I: Basics of Computer: (10 Periods)

Introduction to computer, Definition and Types. Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software; Connecting keyboard, mouse, monitor and printer to CPU and checking power supply.

Unit II: Computer Operation: (13 Periods)

Operating Computer using GUI Based Operating System: What is an Operating System; Basics of Popular Operating Systems; The User Interface, Using Mouse; Using right Button of the Mouse and Moving Icons on the screen, Use of Common Icons, Status Bar, Using Menu and Menu-selection, Running an Application, Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows;

Unit III: MS-Office: (10 Periods)

Introduction to MS-Word: Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document. MS- Excel, Power Point. Internet concept & definition, WWW, URL, http, Browsers, Search engines etc.

Unit IV: Computer Networking: (12 Periods)

Basic of Computer networks; LAN, MAN, WAN; Concept of Internet; Applications of Internet. Communications and collaboration: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration; Instant Messaging; Netiquettes.

Reference Books:

1. Introduction of Computer Science- Pcushman & R. Mata Toledo, McGraw Hill
2. Computer fundamentals – P.K. Sinha – BPB New Delhi.
3. Microsoft Office – 2000Complete – BPB Practicals

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SEMESTER-I

THEORY PAPER-IV: INDIAN SYSTEM OF MEDICINE (HMED-104)

Periods:45 **Credits: 04**

UNIT-I: AYURVEDIC SYSTEM OF MEDICINE (11 Periods)

Principles with merits and demerits, Introduction on different dosage forms, Methods of preparation of Ayurvedic medicines, Standardization of Ayurvedic medicines, Problems in Standardization of ayurvedic medicines.

UNIT-II: UNANI SYSTEM OF MEDICINE (11 Periods)

Principles with merits and demerits, Introduction on different dosage forms, Method of preparation of Unani medicines, Standardization of Unani medicines, Problems in Standardization of Unani medicine.

UNIT-III: HOMEOPATHY SYSTEM OF MEDICINE (11 Periods)

Principles with merits and demerits, Introduction on different dosage forms, Method of preparation of Homeopathic medicines, Standardization of Homeopathic medicines, Problems in Standardization of Homeopathic medicine.

UNIT-IV: TRIBAL MEDICINES (12 Periods)

Medicinal sources-Herbal sources, Mineral sources, Animal sources, their collection, purification and processing, Principles, Importance, Merits and Demerits of Tribal Medicines, Rules and Regulations to Safeguard the Complimentary Medicines.

Reference Books:

1. Ayurvedic Pharmacopoeia.
2. Ayurvedic Formulary of India, the Indian Medical Practitioners Co-operativePharmacy and Stores Ltd, IMPCOPS.
3. Hand Book on Ayurvedic Medicines, H.Panda National Institute of IndustrialResearch, Delhi
4. Ayurvedic system of medicine, 2nd edition, Kaviraj, Nagendranath Sengupata,vol. I &II.
5. Siddha Pharmacopoeia by Dr.S. Chidambarathanu pillai, Ist edition.
6. Unani Pharmacopoeia.
7. Homeopathic Pharmacopoeia.
8. Homeopathic Pharmacy An introduction & Hand book by Steven B. Kayne.
9. Alternative medicine, by Dr. K.B. Nangia.
10. Aromatherapy, Valerie Gennari Cooksley.
11. Indian Herbal Pharmacopoeia vol. I &II Indian Drug Manufacturer's association,Mumbai.
12. British Herbal Pharmacopoeia British Herbal Medicine Association,1990 vol.I.

13. GMP for Botanicals - Regulatory and Quality issues on Phytomedicine, Businesshorizons, New Delhi, First edition, 2003. Robert Verpoorte, Pulok K Mukharjee.
14. Screening methods of Pharmacology by Robert turner.
15. Toxicology and Clinical Pharmacology of Herbal Products, Melanie Johns Cupp.

