एम. ए. भाग दोन - सत्र चार

कौशल्यावर आधारित अभ्यासपत्रिका (Skill Based)

मुद्रितशोधन व ग्रंथ प्रकाशन कौशल्ये

उद्दिष्ट्ये

1.मुद्रितशोधन व ग्रंथ प्रकाशन ही कौशल्ये आत्मसात करणे.
2. लेखनविषयक नियम व मुद्रितशोधन यांची उपयुक्तता समजावून घेणे.
3. मुद्रितशोधन कौशल्य उपयोजनाची विविध क्षेत्रे अवगत करून घेणे.
4. ग्रंथनिर्मिती प्रक्रिया समजून घेणे.

अ. क्र.	घटक	तासिका	श्रेयांक	गुण
विभाग१. Module 1	**मुद्रितशोधन व लेखनविषयक नियम :** अ) प्रमाणलेखनाची आवश्यकता ब) प्रमाणलेखन विषयक नियम क) मराठी विरामचिन्हांचा परिचय	१५	१	२०
विभाग २. Module 2	**मुद्रितशोधन : स्वरूप व महत्त्व** अ) मुद्रितशोधनाचे स्वरूप व मुद्रितशोधनाच्या खुणा ब) मुद्रितशोधन : उपयोजनाची विविध क्षेत्रे क) प्रात्यक्षिक	१५	१	२०
विभाग ३. Module 3	**प्रकाशन व्यवहार** अ) ग्रंथप्रकाशनासाठीचे आवश्यक गुण ब) ग्रंथ प्रकाशन संस्था : स्वरूप व कार्यप्रणाली क) स्वामित्व हक्क कायदा(कॉपीराईट ॲक्ट)	१५	१	२०
विभाग ४. Module 4	**ग्रंथनिर्मिती प्रक्रिया** अ) ग्रंथनिर्मिती प्रक्रियेतील विविध टप्पे ब) संपादकीय संस्कार क) प्रात्यक्षिक	१५	१	२०
	एकूण	६०	०४	८०

संदर्भग्रंथ :

1. मराठी लेखन कोश - अरुण फडके, केशव भिकाजी ढवळे प्रकाशन, पुणे,२००१
2. मराठी लेखन मार्गदर्शिका - यास्मिन शेख, राज्य मराठी विकास संस्था, मुंबई. २०१७
3.मराठीच्या प्रमाण भाषेचे स्वरूप, कॉन्टिनेन्टल, पुणे, १९८३
4.मराठी व्याकरण - लीला गोविलकर,मेहतापब्लिकेशन,पुणे,१९९३
5.सुगम मराठी व्याकरण व लेखन - मो. रा. वाळिंबे, नितिन प्रकाशन,पुणे २०१७ (५३ वी आवृत्ती)
6.सुलभ मराठी व्याकरण व लेखन - पद्मिनी बिनिवाले, नवनीत, मुंबई,
7. शुद्धलेखन नियमावली- भाषा संचालनालय, महाराष्ट्र शासन, मुंबई,१९८७
8. मराठी शुद्धलेखन प्रदीप - मो.रा. वाळंबे, नितीन प्रकाशन, पुणे
9. व्यावहारिक मराठी - ल. रा. नसिराबादकर, फडके प्रकाशन, कोल्हापूर, २००८.
10. ग्रंथ व्यवहार - दशा आणि दिशा, अनिल कुलकर्णी,साहित्य चपराक, पुणे,२०१७.
11. प्रकाशन व्यवसाय परिचय, शरद गोगटे,अखिल भारतीय मराठी प्रकाशक संघ,पुणे
12. मराठी ग्रंथ प्रकाशनाची 200 वर्ष, शरद गोगटे, राजहंस प्रकाशन, पुणे, २००८.
13. ग्रंथव्यवहार, अ. ह. लिमये, व्हीनस प्रकाशन, पुणे, १९५२.
14.पॉप्युलर रीतिपुस्तक,रामदास भटकळ, मृदुला जोशी, पॉप्युलर प्रकाशन, पुणे.२०१५.
15. प्रकाशन व्यवहार आणि संपादन, उज्ज्वला भोर, प्रशांत पब्लिकेशन, जळगाव, २०२०.

COC FOR M.A. –II YEAR HINDI

VIGYAPAN

वालचंद कला एवं विज्ञान महाविद्यालय(स्वायत) , सोलापुर .

हिंदी विभाग

प्रमाणपत्र पाठ्यक्रम का नाम	क्रेडिटस	लेक्चर्स	विद्यार्थी पात्र
विज्ञापन	04	60	**एम. ए. –I**

1. **प्रमाणपत्र पाठ्यक्रम का नाम :- विज्ञापन**

2. **प्रस्तावना :-**

वर्तमान युग को बाजारवाद का युग कहा जाता है। इसलिए अर्थशास्त्र के सिध्दांत की बात करें तो मांग और पूर्ती के आधार पर किसी भी वस्तु का मूल्य तय होता है। इसलिए उस वस्तु के मूल्य में वृध्दि हेतु विज्ञापन बहुत बड़ा किरदार आदा करता है। इस कारण विश्वभर में विज्ञापन का बोलबाल है। जो कई सारे रोजगार के अवसर की ओर हमें इगत करता है। इस वजह से भाषा एवं साहित्य के छात्रों को इस क्षेत्र की ओर आकर्षित करना इस प्रमाणपत्र पाठ्यक्रम का मुख्य लक्ष्य है।

3. **उद्देश्य :-**

1. विज्ञापन के स्वरूप से परिचित कराना।
2. विज्ञापन प्रक्रिया को समझाना।
3. विज्ञापन एवं उससे संबंधित क्षेत्रों के जनसंपर्क एवं कॉर्पोरेट संचार के क्षेत्रों की मूलभूत एवं उभरती हुई अवधारणाओं तथा सिद्धांतों की जानकारी देना।
4. विज्ञापन लेखन की क्षमता विकसित करना ।
5. विज्ञापन के अनुवाद से अवगत कराना।
6. विज्ञापन की भाषा से अवगत कराना।
7 विज्ञापन के माध्यम से रोजगारपरक कौशल विकसित करना ।

4 . **साध्य :-**

प्रस्तुत पाठ्यक्रम संपन्न करने के बाद विद्यार्थियों में निम्न कुशलताओं का विकास होगा -

1. छात्र विज्ञापन कला से परिचत हो जायेंगे।
2. विज्ञापन की प्रक्रिया को समझ पायेंगे।
3. विज्ञापन एवं उससे संबंधित क्षेत्रों के जनसंपर्क एवं कॉर्पोरेट संचार के क्षेत्रों की मूलभूत एवं उभरती हुई अवधारणाओं तथा सिद्धांतों से परिचित होंगे।
4. छात्रों में विज्ञापन लेखन की क्षमता विकसित होगी।
5. छात्र विज्ञापन के अनुवाद से परिचित होंगे।
6 छात्र विज्ञापन की भाषाई सामर्थ्य को समझ सकेंगे।
7. छात्रों में विज्ञापन के अध्ययन से रोजगारपरक कौशल विकसित होगा।

5 . **योग्यता :-**

स्नातकोत्तर भाग एक में पढनेवाला कोई भी सोलापुर शहर का विद्यार्थी इस पाठ्यक्रम में प्रवेश लेने के लिए पात्र माना जाएगा ।

6 . **पाठ्यक्रम**		
इकाई क्रं	**इकाई**	**क्रेडिट्स**
1	1 **प्रस्तावना**	01
	1 विज्ञापनः अर्थ, परिभाषा एवं स्वरूप	
	2. विज्ञापन की अवधारणा एवं सामाजिक पक्ष	
	3 विज्ञापन का महत्त्व एवं उद्देश्य	
2	1. विज्ञापन के तत्त्व	01
	2. विज्ञापन के माध्यम	
	3. विज्ञापन की आचारसंहिता	
	4. विज्ञापन कला	
3	1. विज्ञापन का भाषिक विवेचन	01
	2. विज्ञापन की भाषा	
	3. विज्ञापन भाषा की विशेषताएँ	
	4. विज्ञापन भाषा के गुण और लक्षण	
4	1. विविध विज्ञापनों का लेखन मुद्रित और दृक-श्राव्य	01
	2. विज्ञापन लेखन कला	
	3. विज्ञापन एजेंसी	
	4. विज्ञापन का अनुवाद	
	प्रात्यक्षिक (चित्र , वस्तुओं के आधार पर)	
	कुल लेक्चर्स	60

8 .अवधि -

इस प्रमाणपत्र पाठ्यक्रम का अवधि चार महिने का होगा । हर सप्ताह में चार तासिकाएँ आयोजित की जाएगी । पूरा पाठयक्रम 60 तासिकाओं में पूर्ण किया जाएगा ।

9 . शुल्क रचना :-

प्रस्तुत पाठ्यक्रम के लिए हर विद्यार्थी के लिए संपूर्ण कोर्स का शुल्क रू . ..... /- रहेगा ।

10. **मूल्यांकन :-**

पाठयक्रम पूर्ण होने के बाद विद्यार्थियों का मूल्यांकन निम्न पद्धती से होगा -

1 . लिखित परीक्षा - 60 अंक

2 . विज्ञापन प्रात्याक्षिक - 40 अंक

कुल अंक - 100 अंक

11 . संदर्भ संकेत :-

संदर्भ ग्रंथ :

1. बलदेवराज गुप्त, भारत में जनसंपर्क विश्वविद्यालय प्रकाशन, वाराणसी

2. रामचंद्र तिवारीए विज्ञापनः व्यवसाय एवं कला, आलेख प्रकाशन, दिल्ली

3. डॉ. निशांत सिंह, विज्ञापन प्रबंधन, ओमेगा प्रकाशन, नई दिल्ली

4. डॉ. कृष्णकुमार रत्तू, विश्व मीडिया बाजार, नेशनल पब्लिशिंग हाउस, नई दिल्ली

5. डॉ. मधु धवन, विज्ञापन कला, वाणी प्रकाशन, नई दिल्ली

6. डॉ. प्रेमचंद पातंजलि, आधुनिक विज्ञापन

6. .www.rajbhasha.nic.in

7. hindi.indiawaterportel.org.vontent/vajanapana

।। शिक्षण हाच धर्म ।।

Shri Aillak Pannalal Digambar Jain Pathashala's

(Jain Minority Institute)

WALCHAND COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS), SOLAPUR

(Affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur)

Syllabus

Name of the Faculty: Humanities

Name of the Course: Skill Enhancement Certificate Course

Title: "Spoken and Written English"

With effect from 2022-23

Walchand College of Arts and Science (Autonomous), Solapur

Department of English

Syllabus of the Skill Enhancement Certificate Course for BA First Year Students

Name of the Certificate Course	**Credits**	**Lectures**	**Practical: Library Work, Project, etc**	**Eligible students**
"Spoken and Written English"	04 (60 Contact Hours)	45	15	Students of B.A. First Year

1. Title of the Certificate Course: "Spoken and Written English"

2. Introduction: In the present globalized world, English has become an international language in the widest sense of the word. And acquisition of the spoken and written skills in English is one of the necessary requisites for the students seeking employment in various sectors. This certificate course is an attempt at inculcating spoken and written skills English. There are included components which will help the students develop their skills in spoken and written English. This course is quite complementary to the curricular pursuits of the students doing under-graduation.

3. Course Objectives:

1. To develop spoken English skills of students
2. To help students acquire written skills in English
3. To make the students familiar with realizing these skills in day-to-day life

4. Course Outcomes: After completion of this course the students will

1. know the skills involved in spoken English.
2. understand the written skills in English.
3. do various tasks in spoken and written English.

