Estd. 1962
"A++" Accredited by NAAC(2021)
With CGPA 3.52

SHIVAJI UNIVERSITY, KOLHAPUR - 416 004, MAHARASHTRA
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शिवाजी विद्यापीठ, कोल्हापूर - ४१६ ००४,महाराष्ट्र
दूरध्वनी - ईपीएबीएक्स - २६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९३/९४

SU/BOS/Science/499 **Date: 10/07/2023**

To,

The Principal, All Concerned Affiliated Colleges/Institutions Shivaji University, Kolhapur	The Head/Co-ordinator/Director All Concerned Department (Science) Shivaji University, Kolhapur.

Subject: Regarding syllabi of **M.Sc. Part-I (Sem. I & II) as per NEP-2020** degree programme under the Faculty of Science and Technology.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the revised syllabi, nature of question paper and equivalence of M.Sc. Part-I (Sem. I & II) as per NEP-2020 degree programme under the Faculty of Science and Technology.

M.Sc.-Part I (Sem. I & II) as per NEP-2020			
1.	Microbiology (HM)	10.	Data Science
2.	Pharmaceutical Microbiology (HM)	11.	Computer Science
3.	General Microbiology	12.	Information Technology (Entire)
4.	Electronics	13.	Food Science & Technology
5.	Embedded Technology	14	Food Science & Nutrition
6.	Geology	15.	Biochemistry
7.	Sugar Technology (Entire)	16.	Biotechnology
8.	Alcohol Technology (Entire)	17.	Medical Information Management
9.	Agro Chemical & Pest Management (AGPM)	18.	Environmental Science
		19.	Physics

This syllabus, nature of question and equivalence shall be implemented from the academic year 2023-2024 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website **www.unishivaji.ac.in**)

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2023 & March/April 2024. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Dy Registrar
Dr. S. M. Kubal

Copy to:

1	The Dean, Faculty of Science & Technology	8	P.G. Admission/Seminar Section
2	Director, Board of Examinations and Evaluation	9	Computer Centre/ Eligibility Section
3	The Chairman, Respective Board of Studies	10	Affiliation Section (U.G.) (P.G.)
4	B.Sc. Exam/ Appointment Section	11	Centre for Distance Education

Syllabus

M. Sc. I: Medical Information Management(NEP)

Department of Biochemistry,

SHIVAJI UNIVERSITY, KOLHAPUR

In collaboration with

Hochschule Hannover – University of AppliedSciences and Arts, Germany

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Preamble:

In the recent years in this age of Internet and information technology, we have more information at our fingertips than ever before. Organizing this entire data and combating information overload is becoming more and more important. It is thus necessary for institutes like university to evolve a system, which is most accurate and more student friendly. Keeping this view in mind we have decided to start a master programme in Medical Information Management in collaboration with Hochschule Hannover – University of Applied Sciences and Arts, Germany. After completion of this two year M.Sc. course students can be accommodated in any national/multinational drug designing pharmaceutical company, academia as well as in Clinical Research Organizations (CROs).

Advances in biosciences, clinical medicine and medical technologies have enabled increasing personalized health care. The digitization of healthcare information facilitates new connections, insights and transparency. These developments will include medical information management in educational course format in the coming years and decades. Demographic change is leading to an increasing number of chronically ill and multimorbid patients. This would lead to an increasing need for information management. The years of delays in the introduction a nationwide telematic

infrastructure and an electronic health card, as well as the delays in establishing a cross-sectoral quality assurance of health care show problem areas of modern medical information management. The advances in various interdisciplinary areas of bioscience, clinical medicine and medical technology indicate an increasing need for clinical trials to progress and to make patients accessible. The value of clinical trials is not just to contribute to the development of new therapies but to take proper care of patients. For many participants it means a new drug/option they will be treated with as part of a study.

Clinical research includes planning, implementation, evaluation and publication of clinical trials. In this context, special knowledge is necessary about legal requirements at national and international level as well as all other related issues such as collaboration with institutions of higher education, centers of excellence and authorities, aspects of security of subjects / patients in clinical trials, patient information, insurance and ethical issues. For reimbursement of medicinal products, pharmaco economic data are required, that collection and analysis needs special training. Relevant aspects of benefit for patients such as adequate surrogate parameters and quality of life data require specific recording tools as well as rating benefits that are becoming increasingly important for clinical research and require specialized trained staff.

Medical Information Management course would be useful to train our students in rapidly developing and emerging areas of biosciences, clinical medicine, health sciences, health policy, IPR related activities, drug discovery and designing. These experts are continuously required in various clinical and pharmaceutical industries.

Intake capacity: 20 students per year

Eligibility: A candidate possessing B.Sc. degree in Science (Chemistry/ Physics/ Electronics/ Nanoscience and Technology/ Statistics/ Mathematics/ Biochemistry/ Biotechnology/ Microbiology /Bioinformatics/ Botany/ Zoology / Nursing / Computer Sciences/ Life Sciences/ Agriculture Sciences/ Veterinary Sciences);/ B.Pharm./B.E./B.Tech./B.A.M.S./B.H.M.S./B.D.S./M.B.B.S.) who have passed the entrance examination conductedby the Shivaji University, Kolhapur shall be held eligible for admission to M.Sc. in Medical Information Management course. Students from other Universities with above mentioned degrees and who have passed the entrance examination conducted by the University are also eligible.