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HERBAL MEDICINE

SEMESTER-I

THEORY PAPER-V: SYSTEMATICS OF PLANTS (HMED-105)

Periods:45 **Credits: 04**

UNIT-I: GENERAL PRINCIPLES OF TAXONOMY (11 Periods)

Introduction – Definition, aims and objectives of taxonomy, Morphological, taxonomical, biological, concept of species, categories of classification and rules regarding their nomenclature, Salient features and development of International Code of Botanical Nomenclature (ICBN).

UNIT-II: TAXONOMIC EVIDENCES, TOOLS AND CLASSIFICATION SYSTEMS (12 Periods)

Taxonomic evidence, morphology, anatomy, embryology, cytology, phytochemistry, Taxonomic tools, herbarium, floras, botanical gardens, use of keys in plant identification, Systems of angiosperms classification, broad outline of Bentham and hooker Engler and Prantl's and Hutchinson's system of classification with merits and demerits.

UNIT-III: STUDY OF FAMILIES-I (11 Periods)

Comparative account of following Angiospermic families as per Bentham and Hooker's system-

Brassicaceae, Fabaceae, Malvaceae, Asclepiadaceae,Euphorbiaceae.

UNIT-IV: STUDY OF FAMILIES-II (11 Periods)

Comparative account of following Angiospermic families as per Engler and Prantl's system- Verbenaceae, Solanaceae, Rubiaceae, Cucurbitaceae. Asteraceae.

Reference Books:

1. Vashista, P.C. (1990) – Taxonomy of Angiosperms – S.Chand & Co., New Delhi.
2. Singh, V. and Jain, V.K. (1989) Taxonomy of Angiosperms. Rastogi Publication, Meerut.
3. Sivarajan, V.V. (1989) Introduction to principles of plant Taxonomy. Oxford and IBH, New Delhi.
4. Hutchinson, J. (1973) The families of flowering plants. Oxford University Press, London.
5. Heywood, V.H. (1967) Plant Taxonomy. Edward Arnold, Great Britain.
6. Gamble, J.S. and Fisher, L.E.F. (1967) The Flora of the presidency of Madras (Vol. I – III). Botanical Survey of India, Calcutta.
7. Davis, P.H. and Heywood, V.M. (1965) Principles of Angiosperm Taxonomy. Oliver and Boyd Edinburgh.

8. Lawrence, G.H.M. (1955) The Taxonomy of vascular plants (Vol. I-IV). Central Book
9. Depot, Allahabad Jeffery, C. An Introduction to Plant Taxonomy. J & A Churchill Ltd., London.
10. Radford, A. E. (1986) Fundamentals of plant systematic.Harper and Raw publication, USA.
11. Solbrig, O.T. (1970) Principles and methods of plant Sytematics. The Macmillan Co Publication Co. Inc., USA.
12. Woodland, D. W. (1991) Contemporary Plant Syatematics, Pentice Hall, New Jersery.
13. Takhtajan, A. L. (1997) Diversity and classification of Flowering Plants. Columbia University Press, New York.
14. Stebbins, G. L. (1974) Flowering Plants-evolution Above species Level. Edvard Arnold Ltd,

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SEMESTER-I

THEORY PAPER-VI: BIOINSTRUMENTATION AND ANALYTICAL TECHNIQUES (HMED-106)

Periods:45 **Credits: 04**

Unit-I: MICROSCOPY (12 Periods)

Safety in laboratory - Safe use of laboratory equipment's, Personal protection, Hazards and waste disposal. Microscopy – Working and application of simple microscope, compound microscope, fluorescence microscope, Micrometry, fixation and staining.

UNIT-II: SPECTROSCOPY (11 Periods)

The theoretical aspects, basic instrumentation, elements of interpretation of spectra, and applications of the following analytical techniques, Colorimetry, Ultraviolet and visible spectrophotometry; Infrared spectrophotometry.

UNIT-III: CHROMATOGRAPHIC TECHNIQUES (11 Periods)

Classification of chromatographic methods based on mechanism of separation: paper chromatography, thin layer chromatography, column chromatography , High Performance Liquid Chromatography: Principle, instrumentation, solvents used, elution techniques, HPTLC: Theory and Principle, instrumentation, elution techniques and pharmaceutical applications.