5. Eligibility: The students doing BA First Year with any subjects may take this course.

6. Fee Structure: The fee structure of the Course will be decided by the Academic Council of the College.

7. Syllabus: The syllabus for the Course will be as follows: {60 Lectures= 45 Theory + 15 Practical}

Syllabus of "Spoken and Written English"

Contents	Components	Theory	Practical
1. Introduction	Definitions & Types of Communication	05	--
2. Spoken English	Using correct language and other grammatical components	04	--
-"-	Conversations-Pair/Group, Role Play, Prepared Speech, Extempore Speech	08	06
3. Interview Techniques	Types, Important guidelines	05	--
-"-	Mock Interviews	--	03
4. Group Discussion	Definition, Important guidelines	04	--
-"-	Mock Group Discussions	02	03
5. Writing Skills	Words, Phrases, Clauses, Sentence Formation Theme-based writing, Common Errors	10	--
6. Types of Writing	Letters, C.V., Resume, Summarizing, Report	07	03
	Total	45	15

8. Evaluation - After completion of the syllabus, exams will be conducted in the following manner: **Total**: 50 marks

1. Theory- 40 marks

2. Practical - 10 marks (Spoken and Written)

9. References:

1. Mitra, Barun (2016) "Personality Development and Soft Skills" 2nd Edition, Oxford University Press, India

2. Kumar, Sanjay (2015) "Communication Skills" Oxford University Press, India

3. Chauhan, Gajendra Singh & Sangita Sharma (2015) "Soft Skills: An Integrated Approach to Maximize Personality" Wiley, India

4. Narula, S.S. (2011) "Personality Development and Communication Skills" Taxmann Publications Private Limited, Mumbai

5. Greenbaum, Sidney & Randolph Quirk (2001) "A Student's Grammar of English Language" Longman, London

6. Leech, Geoffrey & Jan Svartvik (2001) "A Communicative Grammar of English" Longman, London

7. Fowler, H.W. (1965) "Modern English Usage" Oxford University Press, London

8. Sethi J. & P.V. Dhamija (2006) "A Course in Phonetics and Spoken English" 2nd Edition, Prentice Hall of India, New Delhi

9. Roach, Peter (2010) "English Phonetics and Phonology: A Practical Course" Cambridge University Press, England

10. O'Brian, Terry (2014) "The Ultimate Book of Common Errors in English" Rupa Publications, India

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Shri Aillak Pannalal Digambar Jain Pathashala's

(Jain Minority Institute)

WALCHAND COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS), SOLAPUR

Syllabus

Affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Syllabus

Choice Base credit System

Name of the Faculty: Humanities

Name of the Course: M. A. Part - II (Sem. IV) Add on Course

Subject: Political Science

With effect from 2022-23

Walchand College of Arts and Science, Solapur (Autonomous College)

M.A. Part II Political Science

SEM - IV

Name of the course: Add on course

Political Process and Journalism

Total Periods 80 L 60+T 20 =80 Marks (UA 80+CA 20=100) Credits – 4

Course Objective / Outcome:

This course will introduce the students to the role of media in the context of Indian political process. Right to communication is now seen as a fundamental right. The main goal of this syllabus is to acquaint the students with media and help them acquire media skills.

Unit I Journalism: Definition, Nature & Scope

Unit II Journalists and their characteristics, Duties, Rights and Responsibility

Unit III Politics and election- Nature of political news, Sources of political news, election news etc.

Unit IV Right to information and Panchayat Raj, Role of Media in Electoral Politics

Reference Books:

1) पाधे प्रभाकर, (अन. प्र.ना. परांजपे), पत्रकारीतेची मुलतत्त्वे, १९९९

2) पवार सुधाकर, वृतपत्र व्यवसाय काल आणि आज, १९८६

3) ताम्हाणे चंद्रकांत, वार्तासंकलन, पॉप्युलर प्रकाशन, मुंबई.

4) धारुरकर वि.ल., आजकालची पत्रकारीता, चैतन्य प्रकाशन, औरंगाबाद.

5) धारुरकर वि. ल., जनसंवाद सिद्धांत, चैतन्य प्रकाशन, औरंगाबाद.

6) डोळे जयदेव, समाचार अर्थात प्रसारमाध्यमांची झाडाझडती, लोकवाड.मय गृह, मुंबई.

7) माळी सुनिल बातमीदारी, राजहंस प्रकाशन, पुणे.

8) कदम प्रशांत, पंचायतराज, ग्रामीण व नागरी स्थानिक शासनसंस्था, टाटा मेघ्राहील, दिल्ली.

9) बिरमल नितिन व पवार वैशाली, महाराष्ट्रातील पंचायतरजा संस्था, डायमंड पब्लिकेशन, पुणे.

10) डॉ. रसाळ रविंद्र, वृतपत्र प्रसारः साक्षरता आणि ग्रामीण विकास, पुणे, १९९७, दास्ताने रामचंद्र अँड कंपणी.

11) K. M. Shrivastave, News Reporting and Editing, 1987, Sterling Publishers, New Delhi.

12) Right to information act, 2005

ll **शिक्षण हाच धर्म** ll

Shri Aillak Pannalal Digambar Jain Pathashala's

(Jain Minority Institute)

WALCHAND COLLEGE OF ARTS AND SCIENCE, (AUTONOMOUS) SOLAPUR

(Affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur)

Syllabus

Name of the Faculty: Humanities

Name of the Course: Certificate Course

Subject: Geography

Title: Travel and Tourism

(With effect from 2022-23)

Walchand College of Arts and Science (Autonomous), Solapur

Department of Geography

Class: B.A.-II

Credit: 04 **Total Marks:-50** **Total Lectures: -60**

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Objective:-

1. Students will understand the basic of Tourism and Travel.
2. Students will learn properties, functions and applications of Tourism and Travel thorough theory and practical.
3. Course will impact the skills amongst students which are required/ involved in Travel and Tourism.

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A) No. of Credits for Theory/Classroom Teaching Lecture:03(1Credit= 15 Lecture)

B) No. of Credits for Practical /Field Work Lecture:01(1Credit=15 Lecture)

Course contents

Unit	Name of Unit	Content	No of Lecture	Credit
	A)TheoryLecture			
I	**Introduction and Factors Affecting on Travel and Tourism**	1.Definition,Natureand Scope of Tourism 2.Recent Trends in Tourism: A)Ecotourism B) Agro tourism 3.Tourism Factors: Physical, Social & Cultural and Economic	15	01
II	**Infrastructures and Support service for Travel and Tourism, Planning of Tourism**	1.Transportation Mode 2.Agencies and guides: their functions 3.Type of Accommodation: Hotel types 4.Concept and Type of Tourism Planning 5.Problem of Tourism Planning	15	01
III	**Travel and Tourism Development**	1.Historical Background 2. Role of ITDC and MTDC in Development Tourism 3.Toursim Places in Solapur District 4. Future for Tourism Development in Solapur District	15	01
	B)Practical			
IV	**Tourism Planning and Tourist Places Visit**	**A) Practical** 1.Preparation of Tour Plan 2.Process of e-Ticketing: Air/ Bus/ Railway 3.Type of Reservation and their process: Air/Bus/Railway 4.Process of obtaining Visa and Passport **B) Tourist Places: Visit**	15	01
	Total		**60**	**04**

2. Course Fee, Rules and Regulation of Examination

1. CourseFee: The Fee structure for the present Certificate Course will be decided by the Academic Council of the College.

2. Attendance: Students will be required to complete minimum 80% attendance in theory & practical to become eligible for appearing in examination

3. Semester wise Examination: It is the majorcomponent of theevaluation system. It carries 50% weightage for Semester theory written examination and 20% weight age will be given to training and project work report 30% weightage will be given Semester wise examination. Each student has to take the examination aftercompletionofthecourse.Ifinanycasestudentdoesnotscoreapassgradethecandidatewillreappearatthenextyearend examination.

4. Conversion of Percentage into Grades:

Percentages	**Grade**
1) Below 40%	D (Fail)
2) 40-50 %	C (Pass)
3) 51-60 %	B (SecondClass)
4) 61-74 %	A (First)
5) 75%Above	O (FirstwithDistinction)

5.Examination Patterns:

Following Semester wise Examination pattern for Theory & Practical will be followed for the evaluation of the student

Written and Practical Examination

A) Theory	**Marks**
1) WrittenTest	40
B) Practical	
	10
	……..
	Total Marks: 50

3.ReferenceBooks:

Sr.No.	Name ofBook
1	BhatiaA.K.:TourismDevelopment PrinciplesandPractices;SterlingPublishers,New Delhi1996.
2	Bhatiya,A.K. InternationalTourism–FundamentalsandPractices;SterlingNewDelhi (1991).
3	Chandra R.H.:Hill Tourism Planning and Development Kanishka publishers; New Delhi (1998)
4	DharPremnath:DevelopmentofTourismandTravelIndustry,2009
5	Lea.J.:Tourism and Development in the Third World, Routledge, London1988.
6	MiltonD: Geography of World Tourism Prentice Hall,New York1993.
7	Sing Ratandeep:Infrastruction of IndianTourism,2007
8	Robinson, H.A.:Geography of Tourism, Macdonald and Evans, London, 1996.
9	SharmaK.C.:TourismPolicy,PlanningStrategy,1996
10	KhatibK.A: Paryatan Bhugol
11	Dr.Nayab Z.A:Introduction to Tourism,
12	Dr.Nayab Z.A: Tourism inIndia

Title of the Course/Paper

Certificate Course in RS, GIS and GPS

Semester- IV

MAGE24COC0122

[Credits: 4]

Walchand College of Arts and Science (Autonomous), Solapur

Choice Based Credit System: With the view to ensure worldwide recognition, acceptability, horizontal as well as vertical mobility for students completing undergraduate degree, Walchand College of Arts and Science, Solapur has implemented Choice Based Credit System (CBCS) at Undergraduate level. The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill based courses. The courses can be evaluated following the grading system, which is considered to be better than the conventional marks system. Therefore, it is necessary to introduce uniform grading system in the entire higher education in India. This will benefit the students to move across institutions within India to begin with and across countries. The uniform grading system will also enable potential employers in assessing the performance of the candidates. In order to bring uniformity in evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations.

Outline of Choice Based Credit System:

1. ***Core Course:*** A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

2. ***Elective Course:*** Generally, a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.

Discipline Specific Elective (DSE) Course: Elective courses may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective.

3. **Ability Enhancement Courses (AEC):** The Ability Enhancement (AE) Courses may be of two kinds: **Ability Enhancement Compulsory Courses (AECC)** and **Skill Enhancement Courses (SEC).** "AECC" courses are the courses based upon the content that leads to Knowledge enhancement; (i) Environmental Science and (ii) English/MIL Communication. These are mandatory for all disciplines. SEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

Credit: Credit is a numerical value that indicates students work load (Lectures, Lab work, Seminar, Tutorials, Field work etc.) to complete a course unit. In most of the universities **15 contact hours** constitute **one credit**. The contact hours are transformed into credits. Moreover, the grading system of evaluation is introduced for PG course wherein different modes of Internal Evaluation are adopted. **The candidate has to appear for Internal Evaluation of 20 marks and End Semester Examination for 80 marks during the academic year.**

Walchand College of Arts and Science, Solapur

(Autonomous)

Department of Geography

M.A. Part II

Semester IV – Certificate Course in RS, GIS and GPS

CBCS (Choice Based Credit System)

With effect from 2022

Course Credits: 04 **Allotted Lectures: 60**

1.1 Preamble:

The Geography students of M. A. Part-II can better understand all latest concepts in RS and GIS in brief but in adequate manner. RS and GIS is part of these courses deals with the study of concept and application of RS, GIS and GPS. In this certificate course also included interpolation method for predicting the value.

1.2 Objectives of the Course:

1. To make students familiars with concept of RS, GIS and GPS..
2. To give detailed knowledge about its application in geographical studies.

1.3 Learning Outcomes of the Course: The students will be able to

1. Understand the process of Remote Sensing.
2. Be able to download data from Bhuvan Portal.
3. Learn to use of QGIS software and handle of GPS instrument.
4. Be ready for individual or group project on current issues.

1.4. Programme Specific Outcomes:

1. Understand the Basic Concept of RS and GIS.
2. Understand the process of digital map making.
3. Understand the various data source for RS and GIS.

1.5 Programme Outcomes:

1. The Students are enabling to draw the map of specific region.
2. Students acquire the understanding of Remote Sensing process.
3. The students are enabling to get the latitudes and longitudes using the GPS.

1.6 Eligibility for Admission: Students who have passed B.A. Geography or similar exams will be admitted to this class.

1.7 Programme Duration: The structure of M.A. in Geography has four semesters in total covering a period of two years.

1.8 Duration of the Course: M. A. Second Year comprises two semesters. Each semester will have **four**

theory and four **practical** papers. The theory papers have 80 marks for End Semester Examination and 20 marks for Internal Evaluation for each paper. The practical papers have 40 marks for End Semester Examination and 10 marks for Internal Evaluation for each paper.