Student/Faculty Exchange: Students and faculty exchange will be done as per MoU, which will be signed between Shivaji University, Kolhapur, Maharashtra, and Hochschule Hannover – University of Applied Sciences and Arts, Germany.

- **Program Structure:** Two year duration; Syllabus structure as per NEP along with research project (Master Thesis).

<table>
<tr><td>University</td><td>Sept – Jan.</td><td>Feb.- July</td><td>Sept – Jan</td><td>March-July</td></tr>
<tr><td>Shivaji University, Kolhapur
(Two Year duration)</td><td>Sem I</td><td>Sem II</td><td>Sem III</td><td>Sem IV (Project)
(Student Exchange)</td></tr>
<tr><td></td><td></td><td colspan="3">Common syllabus</td></tr>
<tr><td>Hocshule Hannover University, Germany</td><td>-</td><td>Sem I</td><td>Sem II</td><td>Sem III (Project)
(Student Exchange)</td></tr>
</table>

- **Exam Pattern:** NEP, Semester Pattern (80 External/20 Internal evaluations).
- This course is as per new M.Sc. NEP pattern
- All rules of new M.Sc. NEP pattern will be applicable for this course.

Department of Biochemistry,
Shivaji University, Kolhapur
Credit Framework for M.Sc. Program as per NEP

M.Sc. Medical Information Management

Year	Level	Sem	Major		RM	OJT/FP	RP	Cumm. Cr.	Degree
			Mandatory	**Elective**					
I	6.0	I	MMI101 (4Cr) MMI102 (4Cr) P-MMI104 (4Cr) P-MMI105 (2Cr)	E-MMI103 (4 Cr)	RM-MMI106 (4 Cr)	---	---	22	**PG Diploma (After 3yr B.Sc. Degree)**
		II	MMI201 (4Cr) MMI202 (4Cr) P-MMI204 (4Cr) P-MMI205 (2Cr)	E-MMI203 (4 Cr)	---	OJT-MMI206 (4 Cr) OR FP-MMI206 (4 Cr) [Any One]	---	22	
Cum. Cr. For PG Diploma			**28**	**8**	**4**	**4**	**--**	**44**	
Exit option: PG Diploma (44 Credits) after Three Year UG Degree									
II	6.5	III	MMI301 (4Cr) MMI302 (4Cr) MMI303 (4Cr) P-MMI305 (2Cr)	E-MMI304 (4 Cr)	---	---	RP-MMI306 (4 Cr)	22	**PG Degree After 3-Yr UG Or PG Degree after 4-Yr UG**
		IV	MMI401 (4Cr)	E-MMI402 (4 Cr)	---	---	RP-MMI405 (14 Cr)	22	
Cum. Cr. For 1 Year PG Degree			**18**	**8**	**0**	**0**	**18**	**44**	
Cum. Cr. For 2 Year PG Degree			**46**	**16**	**4**	**4**	**18**	**88**	
2 Years-4 Sem. PG Degree (88 credits) after Three Year UG Degree or 1 Year-2 Sem PG Degree (44 credits) after Four Year UG Degree									

Abbreviations: Yr.: Year; Sem.: Semester; OJT: On Job Training: Internship/ Apprenticeship; FP: Field projects; RM: Research Methodology; Research Project: ; Cumulative Credits: Cum. Cr.

Courses to be offered under NEP: M.Sc. Medical Information Management

Semester I		Semester II	
MMI101	**: Introduction to Biological Sciences (4 Cr)**	**MMI201**	**: Clinical Data and Quality Management (4 Cr)**
MMI102	**: Medical Informatics (4 Cr)**	**MMI202**	**: Clinical Quality Management-I (4 Cr)**
E-MMI103	**: German Language A1 (4 Cr)**	**E-MMI203**	**: Clinical Data Management-I (4 Cr)**
P-MMI104	**: Laboratory Course I (4 Cr)**	**P-MMI204**	**: Laboratory Course III (4 Cr)**
P-MMI105	**: Laboratory Course II (2 Cr)**	**P-MMI205**	**: Laboratory Course IV (2 Cr)**
RM-MMI106	**: Research Methodology (4 Cr)**	**OJT-MMI206 or FP-MMI206**	**: On Job Training or Field Project (4 Cr)**
Semester III		**Semester IV**	
MMI301	**: Clinical Quality Management-II (4 Cr)**	**MMI401**	**: Python for Clinical Research (4 Cr)**
MMI302	**: Project Management and Project Presentation (4Cr)**	**E-MMI402**	**: NGS for Human Health and Diseases** (4 Cr)
MMI303	**:Module to Deepen knowledge, Clinical Research, Biostatistics and Epidemiology (4 Cr)**	**RP-MMI403**	**: Research Project (14 Cr)**
E-MMI304	**: Clinical Data Management –II (4 Cr)**		
P-MMI305	**: Laboratory Course V (2 Cr)**		
RP-MMI306	**: Research Project (4 Cr)**		