UNIT-IV: ELECTROPHORESIS & CENTRIFUGATION TECHNIQUES (11 Periods)

Theory, principles, and instrumentation of paper electrophoresis, gel electrophoresis-SDS-PAGE, Centrifugation- Theory, principles, instrumentation, applications, types.

3. Understand the methods of separations of samples from mixture

Reference Books:

1. Spectrometric identification of Organic Compounds, Robert. M. Silverstein, Basseler, Morril (John Wiley and Sons. N.Y).
2. Principles of Instrumental Analysis by Donglas A. Skoog, James, J. Leary, 4th Edition.
3. Organic Spectroscopy – William Kemp, 3rd Edition.
4. Chromatographic Analysis of Pharmaceuticals, John A. Adamovics, 2nd Edition.
5. Practical Pharmaceutical Chemistry, Part two, A. H. Beckett & J. B. Stenlake – 4th Edition.
6. Techniques and Practice of Chromatography – Raymond P. W. Scott, Vol. 70.
7. Modern Methods of Pharmaceutical Analysis, Vol 1,2,RE Schirmer,Franklin Book
8. Colorimetric Methods of analysis- F. D. Snell and C. T. Snell (Van Nostrand Reinhold Company, N.Y.).
9. Text book of Pharmaceutical Analysis, K. A. connors, 3rd Ed. Johnwiley & sons, New York
10. Spectrometric identification of Organic Compounds, Robert. M. Silverstein et al, 7th Edition, 1981.

11. Principles of Instrumental Analysis by Donglas A. Skoog, James, J. Leary, 4th Edition.
12. Pharmaceutical Analysis – Modern Methods – Part A, Part B, James W. Munson – 2001.
13. Vogel's Text Book of Quantitative Chemical Analysis, 6th Edition, 2004.
14. Chromatographic Analysis of Pharmaceuticals, John A. Adamovics, 2nd Edition.
15. Techniques and Practice of Chromatography – Raymond P. W. Scott, Vol. 70.
16. Identification of Drugs and Pharmaceutical Formulations by Thin Layer Chromatography – P. D. Sethi, Dilip Charegaonkar, 2nd Edition.
17. HPTLC – Quantitative Analysis of Pharmaceutical Formulations – P. D. Sethi.
18. Liquid Chromatography – Mass Spectrometry, W. M. A. Niessen, J. Van Der Greef, Vol. 58.

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SEMESTER-I

PRACTICAL PAPER -VII: PRACTICAL BASED ON INDIAN SYSTEM OF MEDICINE PAPER-IV (HMED-107)

Marks:75 **Credits: 03**

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1. Demonstration of various dosage forms available in Ayurvedic medicines.
2. Demonstration of various dosage forms available in Siddha system.
3. Demonstration of various dosage forms available in Unani medicines.
4. Demonstration of various dosage forms available in Homeopathic medicines.
5. Demonstration of various dosage forms available in Tribal Medicines.
6. Simple preparations used in Ayurvedic System and their Standardization (with special emphasis on TLC).
7. Simple preparations used in Siddha system and their Standardization (with special emphasis on TLC).
8. Simple preparations used in Unani system and their Standardization (with special emphasis on TLC).
9. Simple preparations used in Homeopathy system and their Standardization (with special emphasis on TLC).
10. Ethnomedicinal Survey & documentations in campus area.

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SEMESTER-I

PRACTICAL PAPER -VIII: PRACTICAL BASED ON SYSTEMATICS OF PLANTS -V (HMED-108)

Marks:75 **Credits: 03**

1. To study the floral symmetry, leaf phyllotaxy
2. To study the differences in dicot and monocot flower.
3. To study the variation in stamens and carpels.
4. To study placentation types
5. To study the floral adaptations for pollination.
6. Description of a specimen from representative, locally available families as per theory paper.
7. Location of key characters and use of keys at genera & family level.
8. Field trips within and around the campus; compilation of field notes.
9. Training by using floras for identification of specimens described in the class.
10. Preparation herbarium sheets of medicinal plants.