1.9 Modes of Internal Evaluation: Assignment, Seminar, Tutorial, Presentation, MCQs via Google, Field Visits, any other suitable mode along with marks for Attendance of the students.

1.10 Medium of Instruction: Marathi, English

Title of the Course/Paper

Certificate Course in RS, GIS and GPS

Semester IV

MAGE23COC0122

[Credits: 4]

Unit No.	Descriptions	No. of. Lectures	Credits
I	**Remote Sensing:** 1.1 Basic Concept of Remote Sensing 1.2 EMR and its interaction with atmosphere 1.3 Platforms and Sensors in RS	15	01
II	**GIS:** 2.1 Introduction, Components and Function of GIS 2.2 Sources of Data, Data Editing, Data Analysis 2.3 Application of GIS	15	
III	**GPS**: 3.1 Introduction ,Components of GPS 3.2 GPS Satellites, Data Receivers and Control Point 3.3 Application of GPS	15	
IV	**GIS Software:** 4.1 Overview of QGIS and toolbar 4.2 Creation of Point, Line and Polygon, Linking Data table 4.3 Georeferencing map and toposheet, mosaic and cropping toposheet 4.4 Data Collection using GPS instrument 4.5 Data Analysis: Spatial and Non Spatial 4.6 Interpolation and Network Analysis	15	01
V	**Satellite Data Analysis:** 5.1 Data Download from Bhuvan and other source 5.2 DEM and its application 5.3 LISS-III data download, composite image, image Analysis- Supervised and Unsupervised 5.4 Map Composition	15	01
VI	**Project**	15	01

Reference Books

Sr. No.	Name of Books
1	Barrett E.C. and L.F. Curtis (1992): Fundamentals of remote sensing and air photo interpretation – Mcmillon, New York
2	Basudeb Bhatta (2016): Remote Sensing and GIS, Oxford University Press, New Delhi.
3	Curran Paul. J. (1985): Introduction of remotes sensing, londman, London.
4	Comphell J. (1989): Introduction to remote sensing, Fuildord, New York.
5	Kang-Tsung Chang (2017): Introduction to Geographic Information Systems, McGraw Hill Education (India) Private Ltd. Chennai
6	Lillesand I. M. and Kiefer R. W. (1979): Remote sensing and image interpretation, John Willey & Sons New York
7	Leuder D.R. (1959): Areal Photographic interpretation, Mc grew Hill Book Company, New York.
8	Saini R. R. Kalwar S. C. (1991): Remote sensing in geography, pointer Publishers, Jaipur.
9	Sabins F. F. Jour (1987): Remote sensing principal of interpretation, (II edition) W.H. Freeman and Company, New York.
10	Ian, Haywood & others (2006): Geographical Information System, pearson Education, Inc., Delhi.
11	Jamwal, Anil K. (2008): Geographical Information System, Jnanada Prakashan, New Delhi.
12	Kakoli Saha and Yngve K. Froyen (2021): Learning GIS Using Open Source Software- An Applied Guide for Geo-spatial Analysis, Routledge Taylor and Francis Group, South Asian Edition.

Question Paper Pattern (for M.A. Part II)

M. A. – II (Semester- IV)

Geography: Revised Syllabus (CBCS)

(To be introduced from June 2022)

End Semester Examination- 80 Marks (Max. Time 3.00 Hours)

{Project- 20 Marks}

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Introductions:

1. *Q. Nos. 1 and 2 are compulsory.*
2. *Attempt any three questions from Q. No. 3 to Q. No. 7*
3. *Figure to the Right indicates full marks.*

****

Que.1 A) Choose correct alternative (10 MCQ) 10 marks
(With four options each)
B) Fill in the blanks OR Write true/false (6 Que.) 06 marks

Que. 2 Answer the following (4 X4) 16 marks
A)
B)
C)
D)

Que.3 Answer the following (8+8) 16 marks
A)
B)

Que. 4 Answer the following (8+8) 16 marks
A)
B)

Que.5 Answer the following (8+8) 16 marks
A)
B)

Que.6 Answer the following (8+8) 16 marks
A)
B)

Que.7 Answer the following (8+8) 16 marks
A)
B)

.....

Shikshan Haach Dharma

S. A. P. D. Jain Pathashala's

(Jain Minority Institute)

Walchand College of Arts & Science, Solapur

(Autonomous)

Affiliated to P.A.H. Solapur University, Solapur

Name of the Faculty: Science & Technology

NEW CHOICE BASED CREDIT SYSTEM

Syllabus: Career Oriented Course

Name of the Course: Sophisticated and Advanced Instrumentation For Industry

(Syllabus to be implemented from w.e.f. June 2022-23)

Walchand College of Arts and Science (Autonomous), Solapur.
Certificate Course in Advanced Instrumentation
Run by Department of Chemistry

Syllabus for skill based programme
Sophisticated Advanced Instrumentation in Industry
Year 2022-23

Eligibility: B.Sc.-III
Duration: 60 Lectures
Total No. of Credits: 4 (1 credit = 15 hours)
Total Hours: 60 hours
Theory – 1.5 Credits
Practical – 1.5 Credits
Training and Project – 1 Credit

No. of credits for theory / Class room / Practical/ Training / Project work Teaching

No. of credits for theory: 1 credit (1.5 credit=23 hours)
No. of credits for Practical: 2 credit (1.5 credit=23 hours)
No. of credits for Training / Project work: 1 credit (1 credit=15 hours)

Course Objective:

- To make the students review the instruments used for measurement of basic process parameters like level, flow, pressure and temperature.
- To explore the various types of analyzers used in industrial applications.
- To make the students to understand the requirement of safety instrumented system, standards and risk analysis techniques
- To make students familiarize with Instrumentation Symbols, Abbreviations and Identification for Instruments, Process Flow diagrams, Instrument Loop diagrams, Instrument Hookup diagrams and Piping and Instrumentation Diagrams.

Syllabus (Theory)

1. Introduction to Technology [7 Lectures]

An introduction to technology including career exploration, history and applications of technology, Industrial biotechnology and laboratory safety practices.

2.Instruments for Analysis [8 Lectures]

Thermal Methods of Analysis: Principles, instrumentation and applications of Thermo gravimetric Analysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC) X-Ray Diffraction Methods: Origin of X-rays, basic aspects of crystals, X-ray Crystallography, rotating crystal technique, single crystal diffraction, powder diffraction, structural elucidation and applications.

2. Introduction to Instrumentation Laboratory and Safety measurements [7 Lectures]

Laboratory operations, management, equipment, instrumentation, quality control techniques, and safety procedures. Includes Standard operating protocols and General laboratory practices in using pH meters, mixing buffers, performing measurements, preparing solutions, and performing separation techniques.

3. Advanced technology Laboratory Instruments [8 Lectures]

Theory, applications, and operation of various analytical instruments. Addresses the production, purification, separation and identification techniques using following instruments: Electronic weighing Balance, Colorimeter, Cooling Centrifuge, pH meter, Autoclave, UV-Vis, NIR Spectrophotometer, Magnetic Stirrer,

Syllabus for practical (As per theory) [1.5 Credit]

Practicals (Any 08) [23 Hours]

Refractometry

1. To determine the structure of given Organic Liquids

pH metry:

2. Determination of pKa of dibasic acids

3. Determination of hydrolysis constant of different hydrochlorides

Conductometry

4. Titration of $CdSO_4$ / $MgSO_4$ against $BaCl_2$ and $Ba(CH_3COO)_2$ and calculation of amount of Sulphate Present.

5. Conductometric estimation of Salts with NaOH solution.

6. Estimate the concentration of Acids and Salts by Conductometric titration with NaOH solution.

Potentiometry

7. To determine the basicity and pKa value of organic acids by potentimetric method.

8. Determine the solubility and solubility product of sparingly soluble salts.

9. To determine the amount of carbonate & bicarbonate by potentiometrically.

Polarimetry

10. To determine the percentage of two optically active substances (d-sucrose and d-tartaric acid) in a given solution.

Spectrophotometer (UV-VIS and IR)

11. To Verify Beer –Lambert's Law for solution of $KMnO_4$ in water and in acid medium Colorimetrically

12. To determine the solubility of calcium Oxalate in presence of KCI (Ionic Strength Effect)

13. Determination of pKa of Bromo Cresol Green Indicator by Spectrophotometric Method.

14. Identification of compounds by using given IR spectral data.

15. Identification of compounds by using given UV spectral data.

List of Reference books:

1. K. Burger, Coordination Chemistry-experimental methods, Butterworth's

2. R. Drago: Physical method in Inorganic Chemistry, DUSAP.

3. Hill & Day advanced methods in Inorganic Chemistry, J.Weily

4. F.A. Cotton, chemical application of group theory, Weily eastern

5. Figgis, Introduction to ligand field theory field

6. Schaefer & Gilman: Basic principles of ligand field Theory, J. Wiely

7. P.R. Backer: Molecular symmetry and Spectroscopy A.P.

8. Ferraro Ziomeek, Introduction to Group theory, plenum

9. Soctland Molecular symmetry DVN

10. Dorian: symmetry in Chemistry EWAP

11. Hall: Group theory and symmetry in Chemistry MGLt

12.Nakamoto Infrared R Raman Spectra of Inorganic & Coordination compounds J.Weily

13. Nakanisha: Spectroscopy and structure J. Weily

14. Ferroro: Metal ligand and related vibrations

15. CNR Rao Spectroscopy in Inorganic Chemistry Vol I,II,III

16. Durie: vibrations spectra and structure Vol. I to IV, Elsevier

17. Dudd, chemical Spectroscopy Elsevier

18. Popel : H.N.M.R. Spectroscopy J.Weily

19. R.J. Abraham, J. Fisher and P Loftus Wiley Introduction to NMR spectroscopy.

20. P.K. Bhattacharya: Group Theory & Its Chemical Applications

21. K.V. Reddy: Symmetry & spectroscopy of Molecules.

Nature of question paper

Total Marks: 100

Theory – Internal Examination

Total Marks = 10

10 Multiple choice questions - 10 Marks

i) ……..
(a)..... (b)..... (c)..... (d).....
ii)
iii)
iv)
v)
vi)
vii)
viii)
ix)
x)

Theory – End semester Examination

Total Marks = 40

Q-1. 10 Multiple choice questions - 10 Marks

i).....
(a)..... (b) ..... (c) ..... (d) .....
ii) …do…
iii) …do…
iv) …do…
v) …do…
vi) …do…
vii) …do…
viii) …do…
ix) …do…
x) …do…

Q-2 Short answer type question 5 out of 7 – 10 Marks

i)
ii)
iii)

iv)
v)
vi)
vii)

Q-3 Short answer type question 2 out of 3 – 10 Marks

i)
ii)
iii)

Q-4 Long answer type question 1 out of 2 – 10 Marks

i)
ii)

Practical – Internal Examination

Total Marks = 10

10 Multiple choice questions - 10 Marks

i) .....

(a)..... (b) ..... (c) ..... (d) .....

ii) …do…
iii) …do…
iv) …do…
v) …do…
vi) …do…
vii) …do…
viii) …do…
ix) …do…
x) …do…

Practical – End semester Examination

Total Marks = 30
One Experiment = 20 Marks
Journal = 5 Marks
Oral = 5 Marks

Project / Field Work report

Total Marks = 10

==========X==========

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Walchand College of Arts & Science, Solapur

Autonomous College

(Affiliated to P.A.H. Solapur University, Solapur)

Name of Faculty: Science & Technology

Syllabus of Certificate Course in Hands on Advanced Instrumentation

Department of Zoology

Walchand College of Arts and Science, Solapur (Autonomous)
W. H. Marg, Ashok Chowk, Solapur – 413 006

Certificate Course in Hands on Advanced Instrumentation

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1) About the Course: A certificate course on Hands on Laboratory Instrumentation aims to impart knowledge of tools used in cell biology, molecular biology and classical zoology. The course will emphasize on hands-on-training exposure to the students so that they will be competent enough to understand and employ these techniques in their higher studies.