Medical Information Management
M. Sc. I: Semester I

MMI101	Introduction to Biological Sciences	TOTAL HOURS: 60
CREDIT I	**Anatomy and Physiology** The cellular level of organization; structure of the cell, comparison of animal cell with evolutionary related cellular forms, cellular functions. Structure and function of the brain Central Nervous System, Peripheral and Autonomic Nervous system, Neurotransmitters. Anatomy of heart and the cardiovascular system, circulatory system, kidneys and excretory system, lungs and respiratory system, digestive system, reproductive system, Lymphatic & Immune Systems. Hormones; Anterior posterior pituitary hormones, contraction and regulation of skeletal muscle and smooth muscle.	**15**
CREDIT II	**Pharmacology** History and development of drug discovery, Basic Principles of pharmacology: molecular and cellular drug targets, drug-receptor interactions, agonism, antagonism, drug metabolism, pharmacogenomics, and pharmacokinetics. Introduction to toxicology: overview of the field of toxicology covering the basic principles, target organ toxicity, the toxicity of a limited group of compounds, and an introduction to modern molecular toxicology.	**15**
CREDIT III	**Epidemiology** Introduction to epidemiology, Determinants of health, measuring disease occurrence (frequency), surveillance, infectious disease epidemiology, direct and indirect standardization, data sources and secondary analysis, epidemiologic study design.	**15**

CREDIT IV	**Biochemistry** Proteins- Chemical structure and General properties of amino acids, classification of proteins on the basis of size, shape, degree of association, complexity and according to biological functions (Enzymes, transport, storage, contractile, structural, defense and regulatory). Types of protein structures. Carbohydrates- Classification, characteristics and functions of monosaccharides, disaccharides – polysaccharides. General scheme of carbohydrate metabolism. Lipids- Classification of lipids. Fatty acids - general formula, nomenclature and chemical properties. Structure, function and properties of simple, complex, acylglycerols, phosphoglycerides, sphingolipids, waxes, terpenes, steroids and prostaglandins Nucleic acid- Structure of nucleoside, nucleotide. Experimental evidence for nucleic acids as genetic material, Watson and Crick model of DNA, types of DNA.	**15**

Reference Books:

1. Lehninger's Principles of Biochemistry 5th edition, Nelson, D. L. and Cox, M. M. (2000) 10.1007/978-3-662-08289-8

2. Anatomy and Physiology by Dummies 2nd edition, Donna Rae, Norris, M., & Siegfried, D. R. (2011). Hoboken, NJ: Wiley Publishing, Inc.

3. Basic & Clinical Pharmacology (2012), Bertram G. Katzung, New York: McGraw-Hill Medical.

4. Biochemistry by Lubert Stryer (2002) Berg, J. M., Tymoczko, J. L., Stryer, L., & Stryer, L. New York: W.H. Freeman

5. Bioinformatics; Methods and applications; Genomics, Proteomics and Drug Discovery 3rd edition (2011), Rastogi, S. C. and Mendiratta and Rastogi, P. New Delhi : PHI Learning Private Limited

MMI102	Medical informatics	TOTAL HOURS: 60
CREDIT I	**Genome Analysis and their applications in Health:** Introduction and history, rough and final draft of human genome project, goals of the human genome project, Nucleic acids, genome information, applications of human genome project, techniques used and data analysis, ethical and social issues, International Human Genome Sequencing Consortium, types of Single Nucleotide Polymorphism (SNPs) and analysis, NCBI, BLAST. Gene Sequencing methods, Next Generation Sequencing (NGS), early detection of diseases using genome analysis.	**15**
CREDIT II	**Structural biology and drug discovery:** Protein sequence information, composition and properties, physicochemical properties based on sequence, sequence comparison, Pair-wise sequence alignment, gaps, gap-penalties, local and global sequence alignment, multiple sequence alignment, useful programs, ClustalW, BioEdit. Protein Structure Prediction; Homology modeling, prediction of protein structure from sequences, functional sites, Protein folding problem, three-dimensional structure determination. Protein identification and characterization by ExPASy server; Primary structure analysis and prediction.	**15**
CREDIT III	**Virtual Screening for Drug Discovery** Introduction, drug discovery area, pharmacogenetics and pharmacogenomics applications, parameters in drug discovery, cell cycles, identification of drug target molecules, drug design and its approaches, computer-aided drug designing methods; virtual screening, computer aided molecular design (CAMD), molecular modeling methods; molecular modeling packages and their uses in drug designing and discovery. ADME and toxicity Predictions, QSAR studies for drug designing.	**15**

CREDIT IV	**Databases and Informatics** Concept of data, data models, data representation, flow charts, data mining, various types of databases; protein sequence databases; primary and secondary protein sequence, nucleic acid databases and structural databases, PubChem, ZINC database and file formats, medical databases, literature databases. Database related programs; Oracle, SQL, VB, Database management System (DBMS), RDBMS.Applications of Medical Informatics	**15**

Reference Books:

1. Lehninger's Principles of Biochemistry 5th edition, Nelson, D. L. and Cox, M. M. (2000) 10.1007/978-3-662-08289-8

2. Anatomy and Physiology by Dummies 2nd edition, Donna Rae, Norris, M., & Siegfried, D. R. (2011). Hoboken, NJ: Wiley Publishing, Inc.