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SEMESTER-I

PRACTICAL PAPER -IX: PRACTICAL BASED ON BIOINSTRUMENTATION AND ANALYTICAL TECHNIQUES -VI (HMED-109)

Marks:75 **Credits: 03**

1. UV/Visible spectrum scanning of a few organic compounds for UV- absorption.
2. Estimation of single drug (raw material/ formulations) by UV spectrophotometry.
3. Estimation of multicomponent formulation by UV- Spectrophotometer in formulations.
4. Effect of pH and solvent on UV Spectrum of certain drugs.
5. Effect of temperature on UV Spectrum of certain drugs.
6. Interpretation of structure of drugs by Infra-red spectra.
7. Experiments based on the application of derivative spectroscopy.
8. TLC for separation of drug mixture.
9. Profiling of plant secondary metabolites using HPTLC
10. HPTLC for quantification of specific compound from plant extracts.

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SEMESTER-II

THEORY PAPER -X: PERSONALITY DEVELOPMENT (BAAGE -110)

Periods:45 **Credits: 04**

UNIT-I: Personality Development: (Periods: 11)

Introduction to personality development: The concept personality- Dimensions of theories of Freud & Erickson- personality – significant of personality development. The concept of success and failure: What is success? - Hurdles in achieving success - Overcoming hurdles - Factors responsible for success, What is failure - Causes of failure. SWOT analyses.

UNIT-II: Attitude & motivation: (Periods:11)

Attitude - Concept - Significance - Factors affecting attitudes - Positive attitude - Advantages -Negative attitude - Disadvantages - Ways to develop positive attitude - Difference between personalities having positive and negative attitude. Concept of motivation - Significance - Internal and external motives - Importance of self-motivation- Factors leading to de-motivation

UNIT-III: Interpersonal Relationship: (Periods: 11)

Term self-esteem - Symptoms - Advantages - Do's and Don'ts to develop positive self-esteem -Low self-esteem - Symptoms - Personality having low self-esteem - Positive and negative self-esteem. Interpersonal Relationships – Defining the difference between aggressive, submissive and assertive behaviors - Lateral thinking.

UNIT-IV: Overall personality development: (Periods: 12)

Other aspects of personality development: Body language, Problem-solving, Conflict and Stress Management, Decision making skills, Leadership and qualities of a successful leader. Character building, Team-work, Time management, Work ethics, Good manners and etiquette. Employability quotient: Resume building, The art of participating in Group Discussion. Facing the Personal (HR & Technical) Interview.

Reference Books:

1. "Personality Development and Soft Skills" by Barun Mitra
2. The Only Skill That Matters by Jonathan A. Levi
3. "Personality Development" by Swami Vivekananda

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SEMESTER-II

THEORY PAPER -XI: ENVIRONMENTAL STUDY (BAAGE -111)

Periods:45 **Credits: 04**

Unit-I: Ecosystems: (Periods: 11)

Introduction, Concept of an ecosystem. Structure and function of an ecosystem. Energy flow in the ecosystem. Food chains, food webs. Ecological pyramids: Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Aquatic ecosystems (ponds)

Unit-II: Biodiversity: (Periods: 11)

Introduction, Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega diversity nation. biodiversity Hot-spots of India. Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit-III: Environmental Biology: (Periods: 12)

Environmental Pollution; Introduction, Definition, Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Noise pollution f. Thermal pollution g. nuclear hazards. Disaster Management; Natural disaster- Earthquake, Tsunami, Cyclone, Tornedo, Chemical Disaster- Bhopal Gas Tragedy, Nuclear Disaster- Chernobil.

Unit-IV: Natural Resources: (Periods: 11)

Renewable and Nonrenewable Resources; Solar Energy, Wind Energy. Forest Resources, Metal Mines, Crude Oil Mines. Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people. Environmental ethics. Population growth, Population explosion.