2) Aim of the Course: To train students about instrumentation that are of direct use in routine experiments, research and development.

3) Objectives:

- To aware students about the different instruments used in life science laboratories.
- To develop the skills for the study of cells, biomolecues and specimen used in Zoology
- To guide students on operating procedures to be followed in laboratory
- To aware students on precision and accuracy while using instruments

4) Title of the Certificate course: "Hands on Advanced Instrumentation"

5) Eligibility: Graduate and postgraduate students of the faculties of Science of WCAS and other colleges in city are eligible to apply for this course.

6) Target Group: Open to all

7) Course Duration: 03 Months

8) Course structure: 60 Lectures (45 Theory + Practical; 15 for Project)

9) Evaluation: The students will be evaluated after the completion of imparting the syllabus by virtue of the following methods. At the end of course, examination will be conducted.

i)	Theory paper (objective/short answer type)	=	50 marks
ii)	Project Submission :	=	25 marks
iii)	Practical paper	=	25 marks

10) Expected Outcomes:

- Students will develop the skills for handling the instruments.
- Students will assist in operating the instruments in different industrial setup.
- They will enhance skill sets to get career in various institute, industry and government organizations.
- Students will aid in creating new instrument and marketing for sustainable development and environment friendly.

11) Marking scheme & award of grades:

- For the successful completion of course, each student must secure grades as given below:-
- Less than 40% marks: Fail
- Marks between 40-60%: 'B' Grade
- Marks above 60%: 'A' Grade

12) Course Content: Theory and Practical- HAI-01 (45 Hours for theory and practical)

UNIT-I: Introduction to Molecular Techniques
An overview of tools and techniques used in life sciences: Microscopy, micotomy, DNA/RNA/protein technology and for use in field and laboratory zoology.

UNIT-II: Introduction to Laboratory and Safety Measures
General laboratory practices in using pH meters, mixing buffers, performing measurements and preparing solutions, safety measurements.

UNIT-III: Principles and Applications of Tools and Techniques
Theory, applications, and operation of various analytical instruments. Production, purification, separation and identification techniques: Biosafety Cabinet, Electronic weighing Balance, Colorimeter, Cooling Centrifuge, pH meter, Autoclave, Laboratory Incubator, Orbital Shaking Incubator, CO_2 Incubator and BOD Incubator; Hot Air Oven, homogenizer, colony counter, Tissue culture facility.

UNIT-IV: Advanced Instrumentation in Life Sciences
Horizontal Gel Electrophoresis, Vertical Gel Electrophoresis, UV-VIS Spectrophotometer, UV-VIS-NIR Spectrophotometer, PCR, Gel Documentation System. Tools used in animal studies: Binocular, GPS, Softwares for field based data management like: EpiCollect, PAST.

UNIT-V: Preparations of SOPs for Data Management in Laboratory:
Overview of Standard Operating Procedure (SOP): SOP general format: Title Page, Table of Contents and Text. Types of SOPs, Guidelines for Technical SOP Text. Preparation of vouchers specimens in zoology laboratory, preservation and labeling of dry and wet specimens.

Practical(s):

1. To Use digital weighing balance for accurate measurement of chemicals.
2. To prepare common buffers for routine use in biochemistry and zoology
3. To perform sterilization of glasswares, buffers using autoclave and hot air oven.
4. To perform separation of nucleic acids (DNA/RNA) using horizontal electrophoresis.
5. To demonstrate separation of proteins using vertical electrophoresis.
6. To demonstrate qualitative analysis of biomolecules using colorimeter (DNA/RNA/Protein)
7. To demonstrate amplification of DNA using PCR.
8. To demonstrate visualization and analysis of DNA using Gel Documentation system.
9. To demonstrate characterization of biomolecules using UV-VIS-NIR.
10. Preparation SOPs for laboratory instruments
11. To perform field based use of binocular, GPS, map making.
12. To learn standard methods for preservation and labeling of specimens in zoology laboratory (insect observation, drying and pinning methods)
13. To use PAST software for univariate statistical analysis of field data

13. Project (15 lectures for project involving field work, laboratory work and library work)

Students are expected to design a particular experiment, develop standard operating protocols for a required instrument and the report of the same needs to be submitted as part of the Project work.

- The students are required to undertake a project. The area of work will be related to the topics covered under the course and work will be decided by the students in consultation with faculty members. A survey of literature and feasibility studies will be undertaken by the students, who plan to undertake a project. Each project will be supervised by a faculty member or a group of faculty members and experts. This exercise will provide the students with valuable experience of proper planning, executing, evaluating and reporting a research project. The students should be encouraged to publish the findings

14. Other infrastructure available for the course:

1) Well equipped Instrumentation lab.
2) Basic instruments for handling (Electronic weighing Balance, Colorimeter, Cooling Centrifuge, pH meter, Autoclave, Laboratory Incubator, Orbital Shaking Incubator, CO_2 Incubator and BOD Incubator, Hot Air Oven etc.)
3) Advanced instruments (Probe Sonicator, UV-VIS Spectrophotometer, UV-VIS-NIR Spectrophotometer, PCR, Gel Documentation System, Fermentor etc.)
4) Broad band Internet to carry out literature survey and reporting.
5) Seminar Halls

15) Suggested Readings:

1. Keith Wilson and John Walker. Practical Biochemistry- principles and techniques; Cambridge University press, London, UK.
2. David T Plummer, Tata McGraw- Hill publishing company limited; McGrqw office, New Delhi.
3. C.R. Kothari, 2nd Edition, 2004. Research methodology- methods and techniques. New Age International (P) limited publishers, New Delhi.
4. Instrumental methods of chemical analysis - P.K. Sharma
5. Biophysical chemistry - Upadhyay. Upadhyay and Nath
6. A Biologist's guide to principle and techniques of practical biochemistry - Brigan L. Williams.
7. Handbook of Biomedical Instrumentation - R.S. Khandpur, Tata McGraw Hill.

Board of Studies in Zoology
Chairperson

Shikshan Haach Dharma

S. A. P. D. Jain Pathashala's

(Jain Minority Institute)

Walchand College of Arts & Science, Solapur

Autonomous College

(Affiliated to P.A.H. Solapur University, Solapur)

Name of Faculty: Science & Technology

Syllabus of Certificate Course on Urban Ecology and Sustainable Development

Department of Zoology

Walchand College of Arts and Science, Solapur (Autonomous)
W. H. Marg, Ashok Chowk, Solapur – 413 006

Certificate Course in Hands on Advanced Instrumentation

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1) About the Course: A certificate course on Urban Ecology and Sustainable Development aims to impart knowledge on the challenges faced by cities due to irrational development. This is necessary to achieve the sustainability goals enshrined in Convention on Biodiversity and

2) Aim of the Course: To aware and impart training to students on the issues, challenges and practices for effective implementation of policies to build sustainable urban spaces.

3) Objectives:

- To understand theoretical and practical aspects of urban sustainability concepts.
- Fostering urban ecological practices to enable better social needs for all stakeholders.
- To create man power for integrating the concepts of ecology, economics, engineering and human culture.
- To create cities that are resilient to face challenges of climate change, global warming and biodiversity loss.
- To promote sustainable urban spaces for coexistence of nature along with the need of housing, industrialization, transportation etc.
- To create awareness and education on sustainable management of urban ecosystems;

4) Title of the Certificate course: "Urban Ecology and Sustainable Development"

5) Eligibility: Graduate and postgraduate students of the faculties of Science of WCASand other colleges in city are eligible to apply for this course.

6) Target Group: Open to all

7) Course Duration: 03 Months

8) Course structure: 60 Lectures (45 Theory + Practical; 15 for Project)

9) Evaluation: The students will be evaluated after the completion of imparting the syllabus by virtue of the following methods. At the end of course, examination will be conducted.

i)	Theory paper (objective/short answer type)	=	50 marks
ii)	Project Submission :	=	25 marks
iii)	Practical paper	=	25 Marks

10) Expected Outcomes:

- Students will develop an understanding on significance of smart cities
- Students will extend their understanding of ecology with policy makers to make necessary changes in infrastructure that are ecological sensitive.

- Students will bring an integrated approach by bringing together the concepts of urban design through ecology, economy, sociology and sustainable future.
- Students will enable in making future cities resilient to climate change and global warming.

11) Marking scheme & award of grades:

- For the successful completion of course, each student must secure grades as given below:-
- Less than 40% marks: Fail
- Marks between 40-60%: 'B' Grade
- Marks above 60%: 'A' Grade

12) Course Content (Theory and Practical):

- **Theory Course Content: Theory and Practical- (45 Hours for theory and practical)**

Unit 1: Introduction to Urban Ecology
Definition, history, objectives and scope of urban ecology; concept of urban sustainability.

Unit 2: Interdisciplinary Aspects of Urban Ecology
Industrial ecology and urban metabolism, urban political ecology.

Unit 3: Structures and Processes of Urban Ecology
Pollution (air, water), land-use pattern, urban biogeochemistry, solid waste management, Urban hydrology; urban heat island.

Unit 4: Ecology of Urban Organisms
Urban green spaces and ecosystem services; urban wetland and ecosystem services; urban biodiversity and ecosystem services, evolution and behavior of urban biota; degradation of ecosystem services in urban spaces; Invasive and exotic species.

Unit 5: Contemporary Urban Development
An overview of urban development in India, comparison of urban development in Asia and Europe; Urban planning and management for sustainable cities.

Unit 6: Sustainable Cities, Eco-cities, Smart Cities
Concept of sustainable cities, eco-cities and smart cities in India; case studies of Indian eco-cities and smart cities; Ecological restoration; applications of geospatial technologies in urban ecology.

Unit 7: Human Dimension of Urban Ecology
Terrace/roof gardening, vertical gardening; role of parks, open spaces and trails, physical activity, obesity and health of citizens,; eco-restoration, eco-literacy, public health and welfare, role of local GOs and NGOs.

➢ Practical Course:

1) Study of native and invasive/exotic plant species along roadside areas in city
2) Study of native and invasive/exotic plant species in residential areas in city
3) Study of biodiversity and ecosystem services of parks and gardens in city
4) Study of biodiversity and ecosystem services in urban agricultural sites

5) Study of status of lakes in urban and sub-urban area w.r.t. diversity, pollution and ecosystem services
6) Collection of socio-economical and demographic data of city and statistical evaluation of its impact on urban ecology
7) To collect and analyze comparison of general diversity pattern in urban vs. sub-urban area
8) To collect data on ecological and biodiversity research projects undertaken in university and colleges and application of the same in urban ecology
9) To evaluate data on projects undertaken under smart city projects and its evaluation in Solapur city
10) To gather data on human perception of urban ecology, biodiversity and ecosystem services through questionnaires and group discussions with citizens, school and college students
11) Applications of geospatial technologies in landscape analysis (case studies on- solid waste management, rainwater harvesting, vermocomposting in Solapur city)
12) Visit to parks, lakes and urban green spaces; visit to NGOs; visit and interaction with officials of smart city office in Solapur

13) Project (15 lectures for project involving field work, laboratory work and library work)

Students are expected to design a particular experiment, develop standard operating protocols for a required instrument and the report of the same needs to be submitted as part of the Project work.

- The students are required to undertake a project. The area of work will be related to the topics covered under the course and work will be decided by the students in consultation with faculty members. A survey of literature and feasibility studies will be undertaken by the students, who plan to undertake a project. Each project will be supervised by a faculty member or a group of faculty members and experts. This exercise will provide the students with valuable experience of proper planning, executing, evaluating and reporting a research project. The students should be encouraged to publish the findings

14) Other infrastructure available for the course:

1) Well equipped instrumentation lab.
2) Basic instruments for handling (Electronic weighing Balance, Colorimeter, Cooling Centrifuge, pH meter, Autoclave, Laboratory Incubator, Orbital Shaking Incubator, CO_2 Incubator and BOD Incubator, Hot Air Oven etc.)
3) Advanced instruments (Probe Sonicator, UV-VIS Spectrophotometer, UV-VIS-NIR Spectrophotometer, PCR, Gel Documentation System, Fermentor etc.)
4) Broad band Internet to carry out literature survey and reporting.
5) GIS tool (ArcGIS, Q-GIS)

15) Suggested Readings:

1) Adler, F.R., Tanner, C.J. (2013) Urban Ecosystems: Ecological Principles for the Built Environment. Cambridge University Press, Cambridge.