3. Basic & Clinical Pharmacology (2012), Bertram G. Katzung, New York: McGraw-Hill Medical.

4. Biochemistry by Lubert Stryer (2002) Berg, J. M., Tymoczko, J. L., Stryer, L., & Stryer, L. New York: W.H. Freeman

5. Introduction to Bioinformatics, (2001) Atwood, T. K. and Parry-Smith, D. J. Pearson Education Asia, Delhi, India

6. An introduction to Computational Biochemistry. (2002) C. Stain Tsai, A. John Wiley and Sons, Inc., publications

7. Bioinformatics; Methods and applications; Genomics, Proteomics and Drug Discovery 3rd edition (2011), Rastogi, S. C. and Mendiratta and Rastogi, P. New Delhi : PHI Learning Private Limited

E-MMI103	German Language A1	Total Hours 60
CREDIT I	**Reading** i. The pupils recognise the following types of text: dialogue; interview; advertisement; programme of a performance (cinema, theatre, concert, sport); a television and radioprogramme; notice; folder page of books, of audio cassettes, of videocassettes and of CDs; articles in dictionaries and lexica; a form to be filled in; menu; poem, short story, diary, comics, picture novel, greeting card, personal letter, email letter, announcement, invitation. ii. The pupils can understand the following types of text globally and/or selectively: leaflet, catalogue, label, transport timetable, city map, a programme of a performance (cinema, theatre, concert, sport), T.V. & radio programme, advertisement, notice, article in a dictionary and lexicon, menu, personal letter, e-mail letter, columns in a newspaper and magazine, comics, cuttings of reports, poem, short story, short texts of information. iii. The pupils understand in detail the type of problem and the instructions in the text book as well as short announcements, signs denoting advice and forbiddings, simple forms, invitations and greeting cards. iv. The pupils make use of the following strategies whilereading: - they recognise the correlation between text and picture. - they recognise personal names, numbers and dates. - they recognise the meaning of punctuation marks and text typography. - they establish the correlation between the title of a text and main points of information. - they recognise the parts of speech and clauses, word roots, prefixes, suffixes and endings of words of those learnt as wellas internationalisms. - they recognise the communicative function of the types of text listed under point (i). - they work with word card indexing. - they perceive the foreign culture in that they take a critical look	15

	at their own culture in the process. - they make use of the knowledge, skills and strategies which they have acquired in the lessons of their mother language or their first foreign language, when deducing pieces of information from text or making connections between them. v. The pupils can handle reference works (e.g., dictionaries, grammars). **Notions:** The contents of teaching include the speaking material which allows the expression of the following notions: Existence, Space and Time; Quantity and Quality, Logical Relationships; Definite and Indefinite Forms. - Existence: being, constancy, change, possibility, impossibility. Space : dimensions, place, motion, direction. - Time : point in time (once, repeated, definite, indefinite), length of time (continuous, limited by time); general observations without concrete reference to time. - Quantity: can / cannot be added. - Quality : of persons, localities, things, objects, events and dealings. - Logical Relationships: connection. Opposition, cause, condition, comparison. Definite and indefinite meanings.	
CREDIT II	**Listening:** The pupils are in a position to understand different German language texts globally or in detail through a direct contact or over the media. The texts should follow the standards of level A1 of the *Framework* and observe the phonetical and intonation variants of the German language. Of special significance in the training for the skill of *listening* is the inclusion of sight perception. i. The pupils understand questions and instructions of the teacher during the lesson. ii. The pupils can create correlations between hearing texts and pictures.	15

	iii. The pupils can understand short dialogues between two or several partners who refer to themes and situations already dealt with. iv. The pupils can understand short everyday and especially tourist related information (e.g., at the post office, in a travel agency, at the railway station / airport). v. The pupils infer main announcements from conversations on themes and situations already dealt with. vi. The pupils can infer selective information from news, advertisements and programme information on Radio or in T.V. as well as from easy descriptive texts. vii. The pupils can understand short literary forms like poems and songs on the basis of directed explanation. viii. The pupils make use of the following strategies while listening: - they put forward hypotheses and examine them in the light of the intention of the statement of various types of text. - they recognise intonation models, linguistic and metalinguistic means of expressing affirmation and negation. - they make use of already known models of word building. - they recognise the communicative function of varied typesof text. - they work with a dialogue – diagram. - they draw up the construction plan of a text they have heard. Language Interactivity: The language interactivity taken up in the teaching contents takes into account the basic functions of the language, namely the social, informative, appellative and affective. (i) making contacts - to welcome, to greet, to send greetings. - To address (even in letters). - To introduce oneself / others. - To ask how one is, to give information about it. - To request, to thank. - To congratulate, to wish luck – to give thanks for it. - To invite, to accept, to refuse. - To express regrets.	

	- To bid farewell (even in letters). (ii) giving information - to ask for information and to give it. - To present facts; to narrate, to report, to describe. - To list (enumerate), to verify by examples. - To complete / correct / disprove / confirm information. - To ask for correctness. - To show knowledge / lack of knowledge. - To give reasons. (iii) arranging things - to express wishes. - To make suggestions; to give / ask for advice. - To ask for / refuse / offer help. - To complain, to protest. - To express readiness / refusal. - To give / refuse / ask for permission; to forbid. - Information about / asking for intentions. - To ask if someone wants to do something, / is ready to do it. - To promise, to confirm. (iv) showing attitudes and expressing feelings Expressions of: - Agreement, refusal - Conjecture, certainty, persuasion. - Importance, insignificance. - Interest, curiosity, disinterestedness, indifference. - Preference, dislike, anger, - Joy, excitement. - Doubt, disappointment, annoyance. - Anxiety, (fear), care, worry. - Relief, appeasing, satisfaction. - Trust, mistrust. - Impatience, expectation, hope. Surprise, wonder. Topics: (i) I and my family : relatives,; relationships; dwelling /house; daily / yearly routine; activities in common; meals; feasts / celebrations; travelling.	