Reference Books:

1. Agarwal, K.C.2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad 380 013, India, Email: mapin@icenet.net (R)
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill lnc.480p
4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W. P. Cooper, T. H. Gorhani, E & Hepworth, M.T.2001. Environmental Encyclopedia, Jaico Publ. House. Mumbai, 1196p
6. Dc A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, 11.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press. 473p
9. Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, VII & Watson, R.I. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p. .
11. Jadhav & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
12. Mckinncv, M.L. & Schoch. R.M. 1996. Environmental Science systems & Solutions. Web enhanced editio

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SEMESTER-II

THEORY PAPER -XIII: PLANT BIOCHEMISTRY (HMED-113)

Periods:45 **Credits: 04**

UNIT-I: STEREOISOMERISM OF NATURAL PRODUCTS (10 Periods)

Chemical and spectral approaches to simple molecules of natural origin, Application of I.R., N.M.R. and Mass spectroscopy in the structural elucidation of organic compounds, Concept of stereoisomerism taking examples of natural products (ephedrine and atropine).

UNIT-II: CHEMISTRY OF PLANT DRUGS (13 Periods)

Cardiac Glycosides: Source, structures, Pharmacological properties and study of interrelationship between cardinolides and bufadienolides (Chemistry of digoxin & digitoxin). Introduction to Scillaren A and ouabain, Terpenes : Classification, General methods of extraction and separation.

UNIT-III: VITAMINS & ALKALOIDS (11 Periods)

Vitamins: Classification, Chemistry of vitamin A, B1, Folic acid and vitamin C, Alkaloids: Classification, isolation, structural elucidation of atropine, ephedrine, reserpine and morphine.

UNIT-IV: ANTIBIOTICS AND FLAVONOIDS (11 Periods)

Chemistry and therapeutic activity of penicillin, streptomycin and tetracyclines, Flavonoids: Classification, pharmacological properties and chemistry of quercetin.

Reference Books:

1. Buchanan, B. B., Gruissem, W. and Jones, R.L. 1989. Biochemistry and Molecular Biology of plants. American Society of Plant Physiologists, Maryland, USA. 2416
2. Dennis, D.T., Turpin, D. H., Lefebvrc, D.D. and Layzell, D.B. (eds).1997. Plant Metabolism (2ndEd.)Longman, Essex, England.
3. Gaiston, A.W.1989. Life Processes in Plants. Scientific American Library, Springer- Verlag, NewYork, USA.
4. Hooykass P.J.J., Hall, M. A. and Libbenga, K.R.(eds).1999. Biochemistry and Molecular Biology of plant Horm. Elsevier, Amsterdam, The Netherlands.
5. Hopkins, W.G. 1995. Introduction to Plant Physiology. John Wiley & Sons, Inc., New York, USA.
6. Lodish, H., Berk, A., Zipursky S.L., Matsudaira, P., Baltimore, D and Darnell, J. 2000.

Molecular Cell Biology (4thed). W. H. Freeman and Company. New York ,USA.
7. Moore, T.C. 1989. Biochemistry and Physiology of Plant Hormones (2nded). Springer Verlag, New York, USA.
8. Nobel, P.S.1999. Physicochemical and Environmental Plant Physiology (2nd ed). Academic Press, Diego, USA.
9. Salisbury, F.B. and Ross, C.W.1992: Plant Physiology (4thed). Wadsworth Publishing Co., California, USA.

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HERBAL MEDICINE

SEMESTER-II

THEORY PAPER -XIV: PLANT HISTOLOGY, ANATOMY AND EMBRYOLOGY (HMED-114)

Periods:45 **Credits: 04**

UNIT –I: HISTOLOGY (10 Period)

Meristematic Tissue: Definition, classification based on position and origin, Histological organization of root and shoot apices. Simple Tissues: Parenchyma, Collenchyma, Sclerenchyma. Complex tissues: Xylem and Phloem. Secretary tissues: Lactiferous tissues & Glandular tissues.