2) Amin, A. & N. Thrift (2002): Cities: Reimagining the urban. Polity Press. Cambridge

3) UN (2004): World urbanization prospects: The 2003 revision. United Nations – Department of Economic and Social Affairs – Population Division. New York. Online available at http://www.un.org/esa/population/publications/ publications.htm (04 May 2007)

4) Hoffken J.I. and Limmer Agnes (2019). Smart and eco-cities in India and China. *The International Journal of Justice and Sustainability*, Volume 24, Issue 7

5) Ken Leinbach (2018). Urban Ecology: A natural way to transform kids, parks, cities, and the world, Morgan James Publishing IIc, pp270

6) Margaret M. Carreiro, Yong-Chang Song, Jianguo Wu: Ecology, Planning, and Management of Urban Forests: International Perspectives, Springer (2008)

7) Richard T.T.Forman: Urban Ecology- Science of Cities, Cambridge University Press (2014)

8) Kate Orff: Toward an Urban Ecology, Monacelli Press (2016)

9) Ian Douglas and Philip James: Urban Ecology:An Introduction, Routlage (2014)

10) Kevin J. Gaston: Urban Ecology (Ecological Reviews), Cambridge University Press (2010).

Board of Studies in Zoology
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Walchand College of Arts and Science, Solapur

Department of Mathematics

Draft of the Certificate Course for B.Sc. Students

Name of the Certificate Course	Credits	Lectures	Practical: Library Work, Project, etc	Eligible students
"Scilab"	04 (60 Contact Hours)	45	15	Students of B.Sc.

1. Title of the Certificate Course: "Scilab"

2. Introduction:

Scilab is an open source software for numerical mathematics and scientific visualization. It is capable of interactive calculations as well as automation of computations through programming. It provides all basic operations on matrices through built-in functions so that the trouble of developing and testing code for basic operations are completely avoided. Its ability to plot 2D and 3D graphs helps in visualizing the data we work with. All these make Scilab an excellent tool for teaching, especially those subjects that involve matrix operations. Further, the numerous toolboxes that are available for various specialized applications make it an important tool for research. Being compatible with Matlab® , all available Matlab M-files can be directly used in Scilab with the help of the Matlab to Scilab translator. Scicos, a hybrid dynamic systems modeler and simulator for Scilab, simplifies simulations. The greatest features of Scilab are that it is multiplatform and is free. It is available for many operating systems including Windows, Linux and MacOS X.

3. Objectives:

1. To bridge up the gap between knowledge based conventional education and market demands and to provide an alternative for those pursuing higher education.
2. To aware the students about SCILAB software environment.
3. To make students learn to implement simple mathematical functions in SCILAB.
4. To provide hands on experience using Scilab software to handle real life problems.
5. To write simple scientific program on your own in Scilab.

4. Course Outcome: After completion of this course the students will be able to handle this software for solving mathematical problems.

5. Eligibility: Students of B.Sc.

6. Fee Structure: The fee structure for the present Certificate Course will be decided by the Academic Council of the College

7. Syllabus: The syllabus for the Course will be as follows: {60 Lectures= 45 Theory + 15 Practical}

Syllabus of "Scilab"

Theory (45 Hours)

Unit No.	Contents	Hours
1	Introduction and Installation, Use of Scilab	**02**
2	Vector, Matrix	**02**
3	Linear equations	**02**
4	First order and second order differential equation	**02**
5	Newton-Raphson method to obtain numerical solutions of transcendental equations.	**05**
6	Newton method of false position to obtain numerical solutions of transcendental equations.	**05**
7	Jacobi method to obtain solution of system of equations.	**03**
8	Gauss-Seidal method to obtain solution of system of equations.	**03**
9	Newton's (backward/forward) difference formula.	**05**
10	Lagrange's interpolation formula	**03**
11	Trapezoidal rule.	**03**
12	Simpson's 1/3 rd and 3/8 th rule.	**03**
13	Euler's method, Modified Euler's method to obtain solution of numerical differentiation.	**03**
14	Runge-Kutta method to obtain solution of numerical differentiation.	**04**

Practical Course(15Hours):

Unit No.	Contents	Hours
1	Vector Operations, Matrix Operations	**02**
2	Linear equations, First order and second order differential equation	**01**
3	Implement program on Newton-Raphson method to obtain numerical solutions of transcendental equations.	**01**
4	Implement program on Newton method of false position to obtain numerical solutions of transcendental equations.	**01**
5	Implement program on Jacobi method to obtain solution of system of equations.	**01**
6	Implement program on Gauss-Seidal method to obtain solution of system of equations.	**01**
7	Implement program on Newton's (backward/forward) difference formula.	**02**
8	Implement program on Lagrange's interpolation formula	**01**
9	Implement program on trapezoidal rule.	**01**
10	Implement program on Simpson's 1/3 rd and 3/8 th rule.	**01**
11	Implement program on Euler's method, Modified Euler's method to obtain solution of numerical differentiation.	**01**
12	Implement program on Runge-Kutta method to obtain solution of numerical differentiation.	**02**

8. Evaluation - After completion of the syllabus, exams will be conducted in the following manner: **Total**: 50 marks

1. Theory- 40 marks

2. Practical - 10 marks

Reference books:

1. **Claude Gomez**, Engineering and scientific computing with Scilab
2. **Dr. Philippe Roux I**., Fundamental Scilab from theory to practice.

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Walchand College of Arts & Science, Solapur

Autonomous College

(Affiliated to P.A.H. Solapur University, Solapur)

Name of Faculty: Science & Technology

Certificate Course in Dairy Microbiology

Department of Microbiology

With Effect from: 2022-23

Walchand College of Arts and Science, Solapur (Autonomous)
W. H. Marg, Ashok Chowk, Solapur – 413 006

Certificate Course in Dairy Microbiology

About the Course:

Milk and milk products occupy significant role in the human food profiles. Milk is described as a whole, fresh, clean, lacteal secretion obtained from the complete milking of healthy animal containing various nutrients.In general milk is considered as the most nutritious and complete food for young animals, neonates and adult human beings. However, these nutritional values also permit growth of many microorganisms, some of which cause undesirable changes in milk and its products. The study of microorganisms that are associated with milk and milk products in all aspects is defined as Dairy Microbiology.

Milk hygiene is concerned with the production of clean, wholesome milk that is free from bacteria or other disease causing micro-organisms and maintenance of this condition from farm to the consumers. Milks sanitary qualities are influenced by many factors in the course of production, processing, and delivery to the consumers. Dairy industry provides an excellent example where bacteria, yeasts, molds and viruses are very important in determining the quality of final product. Microbes are undesirable in milk or its products, if these deteriorate flavor or texture, and produce diseases. It is important that dairy microbiologists understand the facts that, influence the deterioration of milk and the methods through which this type of deterioration can be prevented. The control and destruction of undesirable microorganisms, as well as their intentional introduction and utilization are problems that need special attention.

Many ordinances and other regulations under which milk is produced and handled specify quantitative, qualitative and microbial standards. These standards have shown that under desirable conditions, the numbers of microbes gaining entrance to the product will not exceed

certain levels and, also, that proper handling of these products will not permit growth beyond certain levels. To a certain degree, the numbers of microbes permitted on these standards usually are far much below the numbers necessary to cause spoilage. Practically this results into a gradual up-gradation of microbial standards for different dairy products. Because of this type of control, the packaged milk produced by dairy industries is of high microbiological quality and hence, safe to the consumers. To maintain the quality of milk as per the national, international standards it is necessary to subject the milk sample for various quality control tests which includes chemical and microbiological examination of milk in dairy units or industries.

This course content mainly focusing on qualitative and quantitative analysis of milk to maintain and restore the quality of milk in Dairy industries.

1. Aim of the Course: The aim of Dairy Microbiology is to study microorganisms in milk, milk spoilage and determine the high quality of milk which will be safe for consumers. This course content mainly aims to study qualitative and quantitative analysis of milk.

2. Objectives:

The main objective of the programme is to:

- To demonstrate the role of microbes in milk spoilage.
- Testing and quality control of milk.
- To impart knowledge and technical proficiency in clean milk production,good sanitary practices during milking, handling, processing and preservation of milk.
- To reveal the use of milk to produce various products.
- To get employment opportunities in dairy industries.
- develop young entrepreneurs for self-employment through dairy microbiology

3. Title of the Certificate course: ″Certificate Course in Dairy Microbiology”

4. Eligibility: 12^{th} Pass students of the faculties of Science of WCAS and other colleges in city are eligible to apply for this course.

5. Target Group : Open to all

6. Course Duration : 03 Months

7. Course structure : 60 Lectures (45 Theory + Practical; 15 for Project)

8. Evaluation: The students will be evaluated after the completion of imparting the syllabus by virtue of the following methods: At the end of course, examination will be conducted.

i)	Theory paper (objective/short answer type)	=	50 marks
ii)	Project Submission	=	25 marks
iii)	Practical paper	=	25 marks

9. Expected Outcomes:

- Students will develop the skill forqualitative and quantitative analysis of milk.
- Students will get the knowledge and importance microorganisms in Dairy microbiology.
- Students can become aware about hygienic practices maintained during milking and in milk industries.
- Students will get the knowledge of requirements in dairy industries.
- Students will directly or indirectly help to society to prevent milkborne illness.
- Students will aid in generating awareness of cleanliness and methods of preservation in milk industries.
- **Marking scheme & award of grades:**

- For the successful completion of course, each student must secure grades as given below:-
- Less than 40% marks :Fail
- Marks between 40-60% :'B' Grade
- Marks above 60% :'A' Grade

10.Course Content: Theory and Practical-BF -01 (45 Hours for theory and practicals)

Unit I: Definition of milk and dairy microbiology, composition of milk in various animals.

Unit II: Sources of contamination in milk.Introduction to sources of microbial contamination of milk, interior of udder, Exterior of udder,Coat of cow Animal shed and surroundings, Milking staff, Milking equipment (storage containers and transportation systems), Water supplies, air borne contamination

Unit III: Spoilage of milk: Proteolysis, Ropiness/sliminess, Rancidity, alkali production, flavour defect, pigmentation, souring, Homofermentation, heterofermentation of milk

Unit IV: Principles of Clean Milk Production: Animal management, Clean and healthy cows, Animal housing management, Feeding management, Personal hygiene, Disease control, Cleanliness, Milking management during collection, Hygiene of milking utensils, Cleaning and sterilisation of milking equipments, Hygiene of milking environment,Straining of Milk,Heating of milk,Cooling of Milk ,Transportation of Milk.

Unit V: Preservation of milk: Pasteurisation, boiling, Refrigeration and Drying.

Unit VI: Introduction and list of milk and fermented milk products with reference to its examples

Unit VII: Microbial analysis of milk (quantitative and qualitative)

Qualitative Methods

Dye reduction tests: Methylene blue Reduction time test / Resazurin Reduction Test (RRT) Thermoduric Count, Enumeration of yeast and moulds in milk.

Quantitative tests:

Direct Microscopic Count (DMC), Standard Plate Count (SPC), Most Probable Number (MPN)/coliform count in milk.**(use of selective media, measurement of uncertainty)**

Unit VIII: Dairy Technology: Introduction to Job Profiles in Dairy industries. How to set up the laboratory for chemical and microbiological analysis of milk

11. Practical(s):

1. Platform Test -Colt – On – Boiling Test, Alcohol Test, Sediment Test
2. Determination of Specific Gravity of Milk
3. Determination of Titrable Acidity of Milk
4. Determination of pH of Milk
5. Direct microscopic count (DMC)
6. Standard plate count (SPC)
7. Most probable number (MPN)/coliform count in milk
8. Dye reduction tests: Methylene blue Reduction time test / Resazurin Reduction Test
9. Thermoduric Count
10. Enumeration of yeast and moulds in milk

11.Phosphatase test

12. Detection of mastitis milk

12. Project:(15 lectures for project involving dairy visit, laboratory work and library work)

The report of this study will be submitted by students as part of the Project work.