	(ii) I and my friends : circle of friends / clique; free time (hobbies, sport, games, radio, T.V., music, reading, meetings, parties, pets); idols; dreams. (iii) I and my surroundings : school (subjects, timetable, school day) ; neighbours; my street, my city / village, (means of transport, shops, shopping, post office) Information about the German-speaking countries will be integrated in such topics and their various aspects. Areas, Roles and Places of Language Communication: The lesson prepares the pupils for a reasonable amount of communication in the following areas: Free time, school family, friends, services and for the use of German speaking mass media. Communicative language activity is realized at school, in public, on means of transport, on visits and on the road. The pupils reach their role competence as is described in the *Common European Framework for Languages* of the Council of Europe. Language material: (i) Phonetics Quality and quantity of vowels, **A**-sounds, **E**-sounds, **Ü**- sounds. **Ö**-sounds, the murmuring vowel, **h** at the beginning of the word, **ich**-sound, **ach**-sound, **ng**-sound, accentuation of the word, structure, sentence accent and melody. (ii) Orthography The alphabet, **Aä**, **Oö, Uü, ei, ai, au, eu, äu, sp, st, ch, schg, tsch, ts, tz, chs, ng, ig, qu, ck, ss, ß.** (iii) Lexis Difference is to be made between a productive and a receptive vocabulary. The productive vocabulary comprises the basic vocabulary and the most common models of word-building, which are necessary for realising the above mentioned language interactivity in the parameters of the topics and their aspects already mentioned. The development of receptive skills presupposes and demands a receptive vocabulary that can be increased.	

CREDIT III	**Speaking:** The pupils realize in their statements ways of speaking which are mentioned in the subsequent part entitled *Contents*. i. The pupils reproduce the phonetic and intonation pattern correctly. ii. The pupils ask and answer questions in connection with the themes and situations already dealt with. iii. The pupils participate in conversation with their teacher and / or with their classmates in the course of the lesson. iv. The pupils hold short conversations with one or several partners (known or unknown) in the sphere of the themes and situations already dealt with. v. The pupils make short telephone calls. vi. The pupils make short announcements in connection with themes already handled. vii. The pupils make use of appropriate patterns of behaviour (mimics, gesticulations, body distance or nearness, etc) during conversation. viii. The pupils can make use of the following strategies while - speaking: - they ask for and themselves provide additional / explanatory information. - they signal lack of understanding and demand from their partner an appropriate reaction. - they direct the conversation according to their own interests and / or change the subject. - they make use of clichés in order, e.g., to cope more easily with situations in which they are under pressure of time. they make use of paralinguistic means.	15
CREDIT IV	**Writing** i. The pupils fill in tables with key words according to a text they have read or heard. ii. The pupils fill in easy forms, write greeting cards, invitations and short personal announcements. iii. The pupils lay down vocabulary cards according to apreset pattern. iv. The pupils write short texts to photos and pictures.	15

	v. The pupils make use of the following strategies while writing: - they employ preset patterns and examples with sense. - they use reference works for self correction of mistakes. Form 1 - Grammar o W-Frage: *Wie heißen Sie?* o Aussage: *Ich heiße / Ich bin ...* o Personalpronomen: *ich, Sie, du* o Verbkonjunktion *(ich, Sie, du): heißen, kommen, sprechen, sein.* o Präposition *aus: Ich komme aus Finnland* o Possessivartikel: *mein / meine* Personalpronmen: *er / sie, wir,* *ihr, sie* o Verbkonjunktion: *leben, haben ...* o Preposition *in: Sie leben in Helsinki.* o Ja- / Nein-Frage: *Kennen Sie ...?* o Nullartikel: *Haben Sie Äpfel?* o Bestimmter Artikel: *ein / eine* o Negativer Artikel: *kein / keine* o Plural der Nomen: *Tomaten, Eier,* o Verbkonjunktion: *essen* o Bestimmter Artikel: *der / die / das* o Lokale Adverbien: *hier / dort* o Prädikatives Adjektiv: *Sie ist schön.* o Personalpronomen: *er / sie /es.* o Negation *nicht: Das Bad ist nicht klein.* o Verbkonjugation*: gefallen* o Trennbare Verben: *Timo steht früh auf.* o Verbkonjugation: *sehen, arbeiten.* o Verbposition im Satz o Präpositionen *am, um, von...bis: Am Sonntag um acht Uhr.* o Akkusativ: *den Salat, einen Tee, keinen Saft.* o Ja- / Nein-Frage und Antwort: *ja, nein, doch* o Verbkonjugation: *lesen, treffen, schlafen, fahren, nehmen, „möchten“* o Modalverben*: können, wollen*	

	o Satzklammer: *Ich kann nicht tanzen.* o Perfekt mit *haben: hat...gelernt* o Perfekt mit *sein: ist...gefahren* Form 2 – Topics: o Beruf und Arbeit Berufe benennen und erfragen. o Informationen über Vergangenheit und Gegenwart austauschen. Von Ereignissen und Aktivitäten in der Vergangenheitberichten. Praktikumsbörse: Anzeigen verstehen. Ungewöhnliche Berufe. Kurztexte verstehen. o In einer fremden Stadt Anweisungen geben / Abläufe erklären. Anweisungen und Ratschläge geben. Über Erlaubtes / Verbotenes und Regeln sprechen. Informationsbroschüren verstehen. An der Hotelrezeption: nachfragen, um Erklärungen und Verständnishilfen bitten. o Gesundheit Körperteile benennen. Über das Befinden sprechen. Über das Befinden anderer sprechen.Das Aussehen beschreiben. Anweisungen und Ratschläge geben und verstehen. Einen Brief (Anfrage) schreiben. Einen Termin vereinbaren. o In der Stadt unterwegs Nach dem Weg fragen und den Weg beschrieben. Verkehrsmittel benennen. Ortsangaben machen. Orte und Richtungen bestimmen. Fahrpläne: Informationen entnehmen. Durchsagen verstehen. Am Bahnhof: um Auskunft bitten. o Der Kunde ist König o Zeitangaben verstehen und machen	