UNIT II: ANATOMY (12 Period)

Vascular Bundles: Definition and types. Primary structures: Root anatomy of Monocotyledons (Maize) and Dicotyledons (Sunflower), Stem anatomy of Monocotyledons (Maize) and Dicotyledons (Sunflower), Leaf anatomy of Monocotyledons (Maize) and Dicotyledons (Sunflower), Secondary Growth- Normal Secondary growth in root and stem of Dicotyledons (Sunflower).

UNIT III: EMBRYOLOGY –I (13 Periods)

Introduction- Definition and Scope, Microsporangium- Structure (T.S. of typical anther), Microsporogenesis, Structure of Pollen grain, Pollination (self and cross pollination in brief), Development of male gametophyte, Megasporangium- Structure (L.S.of typical ovule), types of ovule

UNIT IV: EMBRYOLOGY –II (10 Period)

Megasporogenesis, Fertilization- Double fertilization and Significance, Endosperm- Definition and types (Nuclear, Cellular and Helobial endosperm), Embryo- Definition, Development of Monocot and Dicot embryo, Development of seed and Fruit.

Reference Books:

1. Dickison, W.C. (2000).Integrative Plant Anatomy. Cambridge, U.K.: Harcourt Academic Eastern Ltd.. New York, 1895.

2. Dubey. R.C. 2006. A text book of Biotechnology. S. Chand & Co. New Delhi – 110055
3. Easu, K. 1983. Plant Anatomy - Wiley Eastern Limited.
4. Epstein, E. Mineral nutrition in Plants. Principles and Perspectives. Wiley, 1976.
5. Esau, K. (1977).Anatomy of Seed Plants. New Delhi, Delhi: John Wiley & Sons, Inc.
6. Evert, R.F., Eichhorn, S. E. (2006). Esau's Plant anatomy: Mersitems, Cells, and tissues
7. Fageri, K. and Van der Pijl, L. The Principle of Pollination Ecology. Pergamon Press, Oxford, 1979.
8. Fahn, A. 1977 – Plant Anatomy. Pergamon Press.
9. Fahn, A. Plant Anatomy. (3rd edition). Pergamon Press, Oxford, 1982.
10. Forester,A.S. l960. Practical Plant Anatomy. D. Van Nostrand Company lnc.

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SEMESTER-II

THEORY PAPER -XV: BASIC MICROBIOLOGY (HMED-115)

Periods:45 **Credits: 04**

UNIT-1: BASIC ASPECT OF MICROBIOLOGY (12 Periods)

Brief history, development and scope of microbiology, characterization, classification and identification of microorganisms, microscopic examination of microorganisms, bacterial staining, simple and differential staining Morphology and fine structure of microorganisms: Prokaryotes, bacterial cell structures, Gram positive and Gram-negative bacteria, morphological features, cell structure.

UNIT-2: CULTIVATION OF MICROORGANISMS (10 Periods)

Cultivation and cultural characterization of microorganisms: Nutritional and physical requirements of autotrophs, heterotrophs, chemotrophs and lithotrophs, types of culture media, pure culture.

UNIT-3: MICROBIAL GROWTH (12 Periods)

Microbial Growth: Modes of cell division, normal growth cycle, and quantitative measurement of growth, growth curve, synchronous growth and continuous culture, factors affecting growth, sporulation, Maintenance and preservation of microbial cultures.

UNIT-4 MICROBIAL DISEASES AND THEIR CONTROL (11 Periods)

Microorganisms and Diseases: Major diseases caused by different microorganism in human and plants. Microbial Control: Physical and chemical agents for control of microbial growth, their mode of action, sterilization, disinfectants.