- The students are required to undertake a project which should be for a maximum duration of 90 days. The area of work will be related to the topics covered under the course and work will be decided by the students in consultation with faculty members. A survey of literature and feasibility studies will be undertaken by the students, who plan to undertake a project. Each project will be supervised by a faculty member or a group of faculty members and experts. The students will be guided time to time during the project. This exercise will provide the students with valuable experience of proper planning, executing, evaluating and reporting a research project. The students should be encouraged to publish the findings.

13.Other infrastructure available for the course:

Well-equipped microbiology laboratory: Microscopes, Autoclave, Hot air oven, Laminar air flow, Incubator, Incubator shaker, Cameras and Seminar Halls, Chemicals

14. Suggested readings:

1. Dairy Science: Petersen (W.E.) Publisher: Lippincott & Company
2. Outlines of Dairy Technology: Sukumar De, Oxford University press
3. Indian Dairy Products: Rangappa (K.S.) & Acharya (KT): Asia Publishing House.
4. The technology of milk Processing: Ananthakrishnan, C.P., Khan, A.Q. and Padmanabhan, P.N., Shri Lakshmi Publications.
5. Dairy India 2007, Sixth edition
6. Economics of Milk Production – Bharati Pratima Acharya Publishers

Board of Studies in Microbiology

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(Jain Minority Institute)

Walchand College of Arts & Science, Solapur

Autonomous College

(Affiliated to P.A.H. Solapur University, Solapur)

Name of Faculty: Science & Technology

Certificate Course in Innovation, Startup and Entrepreneurship

Department of Bioinformatics

With Effect from: 2022-23

Walchand College of Arts and Science, Solapur (Autonomous)
W.H.Marg, Ashok Chowk, Solapur – 413 006

Certificate Course in Innovation, Startup and Entrepreneurship

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1) About the Course: The goals of this programme are to inspire students and help them imbibe an entrepreneurial mind-set. The students will learn what entrepreneurship is and how it has impacted the world and their country. They will be introduced to key traits and the DNA of an entrepreneur, and be given an opportunity to assess their own strengths and identify gaps that need to be addressed to become a successful entrepreneur. The programme comprises several short courses, each focusing on a specific entrepreneurial knowledge or skill requirement such as creative thinking, communication, risk taking, and resilience and helping them become career ready, whether it is entrepreneurship or any other career

2) Aim of the Course:

- To develop entrepreneurial skills among students and faculties.
- To inculcate a culture of innovation-driven entrepreneurship.
- To promote new technology/ knowledge/ innovation-based startups.

3) Objectives:

1. Develop an understanding of the nature of entrepreneurship.

2. Understand how to identify opportunities (problems), develop creative solutions and build a viable
business model around these.

3. Identify and understand the driving forces of new venture success and to develop skills in innovation
and business planning for entrepreneurial ventures.

4. Able to implement the ethical and legitimacy challenges that face entrepreneurs with new ventures.

4) Title of the Certificate course: "Certificate course in Innovation, Startup and Entrepreneurship"

5) Eligibility: M.Sc. II

6) Target Group: MSc Biotechnology, Genetics and Bioinformatics

7) Fee structure: As per the decision of AC of College

8) Course Duration: 03 Months

9) Course structure: 60 Lectures (45 Theory + Practical; 15 for Project)

10) Evaluation: The students will be evaluated after the completion of imparting the syllabus by virtue of the following methods: At the end of course, examination will be conducted.

i)	Theory paper (objective/short answer type)	=	50 marks
ii)	Project Submission :	=	25 marks
iii)	Practical paper	=	25 marks

11) Expected Outcomes:

The expected Student Learning Outcomes for the Innovation, Startup and Entrepreneurship COC are:

- Entrepreneurship and Innovation minors will be able to sell products and their ideas.
- Students master oral and visual presentation skills and establish a foundation of confidence in the skills necessary to cause others to act.
- This course, teaches students essential skills and effective strategies for working in and managing innovative organizations – and for starting new ones.

12)Marking scheme & award of grades:

- For the successful completion of course, each student must secure grades as given below:-
- Less than 40% marks: Fail
- Marks between 40-54%: 'C' Grade
- Marks between 55-59%: 'B' Grade
- Marks between 60-74%: 'A' Grade
- Marks above 74 %: 'O' Grade

12. Course Content: Theory and Practical (45 Hours for theory and practical)

Unit 1-Innovation and Incubation [06]

Innovative ideas, Nurturing innovative minds, Fundamentals of Innovation and innovation eco-system, Innovation to Invention, Invention to IPR, Creativity and problem solving, Incubator Models and Success Factors, Incubator Operation, Technology Commercialization, Virtual Business Incubation and Hackathon.

Unit 2- Startup [07]

Introduction to startup, types of startup(Micro, Small and Medium), Introduction to Law and Legal Systems to start up, Start-up Landscape, Digital India and Make in India, Innovation in Indian Context, Preparation of Model project, Business Planning- Production,

Marketing(Digital), Organization, Budget Planning, Business Accounting, supply chain management, , Business Analytics, Digital Marketing.

Unit 3-Business Communication [06]

Understanding the foundations of Business Communication, A brief overview of financial institutions in India- Central level and state level institutions- SIDBI- NABARD- IDBI- SIDCO- Indian Institute of Entrepreneurship- DIC- Single Window- Latest Industrial Policy of Government of India.

Unit 4- Entrepreneurship [06]

Entrepreneur - Meaning of Entrepreneur, Evolution of the Concept, Functions of an Entrepreneur, Types of Entrepreneur, Development of Entrepreneurship steps in entrepreneurial process, Biotech Entrepreneurship in India, Identification of Business Opportunities, Qualities, skills and attributes for successful biotech entrepreneurs possess and Case studies in Biotechnology.

Practical- [20]

1. Exercise on market survey
2. To study recent government policies regarding development of entrepreneurship
3. To study the procedure to obtain financial resources from various institutions under DIC Scheme
4. To study various online platforms and schemes for startup funding
5. To study of different government organizations, NGO and private organizations providing financial support.
6. To study online digital platforms/Hackathon for business.
7. Exercise of cost sheets.
8. To prepare proposal for financial assistance for startups
9. To Collect information of any five biotechnology entrepreneurs.
10. To prepare business model for small startup

13. Project (15 lectures for project involving field work, laboratory work and library work)

Idea generation, writing business plan, presentation and preparing business proposal and business model generation. The report of this study will be submitted as part of the Project work.

- The students are required to undertake a project which should be for a maximum duration of 15 hours. The area of work will be related to the topics covered under the course and work will be decided by the students in consultation with faculty members. A survey of literature and feasibility studies will be undertaken by the students, who plan to undertake a project. Each project will be supervised by a faculty member or a group of faculty members and experts. The students will be guided time to time during the project. This exercise will provide the students with valuable experience of proper planning, executing, evaluating and reporting a research project. The students should be encouraged to publish the findings

14. Other infrastructure available for the course:

1) Broadband Internet
2) Computer
3) M.S. Office
4) PDF of Business Magzines and related resources

15) SUGGESTED READINGS:

1. Stepehn P. Robins, Mary Coulter and Agna Fernandes, (2019), Management, Pearson
2. Stephen P. Robins and Timothy A.Judge, Neharika Vohra, (2016), Organizational Behaviour, Pearson
3. Chandrani Singh, (2016), Principles and Practice of Management and Organisational Behaviour.
4. Richard L. Daft, (2012), Principles of Management, Cengage Learning.
5. Hisrich, Robert. Michael Peters and Dean Shepherd, Mathew. (2014). Entrepreneurship; New Delhi: Tata McGraw-Hill Education.
6. Poornima M (2014), Entrepreneurship Development and Small Enterprise, Pearson Education.
7. Hatten, Timothy S. (2011). Small Business Management: Entrepreneurship and Beyond, Mason: Cengage Learning.
8. Bohoney, Jason. (2011). The Entrepreneurship Toolkit: Successful Approaches to Fostering Entrepreneurship. Washington: Weidemann Associates Inc.
9. Allen, K. R. (2011),"Launching New Ventures: An Entrepreneurial Approach", 6th Edition. Mason, Ohio: South-Western Cengage Learning.
10. Kuratko, Donald F. Entrepreneurship: (2010) Theory, Process, Practice 9th Edition. Mason, Ohio: South-Western Cengage Learning.

Board of Studies in Genetics
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Dr. A. S. Injal

Shikshan Haach Dharma

S. A. P. D. Jain Pathashala's

(Jain Minority Institute)

Walchand College of Arts & Science, Solapur

Autonomous College

(Affiliated to P.A.H. Solapur University, Solapur)

Name of Faculty: Science & Technology

Certificate Course in Clinical Biochemistry

Department of Biotechnology

With Effect from: 2022-23

Walchand College of Arts and Science, Solapur (Autonomous)
W.H.Marg, Ashok Chowk, Solapur – 413 006

Certificate Course in Clinical Biochemistry

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1) About the Course:

Clinical Biochemistry gives a thorough grounding in a discipline that deals with the clinical analysis of body fluids and other biological material to aid the diagnosis, therapy and monitoring of diseases.Clinical biochemists are typically clinical scientists who work in hospital laboratories providing advice and interpretation of analytical results to other healthcare professionals such as clinicians, general practitioners and nurses.

They are also involved in the development of new analytical methods and improvement of clinical services, including quality assurance and audit. During this course students will develop analytical skills with relevant practical sessions and will also gain a core knowledge and understanding of the normal physiology and pathophysiology of the major organs and endocrine systems, as well as more specialist areas such as clinical importance of biomolecules and clinical enzymology.

Students will also develop a core knowledge and understanding of clinical disorders and how biochemical parameters and laboratory methods are used for the investigation, diagnosis and management of patients.

2) Aim of the Course:

To inculcate advanced understanding and applied knowledge of the theory and practice of clinical biochemistry. Students will develop critical understanding of how biochemical investigations are employed to develop a clinical diagnosis.

3) Objectives:

- To develop the skills for detection and identification of various clinical diagnostic methods.
- To create awareness of different lifestyle diseases increasingly found in present day.
- To determine various substances including substrates, enzymes, hormones, etc and their use in diagnosis and monitoring of disease are applied
- To evaluate the abnormalities which commonly occur in the clinical field
- To perform the hematology-based analysis.

4) Title of the Certificate course: "Certificate course in Clinical Biochemistry"

5) Eligibility: B.Sc. III Biotechnology students of WCAS.

6) Target Group: Open to all

7) Fee structure: As per the decision of AC of College

8) Course Duration: 03 Months

9) Course structure: 60 Lectures (45 Theory + Practical; 15 for Project)

10) Evaluation: The students will be evaluated after the completion of imparting the syllabus by virtue of the following methods: At the end of course, examination will be conducted.

i)	Theory paper (objective/short answer type)	=	50 marks
ii)	Project Submission:	=	25 marks
iii)	Practical paper	=	25 marks

11) Expected Outcomes:

After successful completion of the course, students will be able to:

- Get basic knowledge on various concepts of clinical biochemistry.
- Understand the diagnostic performance of laboratory tests according to the clinical setting and prevalence of disease.
- Clinically assess the laboratory indicators of physiologic conditions and diseases
- Know the biochemical and molecular tools needed to accomplish preventive, diagnostic, and therapeutic intervention on hereditary and acquired disorders.

12) Marking scheme & award of grades:

- For the successful completion of course, each student must secure grades as given below:
- Less than 40% marks: Fail
- Marks between 40-60%: 'B' Grade
- Marks above 60%: 'A' Grade

13 Course Content: Theory and Practical- BT-01 (45 Hours for theory and practical)

UNIT I- Introduction to Clinical Biochemistry & Basic Laboratory Principles- [05]

Basic Laboratory Principles and Safety Measures- Volumetric Equipment, Units and Reference Values, Regulations and Safety Precautions in Clinical Laboratory. Definition and scope of clinical biochemistry in diagnosis, collection and preservation of biological fluids (blood, urine & CSF), normal values of important constituents of blood, CSF and urine.

UNIT II-Clinical Importance of Biomolecules [05]

Carbohydrates- Estimation of glucose, glycosurias, GTT's, hyper &hypoglycemia, blood glucose regulation and role of hormones; diabetic coma, Lipids- lipid profile estimation, hypercholesterolemia, hyperlipoproteinemia, atherosclerosis and it risk factors. Proteins - albumin, hypoalbuminemia, hypoproteinemia, Bence Jones proteins, proteins in CSF and their estimation.