	Zeitliche Bezüge nennen. Um Serviceleistungen bitten. Höfliche Bitten und Aufforderungen ausdrücken. Einen Informationstext verstehen. Schriftliche Mitteilungen und Telefonansagen verstehen.o Neue Kleider Kleidungsstücke benennen und bewerten.Gefallen / Missfallen ausdrücken. Vorlieben und Bewertungen ausdrücken. Einen Zeitungsartikel verstehen. Vorlieben erfragen, eine Auswahl treffen.Im Kaufhaus: um Hilfe / Rat bitten. o Feste Das Datum erfragen und nennen. Über Personen und Dinge sprechen.Gründe angeben. Einen Termin schriftlich absagen und zusagen. Einladungen lesen und schreiben. Feste nennen. Glückwünsche ausdrücken.Form 2 – Grammar: o Wortbildung Nomen: *der Lehrer die Lehrerein;* *der Kaufmann die Kauffrau* o Präteritum *sein, haben: war, hatte* o Modalpräposition *als: Ich arbeite als Programmierer.* o Temporale Präpositionen *vor, seit für: vor einem Jahr.* o Modalverben: *müssen, dürfen.* o Satzklammer: *Sie müssen einen Tisch reservieren.* o Pronomen *man.* o Imperativ: *Gehen Sie zur Touristeninformation.* o Possessivartikel: *dein, sein, ihr, unser...* o Modalverb *sollen* o Satzklammer: *Wir sollen zu Hause bleiben.* o Präposition mit: *Ich fahre mit dem Auto.* o Lokale Präpositionen *an, auf, bei, hinter, in, neben, über, unter, vor, zwischen:* *Wo...? – Auf dem Parkplatz.*	

	o Lokale Präpositionen *zu, nach, in: Wohin...? - Zum Buchladen.* o Temporale Präpositionen *vor, nach, bei, in: Wann...? – In einer Stunde.* o Temporale Präpositionen *bis, ab: Ab wann...? - Ab morgen.* o Höflichkeitsform Konjunktiv II: *würde, könnte.* o Satzklammer: *Könnten Sie bitte Kaffee kochen?* o Verben mit verschiedenen Präfixen*: an-, aus-, auf-, zumachen.* o Demonstrativpronomen *der, die das: der Rock Der ist super!* o Frageartikel *welch-: Welches Hemd?* o Demonstrativpronomen *dies-: Dieses Hemd gefällt mir.* o Komparation *gut, gern, viel.* o Verbkonjugation: *mögen.* o Personalpronomen im Dativ: *mir, dir,…* o Verben mit Dativ: *gefallen, gehören, passen, stehen.* o Ordinalzahlen: *der erste...* o Personalpronomen im Akkusativ: *mich, dich...* o Konjunktion *denn* o Verbkonjugation: *werden.*	
Reference Book: As per the A1 German Language norms.		

RM-MMI106	Research Methodology	TOTAL HOURS: 60
CREDIT I	**Computer** i) History and generations of computers; Hardware; CPU, input, output, storage devices, classifications of computers; analog computers, digital computers, mainframe computers, miniframe computers, microcomputers. Internet related programmes. ii) Memory: Primary memory or main memory; magnetic core memory, RAM, ROM, PROM, EPROM, EEPROM, Secondary memory or auxillary memory. iii) Modern computers: Workstations, parallel processing computers, super-computers and servers for analysis of biological data. iv) Computer Number system,fundamentals of logical concepts v) Machine level languages, assembly level languages, high level anguages.	**15**
CREDIT II	**Foundation of Research and Research Design** i) Characteristics of scientific Research ii) Formulation of Research Problem iii) Research Process, Literature Review iv) Sampling, Data collection, Data Analysis, Report writing. v) Concept and features of Research Design, Types of Research Design vi) Concept of cause and effect, Correlation and Causation, Types of variables	**15**
CREDIT III	**Hypothesis Testing, Data Measurement and Statistical Data Analysis** i) Definition, Research Hypothesis, Statistical Hypothesis, ii) Qualities of Good Hypothesis, Hypothesis Testing iii) Measuring of Data, Primary Data, Secondary data, iv) Measurement Techniques, Attitude Scaling Techniques v) Sampling types, Cleaning of data, Coding, editing vi) Tabular presentation of data, Frequency tables vii) Univariable Analysis, Bivariable Analysis viii) Linear Regression Analysis, Test of Significance	**15**
CREDIT IV	**Health Science Informatics** i) Introduction to information, scope, components of heath care informatics; standardized languages in practice. ii) Health IT architecture; information technology architecture models in health care organization, service oriented structures. Concept of bio-signal processing and medical imaging. **Communication Skills** iii) Basic process of communication; Types – verbal, nonverbal, channels, barriers. Aggressiveness, Assertiveness and submissiveness. Active listening, iv) Modern tools of communication,Essential element of business communication: letters, minutes of the meeting, CV preparation, presentations, Interview skills.	**15**