Reference Books:

1. Pelczar, T.B. of Microbiology.
2. R.Y. Steiner, General microbiology.
3. Zudykandal, Essential and application of microbiology.
4. Bhojwani SS, plant tissue culture: applications and limitations (edition 1990).
5. Ananthanarayan and Paniker, (2009), Textbook of Microbiology, 8th Edition. Universal Press

6. Cedric Mims et al, Medical Microbiology, 3rd Edition Mosby
7. Prescott, Harley, Klein, Microbiology, 6th Edition McGraw Hill
8. Konemann, Diagnostic Microbiology, 5th and 6th Edition. Lippincott
9. Microbiology and Plant Pathology Dr. Arun K. Zingare 978-81-921419-4-7, Satyam, 2013

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SEMESTER-II

PRACTICAL PAPER -XVI: PRACTICAL BASED ON PLANT BIOCHEMISTRY -XIII (HMED-116)

Marks:75 **Credits: 03**

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1. Study of secondary metabolite structure or drugs by Infra-red spectra
2. Estimation of alkaloids.
3. Separation amino acids by chromatography.
5. Determination of amylase activity using spectrophotometer.
6. To determine the total carbohydrate content in the given sample.
7. To prove Beer-Lambert's law using a suitable solution.
8. Extraction of chloroplast pigments from leaves and preparation of the absorption spectrum of chlorophyll and carotenoids.
9. Preparation of standard curve of protein (BSA) and estimation of protein content in extracts of Plant material by Lowry's method.
10. Preparation of plant extracts and estimation of flavonoids.

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SEMESTER-II

PRACTICAL PAPER -XVII: PRACTICAL BASED ON PLANT HISTOLOGY, ANATOMY AND EMBRYOLOGY –XIV (HMED-117)

Marks:75 **Credits: 03**

1. Study of root apex
2. Study of shoot apex
3. Study of Parenchyma, Collenchyma, Sclerenchyma,
4. Study of Xylem and Phloem.
5. Preparation of a double stained permanent slide of monocot stem.
6. Preparation of a double stained permanent slide of dicot stem.
7. Study of monocot leaf & dicot leaf.
8. Study of monocot root & dicot root.
9. Study of anther & pollen grains
10. Study of embryo and seed.

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HERBAL MEDICINE

SEMESTER-II

PRACTICAL PAPER -XVIII: PRACTICAL BASED ON BASIC MICROBIOLOGY –XV (HMED-118)

Marks:75 **Credits: 03**

1. Gram staining of bacteria.
2. Aseptic techniques
3. Media preparation
4. Sterilization techniques
5. Culture techniques
6. Study of microbial growth
7. Microbial Assay of Antibiotics
8. Estimation of antimicrobial activity using standard guidelines
9. Study of plant viral diseases
10. Study of plant bacterial diseases

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

B.VOC. DEGREE IN HERBAL MEDICINE

(SEMESTER PATTERN)

Skeleton Question Paper

B.Voc. First Year (w.e.f. 2020-2021)

Theory Paper

Marks:75

Q1. Long Answer Type Question ……..(15 Marks).

OR

(a) Short Answer Type Question ……(8 Marks)
(b) Short Answer Type Question ……(7 Marks).

Q2. Long Answer Type Question ……..(15 Marks).

OR

(a) Short Answer Type Question ……(8 Marks)
(b) Short Answer Type Question ……(7 Marks).

Q3. Long Answer Type Question ……..(15 Marks).

OR

(a) Short Answer Type Question ……(8 Marks)
(b) Short Answer Type Question ……(7 Marks).

Q4. Long Answer Type Question ……..(15 Marks).

OR

(a) Short Answer Type Question ……(8 Marks)
(b) Short Answer Type Question ……(7 Marks).

Q5. Write a short note on (**Any three** of following); (15 Marks) (a) ……..(5 Marks)
(b) ……..(5 Marks)
(c) ……..(5 Marks)
(d) ……..(5 Marks)
(e) ……..(5 Marks).

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

B.VOC. DEGREE IN HERBAL MEDICINE

(SEMESTER PATTERN)

Skeleton Question Paper

B.Voc. First Year (w.e.f. 2020-2021)

Practical Paper

Time: Four hours **Marks:50**

Q1. Perform the Major Experiment ……..(20 Marks).

Q2. (a) Perform the Minor Experiment ……(10 Marks).

(b) Describe procedure and working of the Minor Experiment ……(10 Marks).

Q3. (a) Viva -voce ..……(5 Marks).

(b) Submission of Field Collection and Samplings during Field Visits and Excursions. ..……(5 Marks).