UNIT III – Hormones **[05]**

Definition and different classes of hormones; Thyroid hormone and their mechanism of action; Pituitary hormones and their role in biological systems; Hormone regulation, Role of insulin in modulating blood glucose level.

Unit IV- Clinical Enzymology **[05]**

Function and Reference Values- Creatine kinase, Lactate dehydrogenase, Aspartate amino transferase, Alanine amino transferase, Alkaline phosphatase, Nucleotide phosphatase, Markers of liver diseases, Acid phosphatase, Glucose-6-phosphate dehydrogenase, Amylase, Lipase, Aldolase.

Practical(s):

1. Blood Glucose Estimation
2. Analysis of Normal Constituents of Urine
3. Estimation of Blood Urea
4. Estimation of Urinary Creatinine
5. Total Serum Protein Estimation
6. Qualitative Tests for Globulin.
7. Estimation of Serum Bilirubin
8. Estimation of Serum Uric Acid
9. Estimation of Amylase in Serum
10. Estimation of Total Cholesterol in Serum

14) Project (15 lectures for project involving field work, laboratory work and library work)

Every student must visit nearby clinical pathology laboratory or health care research center. The report of this study will be submitted as part of the Project work.

- The students are required to undertake a project which should be for a maximum duration of 15 days. The area of work will be related to the topics covered under the course and work will be decided by the students in consultation with faculty members. A survey of literature and feasibility studies will be undertaken by the students, who plan to undertake a project. Each project will be supervised by a faculty member or a group of faculty members and experts. The students will be guided time to time during the project. This exercise will provide the students with valuable experience of proper planning, executing, evaluating and reporting a research project. The students should be encouraged to publish the findings

15) Other infrastructure available for the course:

1) Biochemistry Laboratory

2) Microbiology Laboratory

3) Pasteur pipettes

4) Incubator

5) Autoclave

6) Water bath

7) Vortex

8) Centrifuge

9) Glass plate

10) Dropper

11) Smart class room

16) SUGGESTED READINGS:

1. Clinical Biochemistry: Metabolic And Clinical Aspects by William J. Marshall, Stephan K. Bangert, Elizabeth S.M.; Elsevier Science Health Science Clinical Biochemistry University of Kashmir
2. Fundamentals of Clinical chemistry – Teitz, W.B.Saunders company.
3. Practical Clinical Biochemistry, volume I and II, 5th edition – Varleyet.al.,CBS Publishers.
4. Biochemistry by Zubay 4th Edition (WMC Brown Publishers)
5. Physiological basis of Medicine (Best & Taylor)
6. Teitz text book of clinical biochemistry 3rd edition – Burtiset al., William Heinmannmedical books, Ltd.
7. Clinical biochemistry – Metabolic and clinical aspects, Pearson Professional Ltd
8. Gerald Karp, Cell and molecular Biology. (John Welly and Sons)
9. Frederic Martini, Fundamentals of Anatomy and Physiology (prentice Hall, New Jersey) Harrison's Principles of Internal Medicine, 18thEdition (Harrison's Principles of Internal medicine) by Dan L. Longo, Anthony S. Fauci, Dennis L. Kasper , Stephen L. Hauser, J. Larry Jameson and Joseph Loscalzo, McGrawhills publishers

Board of Studies in Genetics
Chairperson
Dr. A. S. Injal

Shikshan Haach Dharma

S. A. P. D. Jain Pathashala's

(Jain Minority Institute)

Walchand College of Arts & Science, Solapur

Autonomous College

(Affiliated to P.A.H. Solapur University, Solapur)

Name of Faculty: Science & Technology

Certificate Course in Food Fermentation Technology

Department of Biotechnology

With Effect from: 2022-23

Walchand College of Arts and Science, Solapur (Autonomous)

W. H. Marg, Ashok Chowk, Solapur – 413 006

Certificate Course in Food Fermentation Technology

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1) About the Course:

As a part of food processing technology, fermentation technology has evolved from spontaneous to controlled processes employing improved strains commonly obtained from the benefit of biotechnology development in large industrial scales to produce food, ingredients and additives important for food.

This course includes the application of microorganisms in fermentation technology and biotechnology. The course emphasizes the principles and history of fermentation, microbial isolation and screening, microbial metabolisms and regulation. It also discusses about fermentation techniques and their application in the production of fermented food products from different sources like milk, grains, meat and fish.

This course is designed to enable students to prepare fermented food products using microorganisms and local based substrates.

2) Aim of the Course: This course aims to give the student an overview of food fermentation and its nutritional importance on human health. In particular, this module will focus on production steps of different types of fermented foods from different microbial sources.

3) Objectives:

- To facilitate the students to understand basics of fermentation.
- To impart training to develop skills about handling, cultivation and propagation of quality microbial inoculants.
- To provide exposure to fermented food production technology.
- To make students ready for industry as entrepreneurs.
- To improve the professional competencies and upgrade the knowledge and develop technical skills of food fermentation techniques among the students.

4) Title of the Certificate course: "Certificate course in Food Fermentation Technology"

5) Eligibility: HSC pass (Science stream).

6) Target Group: Open to all

7) Fee structure: As per the decision of AC of College

8) Course Duration: 03 Months

9) Course structure: 60 Lectures (45 Theory + Practical; 15 for Project)

10) Evaluation: The students will be evaluated after the completion of imparting the syllabus by virtue of the following methods: At the end of course, examination will be conducted.

i)	Theory paper (objective/short answer type)	=	50 marks
ii)	Project Submission :	=	25 marks
iii)	Practical paper	=	25 marks

11) Expected Outcomes:

- Students will develop the skills for fermented food production.
- Students will become skilled in planning and maintaining fermented food production unit.
- Students will directly or indirectly help to aware peoples about health benefits of fermented foods and importance of probiotics
- Course can ignite the students to become an entrepreneur.

12) Marking scheme & award of grades:

- For the successful completion of course, each student must secure grades as given below:-
- Less than 40% marks: Fail
- Marks between 40-60%: 'B' Grade
- Marks above 60%: 'A' Grade

12. Course Content: Theory and Practical- BT-01 (45 Hours for theory and practical)

Unit I- Introduction **5L**

Fermentation: Introduction, definition, types. Fermented foods: Definition, types, advantages and health benefits. Types of fermenter and fermentation process.

Unit II- Milk based fermented foods **5L**

Curd, Yogurt, Buttermilk, Shrikhand and cheese: preparation of inoculum, types of micro-organisms and production process

Unit III- Grain based fermented foods **5L**

Bread, Idli, Dosa, Dhokla, Soy Sauce: preparation of inoculum, types of micro-organisms and production process

Unit IV- Other Fermented food products **5L**

Pickles, Sauerkraut, Vinegar, Wine and beer, Fermented meat & fish products

Unit V- Probiotic foods **5L**

Probiotics: Introduction, definition, types and examples, methods of isolation of probiotics microorganisms, Health benefits of probiotic foods

Practical 20**L**

1. Introduction to fermenter
2. Isolation and characterization of *Lactobacillus*
3. Isolation and characterization of *Streptococcus*
4. Inoculum preparation for fermentation
5. Isolation & characterization of yeast
6. Beer/ Wine production
7. Curd & Buttermilk production from milk
8. Sauerkraut production/ Idli/ Dhokla
9. Visit to Milk processing unit

13. To prepare survey report on "Consumption of fermented food product's consumption".

OR

13. Project (15 lectures for project involving field work, laboratory work and library work)

Sample collection form nearby area, Processing and incubation for optimal period and analysis or testing will be performed by students. The report of this study will be submitted as part of the Project work.

- The students are required to undertake a short term research project related to the topics covered under the course and title of project will be decided by the students in consultation with faculty members. A survey of literature and feasibility studies will be undertaken by the students, who plan to undertake a project. Each project will be supervised by a faculty member or a group of faculty members and experts. The students will be guided time to time during the project. This exercise will provide the students with valuable experience of proper planning, executing, evaluating and reporting a research project. The students should be encouraged to publish the findings

14. Other infrastructure available for the course:

1) Nichrome wire loop

2) Microscopes

3) Incubater

4) Autoclave

5) Computer laboratory

6) Seminar Hall

7) Biotechnology Laboratory

8) Glasswares & Nutrient media

15) SUGGESTED READINGS:

1. Kosikowski, F.V. 1997. Cheese and fermented milk foods. Frank Kosikowski and Vikram Mistry, Brooktondale, N. Y.
2. Fox, P.F. 1993. Cheese : chemistry, physics, and microbiology, London ; New York: Chapman & Hall,.
3. Microbiology and biochemistry of cheese and fermented milk. 1997. New York, Blackie Academic & professional.
4. Salminen, S. and A. vonWright. 1993. Lactic acid bacteria. Marcel Dekker, Inc., New York, NY.
5. Wood, J. B. 1985. Microbiology of fermented foods. Volumes I and II. . Elsevier Applied Science Publishers. London, England
6. Joshi, V. K. "Biotechnology Food Fermentation" Volume 1. Educational Publishers&Distributors, 2004.
7. Robert W. Hutkins. "Microbiology and Technology of Fermented Foods", 2nd Edition, Blackwell, 2006
8. Hui Y. H "Handbook of Food and Beverage Fermentation Technology". Marcel Dekker, 2004.
9. Wood, Brian J. B. "Microbiology of Fermented Foods" Volume 1 and 2. II Edition. BlackieAcademic and Professional, 1998.
10. Farnworth, Edward R. "Handbook of Fermented Functional Foods" II Edition. CRC Press, 2008.
11. Ramesh C. Ray and Didier Montet, "Fermented Foods, Part- II Technological Interventions",CRC Press, 2017.
12. N.R. Reddy, "Legume based Fermented foods", CRC Press, 2018.

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Name of Faculty: Science & Technology

Certificate Course in Naturopathy and Cosmetology

Department of Biotechnology

With Effect from: 2022-23

Walchand College of Arts and Science, Solapur (Autonomous)
W.H.Marg, Ashok Chowk, Solapur – 413 006

Certificate Course in Naturopathy and Cosmetology

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1) About the Course:

Naturopathy advocates aiding human system to remove the cause of disease i.e. toxins by expelling the unwanted and unused matters from human body for curing diseases. Nature is the greatest healer. The human body itself has the healing power to prevent itself from disease and regain health if unhealthy. Treatment in Naturopathy is based on the concept of Panchamahabhutas - Earth, Water, Fire, Air and sky (Ether) which form the basic constituents of the body. These elements are used to revitalize and rejuvenate the body and strengthen the immune system against disease-causing agents in and around us.

Naturopathy advocates aiding human system to remove the cause of disease i.e. toxins by expelling the unwanted and unused matters from human body for curing diseases. Nature is the greatest healer. The human body itself has the healing power to prevent itself from disease and regain health if unhealthy.

2) Aim of the Course:

Naturopathy is a distinct primary health care system that stresses upon the body's self-healing mechanism. Naturopathy uses a wide range of therapies to support human wellness. The foundation of Naturopathy is based on the greatness of exercise, sunlight, freshwater, stress management, healthy diet, and so on. Cosmetology is the study and application of beauty treatment.

A cosmetologist is a person who learns and applies these treatments to enhance physical features. Cosmetology is the study and application of beauty treatment. From hair dressing to cosmetics, and manicures/pedicures and Massage Therapy, Cosmetology aims improving people well-being as well as and maintaining an aesthetic healthy skin and body. Cosmetologists can work in a beauty salon or in a spa. Cosmetology involves the study and practice of beauty treatments, including hairstyling, nail care, skin care and makeup. Depending on his or her interest, a cosmetologist can choose to specialize in one or more of these areas

3) Objectives:

The main objectives of Naturopathy are to change the unhealthy living habits of people and to teach them the healthy and positive lifestyle in accordance to the laws of Nature with the effective help of different Naturopathy modalities

- To make students aware about the importance of nature cure and yoga.
- Students will learn the hydropathy and chemotherapy.
- Students will be taught simple techniques of massage treatment and mud treatment.
- Organization of special training program on yoga for health and fitness.
- Field work and training for preparation of Herbal products.