Reference Books:

1) Computer Fundamentals, 6th Edition, P. K. Sinha and Priti Sinha, BPB Publications, 2007.
2) Epidemiological Research Methods (1996) Don McNeil. New York : John Wiley
3) Epidemiology and Statistics for Public Health Research (2018). Broschiertes Buch. Lap Lambert Academic Publishing
4) Medical Biostatistics 4th Edition (2017) Abhaya Indrayan, Rajeev Kumar Malhotra Chapman & Hall/CRC Biostatistics Series, CRC Press
5) Principles of Biostatistics 2nd Edition (2018) Marcello Pagano, Kimberlee Gauvreau, CRC Press
6) Biostatistics: The Bare Essentials, 3rd Edition (2007) Geoffrey R. Norman, David L. Streiner PMPH publishers USA

P-MMI104	**Laboratory Course I (4 Cr): (TOTAL HOURS: 60)**
	i) Computer basic knowledge; hardware, connection cables, typing, Windows98/XP, Internet browsers, search engines. ii) LAN connections, setting up the IP address, network security. Internet surfingand searching information, downloading and installing software. iii) Hands on session with Microsoft Word. iv) Microsoft Excel (Spreadsheet Application). v) Hands on session with Microsoft Access (Database related applications). vi) Creation of computer presentation with MS Power Point. vii) Introduction to Oracle for creation of database. viii) Introduction to literature database at NCBI and querying the PUBMEDdatabase using the ENTREZ search engine. ix) Getting the amino acid sequences by exploring and querying the protein sequence database. x) Getting the gene sequences by exploring and querying the nucleic acid databases. xi) Introduction to RCSB PDB database. xii) 3-D Protein structure visualization and measurement of bond length, bondangle and torsion angles using graphics and command line RasMol. xiii) Analysis of Drug-receptor interactions using Chimera. xiv) Introduction to small drug molecule databases eg. PubChem, ZINC. xv) Similarity search using the Blast and interpretation of the results. xvi) Pair-wise and multiple sequence alignment by using ClustalW.

	xvii) Introduction of BioEdit. xviii) Protein Structure Prediction (Homology Modeling) using SPDBV.

P-MMI105	**Laboratory Course II (2 Cr) (TOTAL HOURS: 30)**
	i) Model Building and Energy minimization. ii) Calculation of molecular properties of drug molecules using SPARTAN. iii) Introduction UNIX/LINUX commands. iv) Data transfer; ping, telnet, ftp. v) Drug-receptor structure stability using molecular dynamics simulationwith the help of GROMACS. vi) Molecular Docking and Drug designing by using AutoDock. vii) Toxicity analysis using ADMET SAR online tool. viii) Pharmacokinetic analysis of drug molecule using T.E.S.T QSAR analysis of drugs using T.E.S.T.

Semester II

MMI201	Clinical Data and Quality Management (4 Cr)	TOTAL HOURS: 60
CREDIT I	**Introduction to Clinical Research** i) Introduction and features ii) Outcome measures iii) Responsibilities and study documents iv) Ethics in Clinical Research	**15**
CREDIT II	i) Introduction to GCP ii) Role of Investigators iii) Clinical Trial Protocol iv) CRF (Case Report Format) v) Informed consent	**15**
CREDIT III	**Regulatory Affairs** i) CRF ii) ICH Guidelines for Clinical Trials iii) Documentation iv) Pharmacovigilance and Clinical Trials v) Drugs Approval Process	**15**
CREDIT IV	**Information Management in Hospitals** i) Necessity of Standards of electronic health ii) Security issues iii) Healthcare Information Regulations of Standards iv) Health Record and Privacy v) Health Level Standards – HL7 vi) Integrated Health Information Systems **Hospital Information Systems** i) Definition, Structure and Application ii) System Advantages iii) Nursing Informatics iv) Automated Clinical laboratory Systems v) Pharmacy Information Systems vi) Electronic Health	**15**

Reference Books:

1) Clinical Data Management 2nd Edition (2000) Richard K. Rondel, Sheila A. Varley, Colin F. Webb. Wiley publishers
2) Principle and Practice of Clinical Research 4th edition (2017) John Gallin, Frederick Ognibene & Laura Lee Johnson. Elsevier academic press
3) Healthcare Information Management Systems Cases, Strategies, and Solutions. Ball, Marion J., Weaver, Charlotte A., Kiel, Joan M. 3rd edition (2004) Springer-Verlag New York

MMI202	**Clinical Quality Management-I (4 Cr)**	**TOTAL HOURS: 60**
CREDIT I	**Introduction to Quality Management** i) Concept of Quality ii) Quality Systems iii) Quality Audits iv) Quality Control, Quality Assurance, v) Total Quality Management (TQM)	**15**
CREDIT II	**Quality Management Tools** i) Site Level Quality Management ii) Quality Management Data Review Tool iii) Quality Management study wise Review Tool iv) Quality Management Summary Report v) Subject Record Review	**15**
CREDIT III	**Quality Assurance and Pharmacovigilance (PV)** i) General Introduction of PV ii) Principles of PV iii) PV and selected organ clone iv) Pharmacovigilance systems iv) Guidelines and laws governing PV	**15**
CREDIT IV	**Pharmacovigilance Global Perspectives** i) Global PV and safety standards ii) Global regulations and guidelines iii) GCP/GMP/GLP guidelines for PV iv) Global audits **Quality Management Indian Perspectives** i) Epidemiology and Evidence Based Medicine ii) Drug Regulatory Authority iii) Guidelines for Pharmaceuticals iv) Guidelines for Neutraceuticals, Cosmetics v) Guidelines for Herbal and Alternative Medicine	**15**