4) Title of the Certificate course: "Certificate course in Cosmetology and Naturopathy"

5) Eligibility: B.Sc.I Biotechnology students of WCAS.

6) Target Group: Open to all

7) Fee structure: As per the decision of AC of College

8) Course Duration: 03 Months

9) Course structure: 60 Lectures (45 Theory + Practical; 15 for Project)

10) Evaluation: The students will be evaluated after the completion of imparting the syllabus by virtue of the following methods: At the end of course, examination will be conducted.

i) Theory paper (objective/short answer type)	=	50 marks
ii) Project Submission:	=	25 marks
iii) Practical paper	=	25 marks

11) Expected Outcomes:

After successful completion of the course, students will be able to:

- Get basic knowledge on various concepts of Cosmetology and Naturopathy.
- Able to do positive thinking and can manage stress level, anxiety.
- Students can improve their lifestyle.
- Can build their health by Yoga and Meditation.
- Can boost their immunity by proper diet and nutrition.
- Able to practice natural beauty remedies by their own.
- Explain personnel finance, entrepreneurship and manage /organize related task in day today work for personal and social growth.

12) Marking scheme & award of grades:

- For the successful completion of course, each student must secure grades as given below:-
- Less than 40% marks: Fail
- Marks between 40-60%: 'B' Grade
- Marks above 60%: 'A' Grade

12. Course Content: Theory and Practical- BT-01 (45 Hours for theory and practical)

Unit I: Three Pillars of life: **[5L]**

I. The power of rest
II. The importance of exercise.
III. The impact of a healthy diet

Physical, nutritional, emotional, social, spiritual, intellectual, financial, and environmental Principles and Practice of Natural Cure.

Unit II: Diet and Nutrition: [5L]

Common Ailments of Diet Cure for: Anemia, Pimples and acne, common cold, fever, cough, constipation, dandruff, Hair fall, diabetes, blood pressure, High cholesterol, Indigestion Intestinal worms, kidney stone, Malaria**.**

Unit III: Diet and Nutrition for health-sprouts and raw foods. [5L]

Healing powers of coloures, health hazards due to foods- Tea, coffee, Sugar, Maida**.**

Unit IV: Cosmetology [5L]

Introduction to cosmetology, Nutrition and health of skin, skincare and treatment, structures and functions of skin problems related to skin, acne, aging, spotting, dermatitis, pigmentation. Cosmetics preparation administration of oils, perfumes, face packs, body lotions, herbal creams facial products, herbal shampoo and conditioner, facial scrubs, hair oil, tooth paste

Unit V: Yoga and Meditation techniques and natural therapy [5L]

Yoga importance and implementation. Different asana, pranayama, Pranic healing processes for healthy living life. Hydrotherapy, mud therapy, massage therapy.

Practical(s): [25L]

1. Management of stress level by meditation.
2. Natural home remedies for common Pimples/Acne/Cough-cold.
3. Natural treatment of acne by multani mitti.
4. Excising for healthy heart by pranayama
5. Preparation of herbal Khadas (tonic).
6. Preparation of oils/perfumes.
7. Preparation of Shampoos/conditioner.
8. Preparation of Calamine lotion
9. Project work

13. Project (15 lectures for project involving field work, laboratory work and library work)

Every student must visit nearby naturopathy center or health care research center. The report of this study will be submitted as part of the Project work.

- The students are required to undertake a project which should be for a maximum duration of 15 days. The area of work will be related to the topics covered under the course and work will be decided by the students in consultation with faculty members. A survey of literature

and feasibility studies will be undertaken by the students, who plan to undertake a project. Each project will be supervised by a faculty member or a group of faculty members and experts. The students will be guided time to time during the project. This exercise will provide the students with valuable experience of proper planning, executing, evaluating and reporting a research project. The students should be encouraged to publish the findings

14. Other infrastructure available for the course:

1) Biochemistry Laboratory
2) Microbiology Laboratory
3) Smart class room
4) Plant tissue culture lab.
5) Autoclave
6) Water bath
7) Vortex
8) Centrifuge
9) Glass plate
10) Dropper
11) Pasteur pipettes

15) SUGGESTED READINGS

1. Naturopathy: The Drugless System of Healing by V.M. Kulkarni, 1986
2. Healthy long life by R.N. Banerjee, 1990
3. Exercising for healthy heart by Paul Vodak, Orient Paperbacks,2011
4. Hearbs for health and beauty, 1997, India Book House Pvt. Ltd.
5. Healing from within; a treatise on the philosophy and theory of nature cure
6. by J.M. Jussawalla. Bombay, Manaktalas [1966]
7. Health and beauty through Aromatherapy by Blossam Kochhar. UBS Publishers Distributors 1994
8. Health Education – A new approach by L. Ramachandran And T. Dharamalingams, S Chand publication, 1976

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Name of Faculty: Science & Technology

Certificate Course in Quality Assurance and Quality Control

w.e.f 2022-23

Walchand College of Arts and Science, Solapur (Autonomous)
W. H. Marg, Ashok Chowk, Solapur – 413 006

Certificate Course in

Quality Assurance and Quality Control

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1) **About the Course:** The Career Oriented Course on Quality Assurance and Quality Control places a strong emphasis on the importance of QA & QC, Testing tools and procedures for overcoming QA problems, and mending methods, as well as practical knowledge about the subject has been incorporated as case studies, practice modules, lectures, online sessions, and discussion, etc. This COC primarily targets post-graduate, and candidates who are already employed in the industry with a strong interest in the QA and QC divisions of the industry. With this understanding, the applicants can aspire to apply with confidence to various industries such as healthcare, quality check divisions of manufacturing units, agriculture, vaccine unit and regulatory authorities.

2) **Aim of the Course:** The primary goal of this COC is to equip applicants with sufficient and relevant knowledge about a variety of quality issues, concerns, industry needs, procedures, legal requirements, and precise understanding for recognizing and resolving quality-related issues that may arise at the workplace.

1) Objectives:

- To gain concepts in QC and QA for food processing and validation of processed food products.
- To Gain knowledge about aseptic operation, containment levels, biosafety, GMP, HACCP in foods, cosmetics and pharmaceuticals.

2) Title of the Certificate course: "Certificate course in Quality Assurance and Quality Control"

3) Eligibility: M. Sc II

4) Target Group: M. Sc Biotechnology, Genetics and Bioinformatics

5) Fee structure: As per the decision of AC of College

6) Course Duration: 03 Months

7) Course structure: 60 Lectures (45 Theory + Practical; 15 for Project)

8) Evaluation: The students will be evaluated after the completion of imparting the syllabus by virtue of the following methods: At the end of course, examination will be conducted.

i)	Theory paper (objective/short answer type)	=	50 marks
ii)	Project Submission :	=	25 marks
iii)	Practical paper	=	25 marks

9) Expected Outcomes

- Understand the basic concepts of Biosafety, GMP, Aseptic Operation and containment.
- Apply the principles of quality assurance and quality control to food, pharmaceutical and beverage industries.
- Analyze the quality control principles and guidelines in pharmaceutical industry for production and handling of products.
- Document, assess and evaluate the QC/QA norms for various industries.

10) Marking scheme & award of grades:

- For the successful completion of course, each student must secure grades as given below:-
- Less than 40% marks: Fail
- Marks between 40-60%: 'B' Grade
- Marks above 60%: 'A' Grade

12. Course Content: Theory and Practical (45 Hours =20 hrs theory + 25 hrs practical)

UNIT-I: BASIC CONCEPTS OF QA AND QC [05]

Aseptic Operation and Containments, Biosafety in Industrial Biotechnology. Health hazards in biotechnology, Freeze-drying of bio-hazardous products, Industrial Safety and Hazard Management in Bio-Technology & related industry - live viruses, bacteria. Quality assurance and Quality control in industry – basic principles involved. Good Manufacturing Practices and Hazard Analysis Critical Control Points (HACCP) in foods, cosmetics and pharmaceuticals.

UNIT-II: QUALITY ASSURANCE [05]

QA of Pharmaceuticals (tablets and capsules): Weight variation; test for hardness; friability; capping; mottling; Test for disintegration and dissolution; Tests for coated and sustained release tablets. QA of Injectables: Sterility testing for pyrogens; particulate matter; volume/weight testing; testing of containers and caps used for packing of injectibles; testing for alkalinity: fibres etc.

QA of In Food And Beverage Industry: Microbiological criteria of food products, beverages and water. Microbial quality assurance, monitoring of factory hygiene and sanitation, microbiological quality of ingredients. Quality assurance and validation principles and their applications in industries. GMP: Concepts of GMP; Basic Components of GMP, types of GMP, Legal requirements pertaining to GMP.

UNIT-III: Quality control [05]

Introduction to QC, Objectives, Basic components of QC, QC activities, WHO GLP, SOPs, Testing and Assessment, International Biological standards, safety testing of pharmaceuticals, Quality control of antibiotics, food & beverages and Agri-products. Critical Process Parameter (CPP), Quality control and validation, Documentation, Deviation and types of deviation, Handling of deviation in Pharmaceutical industry.

UNIT-IV: Quality Standards and Total Quality Management [05]

Principles, features and benefits of TQM, Documentation, Assessment and Evaluation of QA/QC: Document preparation for QA/QC norms of different sectors. Validation of equipments evaluation of possible channels of contamination, QA/QC norms for handling pathological samples, data integrity, Data Management.

Practical(s) (25 hrs):

1) Aseptic Operation and Containments, Biosafety in Industrial Biotechnology
2) Prepare request for material inspection form, material submittal form, installation inspection form, construction control, HVAC checklist.
3) Development of SOPs in different industry.
4) Microbial quality assurance of the pharmaceutical products, Food and Beverage
5) Test for hardness, volume and weight
6) Test for disintegration and dissolution
7) Testing for acidity and alkalinity of the pharmaceutical products.
8) Testing for acidity and alkalinity of the Food and Beverage
9) Practical's based on Good documentation practices (GDP)
10) Design quality assurance plan for pharmaceutical industry
11) Control of inspection, measuring and test of equipment.

13. Project (15 lectures for project involving field work, laboratory work and library work)

The students will collect the QA/QC data .The report of this study will be submitted as part of the Project work.

- The students are required to undertake a project which should be for a maximum duration of 180 days. The area of work will be related to the topics covered under the course and work will be decided by the students in consultation with faculty members. A survey of literature and feasibility studies will be undertaken by the students, who plan to undertake a project. Each project will be supervised by a faculty member or a group of faculty members and experts. The students will be guided time to time during the project. This exercise will provide the students with valuable experience of proper planning, executing, evaluating and reporting a research project. The students should be encouraged to publish the findings.

14. Other infrastructure available for the course:

1) Excellent Laboratories

2) Computer facility with broad band internet

3) Advanced Instruments

4) SOPs

15) SUGGESTED READINGS:

1)Pharmaceutical Quality Assurance, MA Potdar, Nirali Prakashan, Pune
2)Validation of Pharmaceutical process, F. J. Carleton and J. Agalloco, Marcel Dekker Inc.
3)Pharmaceutical Process Validation, Second Ed., Ira R. Ferry & Robert Nash., Marcel Dekker Inc.
4)Quality Planning & Analysis by J. M. Juran and F. M. Gryna, Tata Mcgraw Hill, India.
5)Improving Quality through Planned experimentation by Moen, Tata Mcgraw Hill.
6)Good Manufacturing Practices for Pharmaceutical; A Plan for total Quality Control, 4 th Ed, Sidney willing.
7)Quality Assurance Guide by Organization of Pharmaceutical producers of India. 8.
8)Pharmaceutical Process Validation; By F. R., Berory and Robert A. Nash 9. Impurities
9)Evaluation of Pharmaceutical; Satinder Ahiya Marcel Decker.
10) Quality Control of Packaging material in the Pharmaceutical Industry: Kenneth Harburn, Marcel Dekker.
11) Juran's Quality Control Handbook J.M. Jupron.4th Ed. Good design practices for GMP Pharmaceutical facilities. Andrew A Signature, Marcel Dekker.
12) Methods in Food Analysis by Rui M. S. Cruz, Igor Khmelinskii, Margarida Vieira.
13) Fundamental Food Microbiology, Fifth Edition by Bibek Ray, Arun Bhunia.

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