Reference Books

1. A Practical Guide to Quality Management in Clinical Trial Research 1st Edition (2005) Graham Ogg. CRC Press

E-MMI203	Clinical Data Management-I (4 Cr)	TOTAL HOURS: 60
CREDIT I	**Data Acquisition (DAQ)** i) Importance of Data ii) Data Storage iii) Data Safety iv) Role of Data in Public Health Politics v) Data and Epidemiology studies	**15**
CREDIT II	**Clinical Data Management** i) CDM Process ii) Collection, Integration, and availability of Data iii) Verification, Validation and quality control iv) Software's for CDM v) Clinical Trial Phase wise Data Management	**15**
CREDIT III	**CRF (Case Report Form)** i) CRF and ECRF ii) CRF Requirements ICH Guidelines iii) ICH Guidelines iv) Disease wise CRF v) Comparative study of Indian and Global CRFs	**15**
CREDIT IV	**Document Management System** i) HIS (Hospital Information Systems) ii) Document Management and work Management systems iii) Archiving Systems iv) Clinical Trial Management Systems v) PRO systems (Patient Reported Outcomes) **Hospital Management Systems in India** i) Present Scenario ii) NABH Guidelines for QC and QA iii) Role of HIS in Government Policy making iv) Public Health and HIS v) Private Hospital and HIS	**15**

Reference Books:-

1. Practical Guide to Clinical Data Management. Susanne Prokscha 3rd edition (2011), CRC Press

P-MMI204	Laboratory Course III (4 Cr): (TOTAL HOURS: 60)
	i) Introduction to Didactics ii) Different Didactic Skills iii) Didactic Methodology iv) Different models v) Role of counseling vi) Counseling in clinical Trials vii) Motivational interview viii) Motivation and Psychology ix) Seminar activities x) Types and Methods xi) Case studies xii) CTMS xiii) ePro

P-MMI205	Laboratory Course IV (2 Cr): (TOTAL HOURS: 30)
	i) Basics of HRM ii) Function of HRM iii) Theories of HRM iv) HRM in Clinical Trials v) HRM in Healthcare vi) Role of HRM in corporate hospitals vii) eHRM viii) Software for eHRM ix) Cost, Benefits Ratio of HRM

OJT-MMI206 OR FP-MMI206	On Job Training (4 Cr) (60 Hrs) 100 Marks OR Field Project (4 Cr)

Shivaji University, Kolhapur
Department of Biochemistry

M. Sc. Medical Information Management Course

- **Eligibility:** A candidate possessing B.Sc. degree in Science (Chemistry/ Physics/ Electronics/ Nanoscience and Technology/ Statistics/ Mathematics/ Biochemistry/ Biotechnology/ Microbiology /Bioinformatics/ Botany/ Zoology / Nursing / Computer Sciences/ Life Sciences/ Agriculture Sciences/ Veterinary Sciences);/ B.Pharm./B.E./B.Tech./B.A.M.S./B.H.M.S./B.D.S./M.B.B.S.) who have passed the entrance examination conductedby the Shivaji University, Kolhapur shall be held eligible for admission to M.Sc. in Medical Information Management course. Students from other Universities with above mentioned degrees and who have passed the entrance examination conducted by the University are also eligible.
- Admission for the M. Sc. Medical Information Management course will be given as per Shivaji University rules and regulations.
- Exit Option after level 6: Students can exit after level 6 with **Post Graduate Diploma in Medical Information Management** if he/she completes the courses equivalent to minimum 44 credits.

❖ **Nature of Theory Question Paper:**

Total Marks: 80

Instructions: 1) Question No. 1 is **COMPULSORY**.

2) All questions carry **EQUAL** marks.

3) Solve any **FOUR** questions such that at least **TWO** questions must be from **EACH** section.

Q. 1 Objective (16 Marks)

16 one line answer type questions

SECTION-I

Q.2 Essay type question (16 Marks)

Q.3 Essay type question (16 Marks)

Q.4 Essay type question (16 Marks)

SECTION-II

Q.5 Write notes on (2 x 08 Marks)

2 sub questions

Q.6 Write short notes on (4 x 04 Marks)

4 sub-questions

Q.7 Write short notes on (4 x 04 Marks)

4 sub-questions

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1. Internal exam will be of 20 marks having 20 questions.
2. Each theory paper has 100 marks. University exam will be of 80 marks and internal exam will be of 20 marks.
3. University exam will be of 3 hours.
4. Practical exam will be conducted after theory exam.
5. Each theory paper has 4 lectures per week of 60 minutes.
6. The practicals and research project will be conducted 3 hours per day for five days.
7. Seminar will be conducted for 2 hours per week.
8. There should be at least 15 weeks of actual teaching in each semester as per the UGC requirement. The department should prepare academic calendar of teaching lecture hours. Workload is as per UGC & State Govt. norms.
9. The evaluation scheme will consist of internal and external evaluation, wherever applicable. The exam pattern will be of 80:20, i.e.80 marks for external examination conducted by University and 20 marks for internal examination conducted by department.
10. The standard of passing Examination Ordinances and Rules will be applicable as per the existing system.
11. The examination will be conducted as per the rules and regulations of Shivaji University which are applicable at that time.